CATALOGUE OF EGYPTIAN ANTIQUITIES

Numbers 1–160

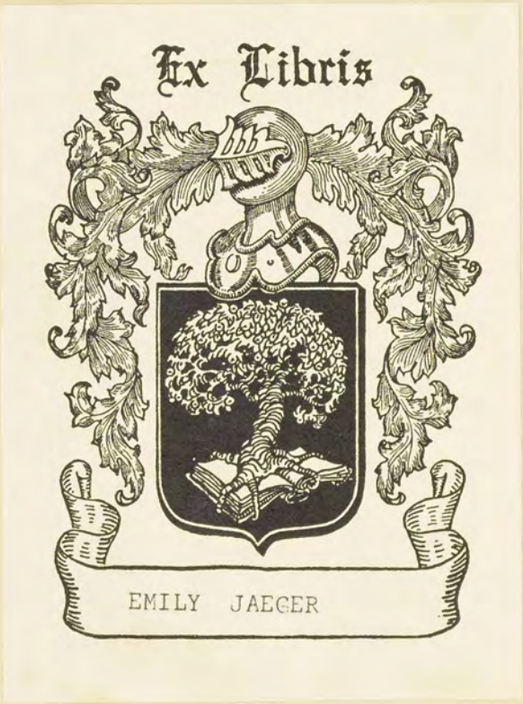
Gold and Silver Jewelry and Related Objects

By

Caroline Ransom Williams

THE NEW YORK HISTORICAL SOCIETY

GER



Pub. at 10¢

Jones
7 52

CATALOGUE OF EGYPTIAN ANTIQUITIES

Gold and Silver Jewelry and Related Objects

THE NEW YORK HISTORICAL SOCIETY

CATALOGUE OF EGYPTIAN ANTIQUITIES

Numbers 1–160

Gold and Silver Jewelry and Related Objects

BY

CAROLINE RANSOM WILLIAMS, PH.D., LITT.D.

SOMETIME ASSOCIATE PROFESSOR OF ART AND ARCHÆOLOGY IN BRYN MAWR COLLEGE;
FORMERLY ASSISTANT CURATOR IN THE EGYPTIAN DEPARTMENT OF
THE METROPOLITAN MUSEUM OF ART; HONORARY CURATOR
OF THE EGYPTIAN COLLECTIONS, THE NEW YORK
HISTORICAL SOCIETY

NEW YORK
1924

PREFACE

This first part of the exhaustive catalogue of the New York Historical Society's Egyptian collection is intended to serve a number of purposes. It will make available to Egyptologists and Classical Archæologists the jewels of the old Abbott collection of antiquities from Egypt, of which some pieces are widely, but inaccurately, known, through the older publications, and others appear in these pages quite unheralded. The book also offers a contribution to the history of metallurgical science in Egypt in the analyses of alloys published and to the history of the jeweler's craft in the record of the technique, which has been studied with the aid of a binocular microscope magnifying 15, 28, and 45 diameters, supplemented by practical experiments, and is explained here in part by means of a sampler and photomicrographic enlargements. The book aims, further, to render Egyptian jewelry more accessible to craftsmen and manufacturing jewelers interested in the history of jewelry or seeking hints for novel and beautiful designs. To this end, not only its plates, but the chronological list of outstanding jewels, accompanied by a bibliography, should be useful. New York users of the book will find the publications cited in the Oriental Room of the Public Library and in the library of the Metropolitan Museum of Art; among them are a surprising number of colored plates, enabling the student to appreciate the colorful designs marking jewels from the Nile Valley. Probably nowhere outside of Cairo may Egyptian jewelry be studied more advantageously than in New York, for the collection of original material in the Metropolitan Museum of Art is large and representative, embracing one lot of magnificent royal jewels of the nineteenth century B. C., and the treasures of its Egyptian "Gold Room" are supplemented by these pieces of the present catalogue, some of them of rare interest, which are now exhibited and labeled with special reference to their technique. Not that I would be understood to recommend the direct copying of Egyptian inlaid pectorals or winged goddesses chased in gold, which invariably look bizarre and exotic taken over into modern jewelry. But a wealth of minor motifs of great charm, derived from Egyptian plant and animal life, has been little utilized by modern designers, many an effective technical process of the ancients has become obsolete, and, above all, the satisfying lines, the balance in the use of mass and color, the excellence of craftsmanship, in the best of these jewels may well quicken the modern creative impulse.

A question which in many Egyptological publications dealing with material from scientific excavations happily does not need to be considered has in the present volume considerable prominence, and that concerns the date of the respective pieces. It is indicative of the advances which have been made in the eighty years since the first catalogue of the Abbott collection was written that today no one acquainted with Egyptian subjects would think of dating the ring containing in its inscription the name of the builder of the Great Pyramid (No. 34) in the Fourth Dynasty. To catalogue a series of objects torn completely from their ancient context, and datable only on internal evidence is also a test—provided that the cataloguer is reasonably

competent—of the state of present-day knowledge of ancient Egypt. One great task of scientific excavation is to establish the chronological sequence and limits of the various kinds of material remaining from antiquity—a task, which in Egypt was not even begun in Dr. Abbott's time, but which today may be said to be accomplished in the large, although still in progress with respect to details. Confronted with an unusual object dissociated from external data, or even with an object not so unusual, one still often must piece together scattered and all too meager evidence in the endeavor to interpret and place it. But thus, gradually, with the help of the ever-growing number of exact records of well-conducted excavations, the details of Egyptian archæological science are being worked out.

The statements of provenience under the different catalogue numbers are taken from the old catalogues of the Abbott collection and are given for what they are worth, except in a few instances when contradicted by the evidence of the objects. The old records are silent, however, about the find-spots of many objects. Especially unexpected, is the presence among the Abbott jewels of the Greek originals (Nos. 85-9) of some of Haller von Hallerstein's drawings published long ago by Fraenkel. I have not included in the text dimensions which are quite, or nearly, as accurately given in the plates as they can be measured with a rule. In the spelling of Egyptian personal names I have followed the standards set in Professor James Henry Breasted's various books, with which, of all writings on Egypt, American readers are most familiar. The dates given for the dynasties are in agreement with the convenient chronological table at the close of Breasted's *A History of Egypt,* second edition, fully revised, New York, 1909. I would point out, however, that the dates for the earlier dynasties represent a conservative minimum, and that in a system of chronology elaborately worked out by Dr. Ludwig Borchardt they are pushed back much farther: *Die Annalen und die zeitliche Festlegung des alten Reiches der ägyptischen Geschichte,* Berlin, 1917. Any eventual consensus of opinion on this difficult subject will no doubt take into consideration Professor Breasted's recent discovery of the names of ten predynastic kings who ruled over a united Egypt before the unification under the southern king Menes. These kings are listed on the Cairo fragments of the early annals known as the Palermo Stone.

Phrases and passages from ancient texts are quoted usually in Professor Breasted's or Dr. Alan H. Gardiner's excellent translations; always a footnote gives the reference for the translation and commonly also for the Egyptian text.

Many specific obligations are acknowledged in the course of the text, but I take much pleasure in thanking here those who have helped me repeatedly: Professor Adolf Erman and Dr. Hermann Grapow, who have given me data from the files of the Berlin Dictionary of Egyptian; Mr. F. Ll. Griffith for the loan for study purposes of photographs from the Oxford excavations in Nubia; M. Jean Capart for a copy of the section of his bibliographical *fiches* which concerns jewelry; many members of the staffs of the Metropolitan Museum of Art, New York, and the Museum of Fine Arts, Boston; Professor Breasted and Dr. T. George Allen for the use of the library and files of the Oriental Institute of the University of Chicago; Mr. Herbert P. Whitlock, Curator of Mineralogy, in the American Museum of Natural History, New York. For opportunities to see something of modern processes in working gold and silver I am indebted to the following firms: Cartier, Fifth Avenue, New York; The Gorham Company at their factory, Providence, R. I.;

Handy and Harman, Gold St., New York; Mr. Charles R. McLeod, New York, and Mr. Daniel Froeschauer, Brooklyn, gold-beaters; The S. S. White Dental Manufacturing Company, Prince Bay, Staten Island.

The analyses published under Nos. 35, 45, and 81 and that of silver of the period of Ramses II on page 29 were made as a courtesy to the New York Historical Society by Dr. J. Edward Whitfield of the firm of Booth, Garrett and Blair, Analytical and Consulting Chemists, Philadelphia. For the composition of a specimen of prehistoric silver, published page 28, I am indebted to M. Capart, whose colleague, Professor Huybrechts, of the University of Liége, was so kind as to make the analysis. All the other analyses given in the book are the work of Mr. W. A. Nyland of Columbia University who used the microchemical method, since this method has the advantage that it is possible to analyze small quantities of metals by studying their compound formations (in crystalline form) with aid of the microscope. The specific gravity tests were accomplished by the method of weighing in air and water with correction for temperature.

The line drawings reproduced in Plates X and XI were made by Mr. Lindsley F. Hall of the Egyptian Expedition of the Metropolitan Museum with the kind permission of the Director of the Expedition, Mr. A. M. Lythgoe, and I owe to the courtesy of Mr. Lythgoe and Mr. Hall also the drawings of the hieroglyphs used in the text of No. 34. The photographs in the size of the originals published in the plates were taken by Mr. Peter A. Juley. The photomicrographs of Plate I were made in the American Museum of Natural History; all the other photomicrographs were done by Mr. A. Tennyson Beals, who even took the trouble to go to Boston with his apparatus to photomicrograph the gold wires from the tomb equipment of the Second Dynasty king Khasekhemui (Plate XXII), published here by kind permission of the authorities of the Boston Museum. The modern sampler in brass (Plate XXXVIII) is almost exclusively the work of Mr. Paul W. Hoffmann, the able preparator responsible for cleaning and mounting all the jewels, from whom I received help particularly in the beginning of my study of technique. Nos. 47 and 70 of the sampler, however, and Plate XXXVII (except H) represent the results of experiments on the part of Mr. John P. Heins, of the Department of Fine Arts of Columbia University, who, as a practical worker in gold and silver and teacher of metal-crafts, has been my main stay in the study of the technique, giving my text on this subject valuable criticism and trying out for me in actual work many debatable questions. The collotypes and photolithographic plates of the volume were executed by Mr. E. O. Cockayne of Boston.

CAROLINE R. WILLIAMS.

Toledo, Ohio
December 1, 1922

NOTE ON ABBREVIATIONS

All personal names and titles of books and journals are cited once in full, afterwards in abbreviations readily understood by readers familiar with the literature of Egyptology and Classical Archæology. The full citation may be located by reference to the General Index under the abbreviation.

TABLE OF CONTENTS

INTRODUCTION

The craft of jewelry-making had an importance in ancient Egypt which is hardly paralleled in modern life. Not only were women then quite as fond of personal adornment as they are at the present time and not only were men more accustomed to wear jewels than they are today, but the ancient Egyptian jeweler had other patronage. He must exercise his very greatest skill in the service of the gods and he must prepare jewels of all degrees from the cheapest to the best for burial with the dead. Very naturally, too, in the era before the invention of coinage, much of the metallic and mineral wealth of the country was wrought into jewelry and the rewards bestowed on the successful soldier and administrator by his king were frequently articles of jewelry.

Many of the foregoing statements in their bearing on Egypt, and other facts to be commented on presently, are well-documented in the texts and vividly illustrated in the art of the country.[1] A local magnate of the First Cataract, Sebni, received from the Sixth Dynasty king, Pepi II (about 2500 B. C., or earlier), for a successful expedition into Nubia, together with other rewards, *the gold of praise*.[2] The inscription does not say in what form the gold was delivered to Sebni, but two centuries earlier, in King Sahure's and King Nuserre's funerary temples, on the walls of the storerooms where treasure was kept, had been depicted, in reliefs preserved in part to this day, the formal presentation of royal gifts of jewelry—bead collars of several varieties, diadems, and a cylinder seal; the recipients are shown in humble attitude of expectation, or carrying in the hand, and fastening on the person, jewels already received, and the scenes are labeled: *The receiving of gold*.[3] The noblemen in like manner bestowed gifts of jewelry upon their dependents; one such scene, a relief from a private tomb, now in the Louvre, bears the legend, *The giving of gold*.[4] Later on, two heroes of the war of the expulsion of

[1] The literary passages and the pictorial material have never been worked through systematically in connection with surviving Egyptian jewelry. M. Capart in *Leçons sur l'art égyptien,* Liége, 1920, p. 472, expressses regret that no one has yet collected the pictorial evidence about the jewelry of the brilliant period of the XVIIIth Dynasty. Suggestive of the discoveries to be made in the texts is Professor Kurt Sethe's essay "Hitherto Unnoticed Evidence Regarding Copper Works of Art" in *The Journal of Egyptian Archaeology* (published by the Egypt Exploration Fund, since 1919 the Egypt Exploration Society; cited hereafter as *J.E.A.*), London, Vol. I (1914), pp. 233-6. We ourselves have gathered much material both from the monuments and texts, but out of space-consideration we abandoned our first intention to include in this Introduction an historical sketch of the development of Egyptian jewelry.

[2] Hieroglyphic text: Sethe, *Urkunden des alten Reichs. I* (Vol. I of *Urkunden des ägyptischen Altertums,* edited by Georg Steindorff), Leipsic, 1903, p. 139. Translation: Breasted, *Ancient Records of Egypt. Historical Documents from the Earliest Times to the Persian Conquest, Collected, Edited, and Translated with Commentary,* Chicago, 1906, Vol. I, §372.

[3] Borchardt, *Das Grabdenkmal des Königs Sahu-re,* Vol. II, *Die Wandbilder* (26te wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft), Leipsic, 1913, pp. 60-64, 121, Pls. 52-4 and Borchardt, *Das Grabdenkmal des Königs Ne-user-Re* (7te Veröffentlichung. D. O. G.), Leipsic, 1907, p. 76, Fig. 51.

[4] Borchardt, *Sahu-re,* II, p. 63, Fig. 9 = Fig. 13, p. 25 in: Luise Klebs, *Die Reliefs des alten Reiches (2980-2475 v. Chr.), Material zur ägyptischen Kulturgeschichte (Abhandlung der Heidelberger Akademie der Wissenschaften. Philosophisch-historische Klasse)*, Heidelberg, 1915. Cf. the Cairo archaistic relief of the second half of the 4th cent. B.C., with legend "The giving of gold" in *Le Musée Egyptien. Recueil de monuments et de notices sur les fouilles d'Egypte,* published by G. Maspero, Vol. II, Pt. 2, Cairo, 1906, Pls. XXXV, XXXVI; also Borchardt, *op. cit.,* Fig. 10.

the Hyksos (sixteenth century B. C.) in their inscriptions were explicit as to the rewards given them, Ahmose, son of Ebana, saying,[5] *I was presented with gold seven times in the presence of the whole land,* and enumerating, besides, in detail, the occasions when he received the *gold of valor* or *gold in double measure,* and Ahmose-Pen-Nekhbet, telling the form in which the gold came into his possession[6]—from Amenhotep I, *of gold, two rings,*[7] *two necklaces,*[8] *a bracelet,*[9] *a dagger, a diadem, a fan, and a mekhtebet;*[10] from Thutmose I, *of gold, four rings,*[7] *four necklaces,*[8] *one bracelet,*[9] *six flies,*[11] *three lions,*[12] *of gold, two axes;* finally, his rewards under Thutmose II, *of gold, four rings,*[7] *six necklaces,*[8] *three bracelets,*[9] *a mekhtebet;*[10] *of silver, two axe-blades.* Around 1400 B. C., and subsequently for many years, the king, often accompanied by the queen and royal children, when about to be-

[5] Text: Sethe, *Urkunden der 18. Dynastie* (Part IV of Steindorff, *Urkunden*), Leipsic, 1906, pp. 1-11. Translations: Breasted, *Records,* II, §§ 6-16, 39, 80-82; (into German), Sethe, *Urkunden der 18. Dynastie. I. Bearbeitet und übersetzt,* Leipsic, 1914, pp. 1-6.

[6] Text in Sethe, *Urkunden,* IV, 32-9; translations: Breasted, *Records,* II, §§ 20-25, 41, 42, 84-5, 124, 344; Sethe, *Urk. übersetzt,* pp. 17-21; in particular pp. 38-9 of text and §§ 21-4 of Breasted's translation; the list of awards exists in three ancient copies varying slightly among themselves. Cf. the analogous lists in Sethe, *Urk.,* IV, 892-3; Breasted, *Records,* II, §§ 585, 587.

[7] This XVIIIth Dynasty word  terminates with a picture sign of a plain hoop or ring, therefore does not denote a signet ring nor ring with ornate bezel; Professor Breasted interpreted it as a "bracelet." All that the phonetically written and pictorial parts of the word together convey is the idea of a "reward" or "present" in the form of a plain ring. It might then refer to plain hoop finger rings or hoop bracelets, but our guess is that it was a name for the rings so frequently depicted in scenes of weighing, which to a considerable extent took the place of ingots of compact form, and which are known to have been used as a medium of exchange. We think it extremely probable that these rings had their origin in primitive jewelry. On the hieroglyph representing them, occurring on stone weights used in weighing gold, see Heinrich Schäfer, *Zeitschrift für ägyptische Sprache und Altertumskunde,* (hereafter cited as *Ä.Z.*), Leipsic, Vol. 43 (1906), pp. 70-71.

[8] The pictorial part of the writing here, at least as autographed, is not quite decisive as to whether a broad collar, or single-string necklace, or bracelet is intended, but in Sethe, *Urkunden,* IV, 893, l. 11, a well-known type of necklace of large lenticular beads is clearly shown.

[9] The Egyptian word is not the generic "bracelet" but the name of a particular form of bracelet well indicated here in the writing, represented often in Egyptian art, and known in extant specimens of gold; one of the actual bracelets is in the treasure of Queen Ahhotep. See Emile Vernier, *Bijoux et orfèvreries* (*Catalogue général des antiquités égyptiennes du Musée du Caire,* cited hereafter as Cairo *Catal.*), Pt. I, Cairo, 1907, (cited hereafter as *Bijoux,* I), No. 52073, Pl. X. Cf. Schäfer, with collaboration of Georg Möller and Wilhelm Schubart, *Ägyptische Goldschmiedearbeiten* (Vol. I of *Mitteilungen aus der ägyptischen Sammlung,* Berlin Museums), Berlin, 1910, p. 24 and Fig. 11.

[10] Professor Breasted did not translate the word nor did Professor Sethe in the German rendering of this passage, but in a footnote Sethe referred to the final picture sign as that denoting "stone," possibly having in mind an ingot of one of the semi-precious stones as the meaning of the word. The question is complicated by the ambiguity of the Egyptian text, as it is uncertain, especially in the list of Thutmose I's gifts, where "gold" is repeated before "axes," whether or not all the gifts, except the silver axe-blades are to be understood as wholly of gold. Dr. Grapow, *Über die Wortbildungen mit einem Präfix m- im Ägyptischen* (*Abhandlung der Königl. Preuss. Akademie der Wissenschaften. Phil.-hist. Klasse*), Berlin, 1914, p. 27, defined the word as an "Art goldenes Schmuckstück" and Professor Sethe earlier (*Ä.Z.,* Vol. 48, 1910, p. 143) had rendered it with "Platten." Following this last suggestion, we should like to see in the final sign, not the usual rectangular determinative of "stone," but a bar or ingot of gold, or a rectangular piece of sheet gold—again as in the "rings," the gold as unworked material, which could be used to buy land and goods or could be wrought into vessels and jewelry.

[11] See under Nos. 4 and 5 and the following note.

[12] Sethe, *Ä.Z.,* Vol. 48, p. 143, who cites: Jean François Champollion, *Monuments de l'Egypte et de la Nubie: Notices descriptives conformes aux manuscrits autographes rédigés sur les lieux,* Vol. I, Paris, 1844, p. 528, tomb 36 at Thebes, reproducing an ancient picture of a man wearing two figures of standing lions suspended from the neck and a broad collar, including in its make-up two large flies.

stow jewelry, appeared in a second-story loggia of the palace, from which he threw down the gifts.[13] These occasions were of great moment in the life of the courtiers and became a stock subject of tomb decoration at Tell el-Amarna and Thebes,[14] and even formed the theme of a casual drawing on a limestone flake;[15] modern interest in them is enhanced by the recent fortunate discovery of parts of the actual audience balcony of Merneptah's palace at Memphis.[16]

The station of jewelers and gold-workers in Egyptian society is a fascinating subject. Certainly in the New Kingdom (1580-1150 B. C.), and possibly as early as the Old Kingdom[17] (2980-2475 B. C., or earlier), in common with other artists and craftsmen, they belonged to an independent middle class. Below them in the social scale at all times were the peasant serfs attached to the soil; above them in the older periods were the landed nobility, and in the New Kingdom, after the disappearance of the landed nobility, the higher government officials, whose lower ranks were often recruited from the middle class.[18] Makers of jewelry in particular are seldom mentioned in the texts, but the comprehensive title *Goldsmith* (*nby*) is a common one, and several of the goldsmiths of Thebes under the New Kingdom were affluent enough to secure rock-hewn tombs[19] and others were able to provide for themselves and relatives a burial equipment, of which some pleasing art-objects have survived to modern times. Such are two statuettes in Berlin, representing the goldsmiths Simut and Siese,[20] kneeling with hands raised in the ritualistic position for

[13] See briefly *Life in Ancient Egypt,* described by Erman, translated by H. M. Tirard, London, 1894, p. 182, now superseded for readers of German by *Aegypten und aegyptisches Leben im Altertum* by Erman, revised by Hermann Ranke, Tübingen, 1923, pp. 80-81.

[14] See Mr. N. de Garis Davies' enumeration of instances in *The Bulletin of the Metropolitan Museum of Art,* New York, July, 1920, Part II, p. 30, Figs. 3, 4, and the references for one of the scenes at Amarna given in our note 11, p. 77.

[15] Schäfer, *Jahrbuch der Königl. Preuszischen Kunstsammlungen,* Berlin, Vol. 37 (1916), p. 41, No. 66, Fig. 21 and *Amtliche Berichte aus den Preuszischen Kunstsammlungen,* Berlin, Vol. XL, Dec. 1918, Fig. 22. Also Davies, *loc. cit.,* Fig. 5.

[16] By Mr. Clarence S. Fisher. See preliminary account, *The Museum Journal* (University of Pennsylvania), Philadelphia, Vol. VIII (1917), p. 222. On the longer known actual loggia in the palace of Ramses III at Medinet Habu, Thebes, see: Uvo Hölscher, *Das hohe Tor von Medinet Habu* (12. wissenschaftliche Veröffentlichung der D. O. G.), Leipsic, 1910, p. 50 and Schäfer, *Amtliche Berichte,* XL, col. 43, Fig. 23.

[17] Breasted, *History,* p. 85.

[18] Breasted, *op. cit.,* pp. 245-6. But for the scorn which the Egyptian scribe felt for all workmen who labored with their hands, to whom, for lack of learning, a career as an official was closed, see Erman-Ranke, *Aegypten,* p. 533, quoting a passage of Middle Kingdom poetry which is directed in particular against workers in metal.

[19] Gardiner and Arthur E. P. Weigall, *A Topographical Catalogue of the Private Tombs of Thebes,* London, 1913, Nos. 114, 165, 169, 189. They are not, to be sure, among the more imposing tombs, as three are entirely unpublished and Mr. Davies describes No. 165 as "a small chamber, less than 12 feet by 6 and only man's height, . . . with decoration of a very summary character." See *Five Theban Tombs* (XXIst Memoir. Archaeological Survey of Egypt, a branch of the Eg. Expl. Fund, edited by F. Ll. Griffith), London, 1913, p. 40. Mr. Lindsley F. Hall was so kind as to visit the other three and reported to us that they conform to the usual type "of a transverse chamber after the vestibule or wide-jambed entrance, then a longitudinal chamber with sculptured walls, and another transverse one." No. 114 is about 10 meters from entrance to back, No. 169 rather more than 10 m. In No. 114, the only decoration is about the entrance and in the first chamber. No. 169 is now part of a native residence; the first chamber has the ceiling cut out in the shape of a barrel vault, decorated in color, but little evidence is left of the original state of the side walls; the longitudinal chamber has a flat decorated ceiling and offering bearers painted on its north wall; there is a niche and pit (descending to the burial chamber) in the back room. No. 189 is a rather well sculptured tomb.

[20] Inventory numbers 2312 and 2314; *Ausführliches Verzeichnis der aegyptischen Altertümer und Gipsabgüsse,* Berlin, 2nd ed., 1899 (cited hereafter as Berlin *Verzeichnis*), p. 142; Günther Roeder, *Aegyptische*

uttering a hymn of praise; inscribed on stelae before them are the words which they are conceived to be chanting, in the one instance in praise of the Sun-god at his setting, in the other, acclaiming the morning Sun. Indeed, a long list of names of ancient Egyptian goldsmiths could be compiled from their extant monuments,[21] and from scenes in which they are represented and identified by legends,[22] but in no instance is it possible to associate the name of any one of them with the actual products of his art. Three of the men who acquired rock-hewn tombs were in the employ of the eminent Theban god Amon, bearing the title *Chief of the Gold-Workers of the Estate of Amon* and being thus accredited, each in his day, as the most skillful workman in decorating with gold the god's cultus shrines and barks, in making articles of adornment for his cultus statues, and the like. The Theban Baki of Tomb 18 of the modern numbering, if one may judge by his title *Chief Servant Who Weighs the Silver and Gold of the Estate of Amon,* was an administrative officer, not a craftsman. Other officers high in the realm were over such as Baki in the control of supplies: one Wersu, *Superintendent of the Mountain Lands of Gold of Amon;* and, bearing the same title, Huy, Viceroy of Kush, in the late Eighteenth Dynasty under Tutenkhamon (about 1350 B. C.), and the Viceroy of Kush (Ethiopia) who became the later king Seti II (about 1209 B. C.).[23] One of the Theban goldsmiths was also a *Portrait Sculptor,*[24] but the "portraits" he made were perhaps wrought or cast of precious metals, rather than carved in stone or wood; such a portrait figure of a young boy in electrum, dating from about 1550 B. C., a piece of considerable artistic merit, was found by the late Earl of Carnarvon at Thebes,[25] long before his great discovery which excited the world in the winter of 1922 to 1923. Let us not think of these Egyptian goldsmiths as organized into guilds; rather, a man's occupation was an affair of family, handed down from father to son, and very likely many a secret of technique was kept within a given family from generation to generation, much as in modern times the best method of preparing gold-beater's skin has remained the possession of the Partridge family in London. The Louvre Museum has an inscribed stela naming two goldsmiths, father and son,[26] and other similar examples could be given. In the allied

Inschriften aus den Königlichen Museen zu Berlin, Vol. II, Pt. 1, Leipsic, 1913, p. 51; Alexander Scharff, *Aegyptische Sonnenlieder übersetzt und eingeleitet,* Berlin, 1922, pp. 76, 75. On this class of statuettes, interpreting their pose: H. E. Winlock, *J.E.A.,* Vol. VI (1920), pp. 1-3.

[21] At the moment we can lay our hands on: (a) Thenena, who dedicated a very fine little copper figure of his brother, one now in the Athens Museum; see F. W. von Bissing, in *Mitteilungen des Kaiserlich Deutschen Archäologischen Instituts. Athenische Abteilung,* Athens, Vol. XXXVIII (1913), pp. 239 ff.; (b) Amenhotep, a Chief Goldsmith of Amon, whose name is preserved on an especially handsome amulet of green felspar; see J. E. Quibell, *The Ramesseum,* (IInd Publication. Egyptian Research Account, 1896), London, 1898, p. 21, Pl. XXX A, 4 and *Annales du Service des Antiquités de l'Egypte* (hereafter, cited as *Annales*), Cairo, Vol. XI (1911), p. 172.

[22] So the goldsmith [Amen]emhab, see p. 64 note 6 of: *The Tomb of Amenemhēt (No. 82)*, Copied in Line and Colour by Nina de Garis Davies and with Explanatory Text by Gardiner (First and Introductory Memoir, the Theban Tomb Series, Edited by Norman de Garis Davies and Gardiner, published under the auspices of the Eg. Expl. Fund), London, 1915.

[23] Griffith in *J.E.A.,* Vol. II (1915), p. 6.

[24] Of tomb 165, see above n. 19.

[25] Frontispiece and p. 75 in: The Earl of Carnarvon and Howard Carter, *Five Years' Explorations at Thebes. A Record of Work Done 1907-1911,* London, 1912; see also p. 103, No. 2, Pl. XV in: *Catalogue of an Exhibition of Ancient Egyptian Art* (Burlington Fine Arts Club), London, 1922.

[26] Paul Pierret, *Recueil d'inscriptions inédites du Musée Egyptien du Louvre,* Pt. II (*Etudes égyptologiques,* Pt. 8), Paris, 1878, p. 51, C 83.

crafts, too, whole families were united, as seen in the famous "Tombeau des graveurs", No. 181 at Thebes, about which Mr. N. de Garis Davies has written [27] pointing out that no evidence exists here for an organization of artists in guilds or schools, but that the two artists celebrated in this tomb were the successive husbands of one woman, who presumably was the moving spirit in the double tomb-memorial; the brother of one of the men was also an artist. We think of Egyptian artificers as often working in their own houses, just as did the makers of amulets in the compound of necropolis workmen excavated at Amarna.[28] In the instance of the goldsmiths, however, the value of the property involved must usually have led to their activities being transferred to the palace or temple, where their materials and products could be guarded; in the temples, they often worked in the *House of Gold,* a combined treasure house and workshop, to which reference is frequent.[29] We have reason to suppose also that a particularly adept craftsman sometimes traveled from temple to temple, as one of these men, an engraver, enumerated in his inscription thirty cultus statues in various places on which he had worked.[30]

Egyptian art affords many a glimpse of craftsmen, including the jewelers and gold-workers,[31] at their tasks. These animated pictures transport us into the very spirit of the ancient workshops. We see the men shield their faces from the heat, as the tongues of flame dart about the crucible, we sense the force and swing of the gold-beaters'

[27] *Bull. M.M.A.,* December 1920, Part II, p. 34.

[28] C. Leonard Woolley in *J.E.A.,* Vol. VIII (1922), p. 56.

[29] Schäfer, *Die Mysterien des Osiris in Abydos unter König Sesostris III nach dem Denkstein des Oberschatzmeisters I-cher-nofret im Berliner Museum* (*Untersuchungen zur Geschichte und Altertumskunde Ägyptens,* edited by Kurt Sethe, IV, 2), Leipsic, 1904, p. 15, n. 3; Davies-Gardiner, *Amenemhēt,* p. 58, n. 1, citing the data given by Schäfer.

[30] Schäfer, *Mysterien, loc. cit.* The New York Historical Society possesses a large limestone relief of the Eleventh Dynasty king Senekhkere, found at Hermonthis, which is so similar in style to another relief of this king discovered one hundred and thirty-five miles to the south on the island of Elephantine as to require us to assume that the same artists executed the two sets of temple relief. See *The New-York Historical Society. Quarterly Bulletin,* New York, Vol. II (1918-19), pp. 17 ff.

[31] Old Kingdom (2980-2475 B.C.): scenes conveniently listed, with bibliography, in L. Klebs, *Reliefs,* pp. 84-6.

Middle Kingdom, Dyn. XII (2000-1788 B. C.); Percy E. Newberry, *Beni Hasan,* Pt. I (Ist Memoir. Arch. Survey of Egypt), London, 1893, Pl. XI; *Beni Hasan,* Pt. II (IInd Memoir), 1894, Pls. IV, XIV; also Sir J. Gardner Wilkinson, *The Manners and Customs of the Ancient Egyptians,* revised and corrected by Samuel Birch, London, 1878, Vol. II, p. 234. In the proof we add a reference to Klebs, *Die Reliefs und Malereien des mittleren Reiches* (*Abhandl. der Heidelberger Akademie. Philosophisch-histor. Klasse*), Heidelberg, 1922, pp. 108-113.

New Kingdom, Dyn. XVIII (1580-1350 B. C.). Scenes in the tomb of Rekhmire: in full, in line cuts, Ph. Virey, *Le tombeau de Rekhmara* (*Mémoires publiés par les membres de la Mission Archéologique Française au Caire,* cited hereafter as *Mémoires. Mission,* Vol. V, Pt. 1), Paris, 1889, Pls. XIII—XVI; Newberry, *The Life of Rekhmara; Vezîr of Upper Egypt under Thothmes III and Amenhetep II* (*circa B.C. 1471-1448*), Westminster, 1900, Pls. XVII, XVIII; in part in colors in the older publications, Frédéric Cailliaud, *Recherches sur les arts et métiers,* Paris, 1831, Pls. 6 B, 10; I. Rosellini, *Monumenti dell' Egitto e della Nubia,* Atlas Vol. II, Pisa, 1834, Pls. L, 2 a-c, LII, 4, 5 = Champollion, *Monuments de l'Egypte et de la Nubie,* Atlas Vol. II, Paris 1845, Pls. CLXIII, 2-4, CLXV, 4, CLXVI, 2; Prisse d' Avennes, *Histoire de l'art égyptien d' après les monuments,* Atlas Vol. II, Paris, 1878, section "Peinture," Pls. 10, 11; excerpts, Vernier, *La bijouterie et la joaillerie égyptiennes* (cited hereafter as *Bijouterie*) = Vol. II of *Mémoires publiés par les membres de l'Institut Français d' Archéologie Orientale du Caire,* cited hereafter as *Mémoires. Institut,* Cairo, 1907, Figs. 2-5; Wilkinson, *Manners and Customs,* ed. Birch, Vol. II, pp. 235 (No. 415), 312, and elsewhere frequently. Scenes from other tombs: V. Scheil, *Tombeaux thébains de Mâi, des graveurs, etc.,* (*Mémoires. Mission,* Vol. V, Pt. 4), Paris, 1894, in "Tombeau des graveurs," Pl. II; Davies, *The Tomb of Puyemrê at Thebes,* Vol. I (M. M. A. Robb de Peyster Tytus Memorial Series, Vol. II), New York, 1922, pp. 71-6 and references in footnotes, Pls. XXV-XXVII; excerpts, Davies, *Bull. M.M.A.,* Dec., 1920, Pt. II, pp. 37-40, Figs. 8-11.

Late period (after 1000 B.C.): see the references of n. 16, p. 200.

blows, from the accompanying legends we catch snatches of the conversation, as one workman says, *It is very beautiful, comrade,* or another is admonished, *Hurry, make it ready,* or *Beat hard!* [32] In the period of the Old Kingdom, dwarfs are occasionally represented busying themselves with jewels. In those days pygmies imported from the upper Nile regions [33] occupied a position in the Egyptian court affording points of comparison with that of the seventeenth century dwarfs immortalized by Velasquez. The nobleman aped his royal master in attaching, if possible, one of these droll and curious beings to his person.[34] The dwarf's offices perhaps included that of taking care of the master's jewels [35] and sometimes he was employed in the lighter tasks of jewelry-making, as in assembling the parts of a bead collar,[36] but he was never given such heavy work as gold-beating.

In the materials employed ancient Egyptian jewelry differs from nearly all present-day jewelry. Platinum as a separate metal was unidentified and therefore in the more valuable jewels [37] gold or silver was invariably used, whether alone, as in the lovely gold circlet catalogued here as No. 2, or inclosing gem-stones, which were always semi-precious, rather than precious. Glitter and highly-reflecting surfaces were absent, as the gold and silver were given a matt, not a brilliantly polished, finish, and the stones were never faceted. Besides semi-precious stones, especially after 1500 B. C., glass imitating these stones with varying success, was set in gold of high carat (Nos. 18, 19); garnets were so well imitated by Egyptians and Greeks (No. 85) as often to escape detection; carnelian, also, was well reproduced in glass (No. 19) and so was turquoise—according to some authorities at a very early time (compare page 22); lapis lazuli was less well imitated because of the mineral inclusions veining the natural rock, which usually were not rendered in glass, although the characteristic deep blue color was caught (Nos. 19, 24). No such sharp distinction between the value of stones and the value of glass was felt as at the present time and in the Egyptian use of glass the jewels were seldom cheapened in effect. The aim was to produce a beautiful pattern of color and always the gold enriched and harmonized the whole. Carnelian, turquoise (or amazon stone), and lapis lazuli, inlaid in gold, were a frequent combination, or, omitting the red, the light blue and dark blue were combined with gold as in No. 104 or red and dark blue with yellow as in No. 3. The Egyptians never introduced

[32] These legends, very difficult of translation, are treated in: Erman, *Reden, Rufe und Lieder auf Gräberbildern des alten Reiches* (*Abhandlung der Preuss. Akad. der Wissenschaften, 1918. Phil.-hist. Klasse,* No. 15), Berlin, 1919, especially §§ 24, 27, 28.

[33] A letter written by the child-king Pepi II, expressing eagerness to see a dancing dwarf and giving directions for his safe transportation, is preserved at the First Cataract of the Nile in the tomb inscriptions of the noble to whom it was addressed; text: Sethe, *Urkunden,* I, 128-31; translation: Breasted, *Records,* I, §§ 351-4; see also Breasted, *History,* pp. 140-1, Fig. 75. The practice of keeping dwarfs at court originated before 3000 B.C., for deformed bones of dwarfs have been found in royal tombs of the Ist and IInd Dynasties.

[34] The dwarf is seen in the reliefs standing next the master's chair, sometimes with pet animals, or accompanying the master out of doors, when the latter usually is borne in a litter and the dwarf follows on foot with the dogs or monkeys on a leash, etc. See L. Klebs, *op. cit.,* pp. 32-3.

[35] So Griffith in *The Tomb of Ptah-hetep,* copied by R.F.E. Paget and A. A. Pirie (Egypt. Res. Acc., 1896), London, 1898, p. 27, Pl. XXXV; but cf. L. Klebs, *loc. cit.,* who interprets all the scenes of dwarfs handling jewels as scenes of manufacturing.

[36] J. de Morgan, *Recherches sur les origines de l'Egypte,* Vol. I, Paris, 1896, cut on p. 199 = Klebs, *op. cit.,* Fig. 68 = Breasted, *History,* Fig. 41 = *Bull. M.M.A.,* Vol. XIII (1918), cut on p. 287.

[37] We use the word "jewel" in this book in its early sense as a "costly ornament," one which may consist only of gold or silver or may contain a gem-stone.

amethyst into their multiple-colored jewels, as its color does not combine well with the colors of the other stones which they possessed, but, especially in the Twelfth Dynasty (2000-1788 B. C.), they used amethyst much for beads, and often set it off by gold caps; haematite was similarly employed. Also garnets were used for beads and were introduced sparingly into complex pieces, as for the eyes of the gold cobra, which was worn on the king's brow. Many pleasing adornments were produced wholly, or partially, of glazed steatite (No. 20) and even of glazed pottery. In the Classical period, Oriental pearls became common (Nos. 56, 67), and also were imitated in glass (Nos. 59-61), and a few precious stones became known; emerald was now very popular and this gem, too, was reproduced in glass (No. 65). In late Roman times, a beginning was made in faceting stones, although the older cabochon cut was more in favor (compare under No. 43). Engraved gems, very rare in Pharaonic Egypt, were among the greatest specialties of Greek and Roman jewelry, in Egypt as elsewhere (Nos. 88, 89).

The principal articles of jewelry in ancient Egypt were diadems or circlets to confine and ornament the hair or wig, broad collars, necklaces, armlets, bracelets, finger rings, and girdles, worn by both men and women,[38] and anklets, usually restricted to women's adornment.[39] Earrings were introduced from abroad comparatively late. Brooches and pins, which in the colder climates of the north were so important for fastening the clothing,[40] were exceedingly rare in Egypt[41] and very

[38] Some differences of practice on the part of men and women there were, of course. We cannot go into many details here but may note as an illustration that the king's girdle was an elaborate creation worn on public occasions and was of a design appropriate to his exalted royal station; the woman's girdle of various distinctive patterns was worn over the unclothed body, publicly by dancing women and serving maids, and in the privacy of the harem possibly by ladies (so Winlock, in *Ancient Egypt,* London, 1920, pp. 80-84). In the Vth Dyn., bracelets seem to have been confined to women's use; in the VIth Dyn. and later, men, too, regularly wore them. Excavators have sometimes observed in a series of graves a greater elaboration in the ornaments given to women than in those given to men, thus in: R. Randall-MacIver and A. C. Mace, *El Amrah and Abydos, 1899-1901,* (special extra publication of the Eg. Expl. Fund), London, 1902, p. 49, dealing with predynastic material, we find the statement that beads "were essentially the ornaments of women and children, were very rarely found with men, and when they occurred in a man's grave were always of the most valuable materials." We have been unable to trace any difference in the forms of finger rings, broad bead collars and their accessories, bead bracelets and pectorals, as worn by men and women. In Capart, *Une rue de tombeaux à Saqqarah,* Brussels, 1907, Pl. 93, a man and wife who lived about 2500 B.C. are decked with exactly the same type of diadem.

[39] But see Edouard Naville, *The Temple of Deir el Bahari,* Pt. IV (XIXth Memoir. Eg. Expl. Fund), London, 1901, Pl. CI for anklets worn by the male divinity Amon.

[40] In Egypt, in prehistoric times, pins of copper were used to fasten goat-skins about the body; so W. M. F. Petrie and Mace, *Diospolis Parva* (XXth Memoir. Eg. Expl. Fund), London, 1901, p. 24. Cf., however, Petrie, *Prehistoric Egypt* (XXXIst Publication. British School of Archaeology in Egypt and Egypt. Res. Acc., XXIIIrd Year, 1917), London, 1920, p. 26. But in historic times, shawls and mantles were simply thrown about the figure and other garments were usually cut, pleated and sewed into convenient shapes; often attenuated ends were dexterously tucked under or over another part to secure them and, in the older period, shoulder straps and girdle ends were tied in a reef knot; Borchardt, *Statuen und Statuetten von Königen und Privatleuten im Museum von Kairo* (Cairo *Catal.*), Pt. I, Berlin, 1911, Nos. 27, 113 etc., see cuts in text; cf. the interpretation as loop and button in Hans Bonnet, *Die ägyptische Tracht* (Vol. VII, Pt. II of Sethe, *Untersuchungen*), Leipsic, 1917, pp. 40-41, Pl. VI, 37-8. The more elaborate garments in favor after 1500 B.C. were sometimes tied at the throat and were often confined at the waist by sashes; see B. M. C[artland], *Bull. M.M.A.,* Vol. XI (1916), pp. 211, 212. Thus the Egyptians usually dispensed with pins and had no special incentive to develop fibulae or other jewelry of the kind.

[41] "Pins" are mentioned occasionally in excavator's reports, but often are not of the kind used for fastening clothing. Thus in De Morgan, *Fouilles à Dahchour en 1894-1895,* Vienna, 1903 (cited hereafter as *Dahchour,* II), p. 48, we find: "Vers la ceinture, j' ai rencontré une plaque d'argent et quelques épingles du même métal"; these pins were probably from girdle clasps or from the princess Ita's bracelets, as she

few ornamental hairpins [42] and combs [43] have been found, although they were worn to some extent. Such barbarous ornaments as nose-rings, occurring in neighboring lands,[44] are almost unknown from Egypt.[45] Particularly characteristic of Egyptian jewelry are the elaborate pendants worn suspended from the neck, for which the Egyptological term is "pectoral"; sometimes these were balanced by a dorsal ornament of the same or a different form, nearly or quite as elaborate as the pectoral; [46] also other necklaces and broad collars often had at the back some form of pendant, such as the *menat* [47] or *menkhet*,[48] which served the double purpose of

is reported (top of p. 54) to have had bracelets of the type of those of Nebheteptikhrod, which, like our No. 3, required pins to secure the clasps; see De Morgan, *Fouilles à Dahchour. Mars-Juin, 1894,* Vienna, 1895, (cited hereafter as *Dahchour,* I), Pl. XXXVIII, A, B, D. On the other hand, "toggle pins," although surely not an indigenous piece of jewelry, have been found in Egypt. From the upper Nile Valley and a comparatively late period, Professor Reisner reports the occurrence of "Ram's head brooches" (*Museum of Fine Arts Bulletin,* cited hereafter as Boston *Bulletin,* Vol. XVI, 1918, p. 72); and such a piece as the following may have been used on clothing: Petrie, *The Royal Tombs of the Earliest Dynasties. 1901. Pt. II,* (XXIst Memoir. Eg. Expl. Fund), London, 1901, p. 23, Pl. V A (supplementary vol.), No. 7.

[42] See, however, for the early period, Petrie, *Prehistoric Egypt,* Pl. VIII and for later times, Schäfer, *Goldschmiedearbeiten,* p. 25, No. 20, Pl. 7, and possibly the two ivory pins of Petrie, *Ehnasya, 1904,* (XXVIth Memoir, Eg. Expl. Fund), London, 1905, No. 14, p. 4; Nos. 11, 12, Pl. IX a. In a scene on a coffin of the XIth Dyn. (*ca.* 2100 B.C.) a long pin with ornamental head is clearly shown in the fingers of the maid who is dressing her royal mistress' hair; published: Georges Bénédite, *Objets de toilette, Ière Partie, Peignes, etc.* (Cairo *Catal.*), Cairo, 1911, Pls. I-II; interpreted in Erman-Ranke, *Aegypten,* p. 251 as used temporarily in curling the hair, not as an ornament. Cf. also Bénédite, *op. cit.,* pp. 15-19, Pls. VIII-IX.

[43] Practical combs for combing the hair, usually of wood, and with teeth on one or both sides, have been preserved from ancient Egypt (Bénédite, *op. cit.,* pp. 1-7, 10-15, Pls. IV, V, VII) but combs which were intended also to ornament the hair seem to be confined to a very early period (Petrie, *Prehistoric Egypt,* pp. 29, 30, Pl. XXIX; Bénédite, *op. cit.,* Pl. VI), before wigs and elaborate diadems came in. The later Egyptians, on occasion, strewed rosettes all over the wig; see Arthur C. Mace and Herbert E. Winlock, *The Tomb of Senebtisi at Lisht* (M.M.A., Egyptian Expedition), New York, 1916, cited hereafter as *Senebtisi,* pp. 59, 60, Pls. XV, B, C, XXI, XXVIII, F, D; also *J.E.A.,* Vol. V (1918), p. 172, No. 10. For possible lavish wig ornaments of another type, see *Bull. M.M.A.,* Dec. 1919, Pt. II, p. 12, n. 1 and Guy Brunton, *Lahun I. The Treasure* (XXVIIth Publication, Brit. Sch. of Arch. in Eg. and Egypt. Res. Acc. XXth Year, 1914), London, 1920, pp. 27-8, "The Gold Ring-beads." The wig was less well adapted than the natural coiffure to hold a comb and the circlet or diadem, the usual ornament, so dominated the head as to satisfy all desire for a display of jewelry on that part of the person.

[44] Genesis XXIV, 47; Isaiah III, 21; Georges Perrot and Charles Chipiez, *Histoire de l'art dans l'antiquité,* Vol. IV, *Judée. Sardaigne. Syrie. Cappadoce,* Paris, 1887, pp. 446-8; F. H. Marshall, *Catalogue of the Jewellery, Greek, Etruscan, and Roman, in the Departments of Antiquities, British Museum,* London, 1911, p. 167, Fig. 48 (Cypriote statuette).

[45] The woman buried at Abydos in the XXIInd Dyn. with her nose-ring in position may have been a foreigner; T. Eric Peet, *The Cemeteries of Abydos. Part II, 1911-1912* (XXXIVth Memoir. Eg. Expl. Fund), London, 1914, p. 47, S 29, Pl. IX, Fig. 4, top right corner.

[46] This way of mounting the pectoral is well authenticated for the period of the mid-XVIIIth to early XIXth Dynasties (1475-1250 B.C.): Sethe, *Urkunden,* IV, 870, l. 16, 871, l. 9, 873, l. 8; G. Daressy, *Annales,* Vol. II (1901), pp. 1-13; George A. Reisner, *Amulets* (Cairo *Catal.*), Cairo, 1907, Nos. 12196-12201, 12216-17; G. Elliot Smith, *The Royal Mummies* (Cairo *Catal.*), Cairo, 1912, p. 37, describing the mummy of Amenhotep II: "In the resin covering the fifth dorsal spine there is the distinct impression of a series of beads arranged in the pattern of the well-known pectoral ornament"; Champollion, *Monuments,* Atlas Vol. IV, Pl. CCCCXXXII, with name of Thutmose IV; A. St. G. Caulfeild, *The Temple of the Kings at Abydos* (*Sety I.*) (VIIIth Publ. Egypt. Res. Acc. VIIIth Year. 1902), London, 1902, Pl. XVI, 1, 3. See also the combination of leopard's head and ordinary pectoral connected by rows of beads reproduced in: Prisse d'Avennes, *Histoire de l'art,* Atlas Vol. II, section "Art industriel," Pl. 15. But in the XVIIIth Dyn. the pectoral was mounted and worn sometimes by itself, suspended on strings of beads, as in the example pictured in the tomb of Huy; see Erman-Ranke, *Aegypten,* p. 238, Fig. 87, after Richard Lepsius, *Denkmäler aus Ägypten und Äthiopien,* Berlin, 1849 ff., Pt. III, Pl. 115. Cf. below, n. 71.

[47] See p. 176 and Pl. XXVII, 107.

[48] Pictured separately in Pierre Lacau, *Sarcophages antérieurs au Nouvel Empire* (Cairo *Catal.*), Cairo, Vol.

a counterweight and an ornament. The forms of Egyptian jewels were undoubtedly influenced by the fact that during the Old Kingdom when, as the culmination of centuries of development, a characteristic national stamp was given to jewelry, the fashion still prevailed of wearing very little clothing on the upper part of the body; even the woman's dress suspended by one or two shoulder straps left the breast and shoulders largely free; royal personages and members of the nobility then adorned themselves with jewels extending down on the breast and back and in part covering the arms.

In construction much of the Egyptian jewelry falls into two classes: hoop jewelry, that is, articles which consist essentially of a hoop of metal, whether or not elaborated by inlaid or appliquéd ornament, and bead jewelry.[49] To the first class belong nearly all finger rings and circlets for the head, and many armlets, bracelets, and anklets; to the second class, necklaces, girdles, the large majority of wide collars, and also many armlets, bracelets, and anklets. Indeed, the elaboration of bead jewelry was one of the most prominent contributions of Egypt[50] to the development of personal adornments in antiquity. Never was a people fonder of beads or more ingenious and skillful in combining them; compared with Egyptian bead jewelry, modern bead bags seem trivial, and even the present-day necklaces of better materials are usually of less interesting, and less organized, designs. Other ancient folk of the Mediterranean basin and of Babylonia, too, made much use of beads, generally, however, so far as is now evident, unless influenced from Egypt,[51] only in the form of single strings, however many such strings they wore! It was in Egypt that the colorful combining and intricate threading of beads of precious materials reached a high art. One of the principal pieces in a set of bead jewelry was the wide, flat collar, which extended from the base of the neck out over breast and shoulders and was composed largely of cylindrical beads strongly threaded into a flexible whole; the lengths of the cylindrical beads were varied, and by placing them radiating from the neck, the shorter ones toward the back, it was possible to narrow the collar and bring all its threads into semi-circular end-pieces, or pieces having the outline of falcon heads;[52] the designs worked out in the shapes and arrangement of the beads were accentuated, or further elaborated, by the rhythmic distribution of masses of color.[53] Much use was made in bracelets and necklaces of

I (1904), Pl. LII, Nos. 440-43, and in position, hanging behind, in Borchardt, *Statuen,* I, Nos. 33, 56, 83, 139, 153, 208, etc., cuts in text.

[49] We are aware that some diadems, such as the one of interlacing wire of Mace and Winlock, *Senebtisi,* Fig. 28, Pl. XXI and those of De Morgan, *Dahchour,* II, Pl. X, also gold chains, and a few other items are not covered in this classification, but pectorals hung on strings of beads, the majority of amulets, and ornamental seals, may be regarded as elaborated beads.

[50] Probably this bead jewelry should be regarded as characteristic of northeast Africa, rather than solely of Egypt, since in early Egyptian reliefs (Borchardt, *Sahu-re,* II, Pls. 1, 5-7) the Libyans and Puntites wear it, but even so, the Egyptians, as apparently the most highly civilized people of that part of the world, must have had the chief part in developing it.

[51] Gold bar spacers of twenty holes which bear evidence of some elaborate bead jewelry known to the people of strata II-V, Troy, were found by Schliemann. Were they importations from Egypt? See Hubert Schmidt, *Heinrich Schliemanns Sammlung trojanischer Altertümer,* Berlin, 1902, p. 236, 21 (Nos. 765, 766) and Alfred Götze in Wilhelm Dörpfeld, *Troja und Ilion,* Athens, 1902, Vol. I, p. 361, Fig. 303, f.

[52] Pictures of these wide collars may be found in Lacau, *Sarcophages,* I, Pl. LI, Nos. 426-32.

[53] Perhaps the reader should be reminded that the strings of Egyptian beads sold by dealers rarely give a correct notion of the merit of ancient bead jewelry, being made up usually of the commoner beads in an arrangement entirely modern and often including units of widely varying periods and diverse original use. Especially frequent on the market are strings of late glazed cylindrical and disk beads from shrouds,

"dividers" or "spacers," that is, bars of gold pierced with holes, through which the various threads passed and thus were prevented from spreading or becoming tangled; also beads soldered together one above the other acted as spacers. This advance over the single-thread bead bracelets of predynastic days seems to have been made in the court ateliers of the First Dynasty, as two of the royal bracelets of that time included spacers of three holes each.[54] In the Third or Fourth Dynasty we find a certain private person of the region of El Kab furnished for the next life with a bracelet composed of gold and carnelian beads in alternating rows on five threads, with gold bar spacers of five holes.[55] In the Fifth and Sixth Dynasties, as representations in relief sculpture abundantly prove,[56] the rows of beads were eight to sixteen in number and the spacers sometimes elaborated with decoration; very charming actual examples of such spacers, inlaid and chased, have come down to us from the Twelfth Dynasty,[57] and there are many others extant.

Unfortunately much valuable archæological evidence about Egyptian jewelry, as about other classes of material, was wasted in the earlier days of excavation. Thus less is known of the designs of the princesses' jewels from Dashur [58] than we should know, had they been taken care of by the minute and exact methods practised in the field today. Yet even with the most punctilious and efficient recording, the condition in which jewels are found often leaves many questions unsettled. Most tombs —and with few exceptions, extant Egyptian jewels are from this source—were rifled in antiquity and the modern scientific excavator must needs cherish the leavings of the ancient robbers; even when an untouched tomb *cache,* such as that rare one of Lahun, is found, the jewel boxes may have fallen apart and the threads of the bead jewelry have rotted, with the result that the designs of some of the pieces remain in doubt. Occasionally, however, as in the ornaments of the baby princess Maït of the Eleventh Dynasty [59] and in the jewelry of the lady Senebtisi of the Twelfth,[60] the exact order of the beads has been recovered, and always the representations of jewelry in Egyptian art are a potential aid for putting together disjointed units.

One of the first queries in dealing with these pieces of jewelry buried with the dead—whether placed on the mummy or deposited in various situations in the tomb —is how far they have been worn in life, how far made expressly for burial.

of blue, yellow and other colors, but occasionally one comes on the more desirable early collar beads of varying lengths, referred to above. But even these, and also the funerary bead collars (cf. p. 11) preserved in museums, are more monotonous in design and colors than the wide collars worn in life, as we may study them in ancient reliefs and paintings.

[54] See our list of outstanding jewels, p. 237, under a.

[55] Quibell, *El Kab* (IIIrd Publ. Egypt. Res. Acc. IIIrd Year, 1897), London, 1898, p. 7, St. 2; on date, p. 138 in Reisner, *The Early Dynastic Cemeteries of Naga-ed-Dêr,* Pt. I (University of California Publications. Egyptian Archæology, Vol. II), Leipsic, 1908, cited hereafter as *Naga-ed-Dêr,* I.

[56] For Vth Dyn. see: Borchardt, *Sahu-re,* II, Pl. 18 left, bracelets with 14 rows of beads showing between spacers, anklets with 16; Pl. 22, anklets with 11 rows between spacers; *Ne-user-re,* Pl. 16, 8 rows visible on goddess' anklets and a suggestion of figures ornamenting spacers. Such jewelry was made for the statues of divinities, but see Capart, *Rue de tombeaux,* Pls. XX, XXI, for bracelets of 13 threads controlled by spacers, worn by a VIth Dyn. nobleman.

[57] See references for Dashur and Lahun jewelry, p. 238.

[58] See preceding note and Mr. Lythgoe's remarks in *Bull. M.M.A.,* Dec. 1919, Pt. II, p. 22, n. 3. The condition of the jewelry from Tutenkhamon's tomb is not yet known as we go to press, but we look forward to very interesting revelations when it does become available.

[59] P. 237, under e.

[60] Mace and Winlock, *op. cit.*

Some pieces reveal themselves at once as undoubtedly in the latter category, because too unsubstantial to endure wear; such pieces are our Nos. 23 and 38. In addition, some other funerary jewels placed on the mummy are not merely inappropriate in their materials and technique for actual use, but also in their form; such are the broad collars of beads which cover only the breast and shoulders of the mummy in front, without passing around the neck, and which have no means of fastening; in them the semi-circular end-pieces, to which we referred above and which worn by the living rested on the shoulders behind,[61] are in view from the front; and again funerary anklets and bracelets are found held only by the bandages and not completely encircling the ankles or wrists.[62] Critical judgment must therefore be exercised when examining these exclusively funerary pieces in an effort to visualize the normal jewelry of the Egyptians and to estimate the merit of their accomplishment in the designing and making of jewelry. Surely one would be in error to infer from Senebtisi's wide collar of sheet copper covered with gold foil, or from Hapi-Enekhtifi's of wood covered with gold,[63] that in the Twelfth Dynasty, in life, a woman or man wore collars made out of sheet gold all in one piece, for the funerary collars mentioned are chased with a design representing the usual bead collar and were mere substitutes for such collars, perhaps conceived as composed entirely of beads of gold. At this point, we may call attention to the legends accompanying pictures of jewelry on coffins of about 2000 B. C. which occasionally read, *Ornaments of the Nether World,* that is, laconically suggest the purpose of the ornaments;[64] the more usual legends[65] refer imaginatively to the rich materials or characteristic designs of the royal jewels with which, magically, by virtue of these pictures, the deceased was provided (compare pages 158, 161-4, 192-3).

But it was also customary among people who could afford it to deposit some substantial jewelry with the dead. Often, as is evident in their worn condition, these were jewels which had seen use in life; such are our Nos. 1, 59, 60, 96, 123, and 125.[66] But we conjecture that good jewelry was acquired also expressly for the tomb, perhaps by the person himself during his older years or by survivors at his death, if his store of jewels was not yet adequate for a burial befitting his station. It would seem that chance conditions or individual preferences must often have controlled the composition of the set of jewelry and other valuables which a given person, following Egyptian thought, carried into the next life. Why else should the Dashur princess Ita have been provided with a substantial dagger having a beautiful inlaid handle of precious materials and her contemporary Khnumit, also of the royal house, whose tomb equipment in general was even richer than hers, have had only a dummy dagger of gilded wood?[67]

[61] Known from representations of collars in position on statues and statuettes; see the ushebti pictured in the New York Historical Society's *Quarterly Bulletin,* Vol. I (1917-18), p. 95; evident also in the shapes of the collars as drawn anciently. Cf. p. 9, n. 52.

[62] So the funerary pieces in Senebtisi's equipment.

[63] Mace and Winlock, *op. cit.,* p. 66. The question of these collars is quite apart from that of the construction of vulture collars, or that of the earliest occurrence of such hinged collars of sheet gold as the late example found by Professor Reisner in Nubia (see under l, p. 242).

[64] Lacau, *Sarcophages,* Vol. II, Cairo, 1906, p. 44, Nos. 36, 46; p. 62, No. 99; cf. Vol. I, p. 111, No. 34.

[65] For other legends consult Lacau, *op. cit.,* Vol. II, Index, pp. 156 ff., and the legends and literature cited by Mr. Mace in *Senebtisi,* Ch. IV.

[66] So also the pendant of Schäfer, *Goldschmiedearbeiten,* No. 13.

[67] De Morgan, *Dahchour,* II, p. 51, No. 1, Pl. VI, and p. 55. Ita's dagger was placed by her mummy and Khnumit's with her staves outside the coffin, and neither lady appears to have had a second dagger.

In the study of Egyptian jewelry the criterion provided by the marks of wear has been little used. Let us consider for a moment the two "pectorals" of the Lahun princess, who lived in the nineteenth century B.C.[68] These jewels have corresponding designs, one including the name of Sesostris II, possibly the princess' father, the other the name of Amenemhet III, perhaps her nephew, and the current theory requires us to believe that they were gifts made to the princess by the kings named, at some time in their respective reigns. Now thirty-eight years intervened between the death of the one king and the accession of the other, and according to this theory, nearly forty years, at the very least, would have separated the one gift from the other. If then the pectoral with Sesostris' name was really acquired during the princess' youth, and worn by her during those forty odd years, before, in her old age, she was given the second pectoral, we should expect the older piece to show far more evidence of wear; the loops by which it was suspended might well be almost worn through (compare No. 96). The publication of the Lahun jewelry makes only the following very general statement: "The ornaments show signs of wear, and where inlay is now missing, it was no doubt lost anciently," [69] and the two pectorals have not, to our knowledge, been compared especially with respect to the indications of wear; so far as one can judge, however, by the half-tones representing them from the reverse,[70] the loops on the supposed older pectoral certainly look in quite as good condition as those on the supposed later piece! The manner in which these pectorals were mounted and worn is not known.[71]

In ancient Egypt, fashions in jewelry were set by the king and his household. This dominating influence may be traced even as early as the First Dynasty, long before 3000 B.C. One of the royal bead bracelets of that early time [72] is composed largely of barrel-shaped beads of which the surfaces are ornamented with spirals in a style which was in vogue by the time of Menes,[73] founder of the Egyptian state; one other such bead of blue glaze, dating from the same early period, was found at Abydos,[74] and a dozen and more of gold were discovered at Naga-ed-Dêr, opposite Girga.[75] Again, the beads of another of these royal bracelets imitate the form of the Horus name of the king, even to the falcon-hieroglyph by which this name was introduced. At Abydos, similar beads, one of lapis lazuli, one of ivory, from two other pieces of jewelry,[76] were recovered, and some three hundred miles away to the north, near the Great Pyramid of Giza, in a tomb dated by a sealing to the reign of Zet (Atotis), a nearly complete bracelet of the same style came to light; its units all have two

[68] Literature given p. 238, also following note.

[69] Brunton, *Lahun I,* p. 42.

[70] Brunton, *op. cit.,* Pl. VI.

[71] No satisfactory evidence is as yet available for the XIIth Dyn., but see above, n. 46, for the two ways—with and without a corresponding dorsal ornament—characteristic of the XVIIIth Dyn., ways which may have come down from earlier times. Mr. Winlock has drawn our attention to the fact that the two Lahun pectorals were found somewhat separated, each with its own lot of beads (Brunton, *op. cit.,* pp. 24-5, Pl. XII), a circumstance which apparently forbids regarding one of them as a dorsal ornament to be worn simultaneously with the other, a pectoral.

[72] No. 52,009 as catalogued in Vernier, *Bijoux,* I; cf. p. 237, under a.

[73] De Morgan, *Recherches,* Vol. II, *Ethnographie préhistorique et tombeau royal de Négadah,* Paris, 1897, pp. 195, 197, Fig. 744; Vernier, *Bijouterie,* p. 114, Fig. 137.

[74] Petrie, *Royal Tombs. II,* Pl. XXXV, 75.

[75] Reisner, *Naga-ed-Dêr,* I, Pl. 7, Nos. 6, 9, and 10, from grave N 1532, dated p. 14 to this period of the Ist Dyn. kings Zer and Zet, but on p. 119 to the close of the dynasty.

[76] Petrie, *Royal Tombs. II,* pp. 17, 37, Pl. XXXV, 81.

threading holes, the terminal pieces resemble roughly the gold cones of the royal model, and it was once tied in like manner to the arm, but the material is only blue-glazed pottery; the whole was an inexpensive imitation which had to suffice for a mere retainer buried far away from his lord.[77]

The style of adornments adopted by the monarch influenced not only the jewelry of his subjects but the visualization of the Egyptian gods and consequently their material property, including jewelry.[78] Many gods were conceived as rulers or young princes and so were represented in art with the royal appurtenances of the Pharaoh and his sons. A common title of goddesses was *Mistress of Heaven* and what more natural than to imagine a god's consort as looking much like the Pharaoh's queen? But the gods had also certain attributes original to themselves—headdresses inherited from primitive times when particular local gods, later among the great divinities of Egypt, wore towering crowns of feathers and horns, or objects carried in the hands, which originally symbolized their gifts to the king. Therefore in Egyptian art we see the gods wearing the royal crowns of Egypt and carrying the king's scepters, and we also see the Pharaoh, impersonating one of the gods, wearing the headdress peculiar to this or that divinity. This inter-influence is such that it is often difficult to discover the origin of a particular attribute, whether first proper to a human king or to a god.

The rich treasure of the temples, including jewelry actually placed, during the services, on the statues of the gods, was largely the gift of the king, in the earlier periods perhaps an evidence of real piety, later certainly, after the rise of a powerful priesthood whose support the king needed, to a large extent political in purpose. Various lists of king's gifts to the gods have come down to us—beginning as early as the twentieth century B.C.,[79] and most impressively represented by the great Harris papyrus,[80] which enumerates the benefits conferred by Ramses III (1198-1167 B.C.) upon all the principal temples of the land. Besides these royal documents, inscriptions of the officers who carried out the king's purposes contain references to the jewels bestowed on the gods. In the mortuary stela of Mentuhotep, vizier under Sesostris I (1980-1935 B.C.), we hear of *collars of real turquoise* (not imitation turquoise, the narrator would have one understand), and of *bracelets of every kind of costly stone* given to the temple at Abydos.[81] And the chief treasurer of Sesostris III (1887-1849 B.C.), Ikhernofret, set up a monument[82] on which the king's letter, commissioning him to go to Abydos and look after the royal works there, was copied. In this important inscription, which also gives some hints about the conduct in Ikhernofret's day, of the religious drama of Osiris' death and resurrection,

[77] Petrie, *Gizeh and Rifeh,* (XIIIth Publ. Egypt. Res. Acc. and Br. Sch. of Arch. in Eg. XIIIth Year), London, 1907, p. 6, Pl. III.

[78] In section E we shall have occasion to take up the influence of royal jewelry on the equipment of the dead.

[79] Breasted, *Records,* I, § 500; Daressy, *Annales,* Vol. IV (1903), pp. 101-102, No. 2. Cf. Sethe, *Urkunden,* IV, pp. 22-4 (text) and Breasted, *Records,* II, §§ 29-32 (translation) for a list of the first half of the 16th cent. B.C., containing items such as "gold seals," "necklaces of gold and silver, combined with lapis lazuli and turquoise," etc.

[80] S. Birch, *Facsimile of an Egyptian Hieratic Papyrus of the Reign of Ramses III, now in the British Museum,* London, 1876.

[81] Breasted, *Records,* I, § 534. In this passage and others quoted subsequently we have substituted "turquoise" for "malachite" in the translation.

[82] Now in Berlin. Text, translation into German, and important discussion: Schäfer, *Mysterien des Osiris in Abydos;* Engl. transl.: Breasted, *Records,* I, §§ 661-70.

we learn that the chief treasurer represented the king at the consecration of a new statue of the god,[83] and with his own hand decked the god with *lapis lazuli and turquoise, electrum(?) and every costly stone, as ornaments of the limbs of the god.* Perhaps the reader by this time has inferred that the king's gifts of jewels were made in royal workshops at the capital city. This may well have been true respecting his gifts to his subjects, but apparently he did not usually send, or present in person, gifts of finished jewels, except some foreign pieces, won in the wars or acquired as tribute.[84] Rather, there are indications [85] that the jewelry of the gods was made in temple workshops, as we have already noted (page 5), and that the king's patronage usually consisted in furnishing the unworked materials for the jewelry,[86] in keeping control through his officers [87] of the supplies possessed by the various temples and of their further needs, and perhaps in sending royal artificers. The king Neferhotep of the Thirteenth Dynasty, however, boasted that he went to Abydos and himself superintended the work on the god's cultus statue,[88] and certain inscriptions have been interpreted to indicate that Thutmose III actually designed cultus objects for the god Amon.[89]

In his care for the appropriate adornment of the gods, from the Egyptian point of view, the king was returning to them a part of what they had bestowed on him. During the Old Kingdom and earlier, lesser folk presumably received solace and help from their particular *city gods,* but the prominent gods of the land cared solely for the king! Many brought to him the supreme gifts of *life, health, endurance, good fortune, millions of years,* but one in particular, Nekhbet, tutelary divinity of the South, had in her right,[90] the gift of metals. In a relief from the funerary temple of Sahure,[91] she addresses the king: [*I give to thee to mine(?)*] *gold and to wash silver,* in other words she promises him control over the regions where these metals were obtained, a promise which we may associate in thought with the sea expedition sent forth in Sahure's reign, around 2740 B.C.,or earlier.

Actually, in predynastic times, materials for jewelry which were not obtained in the deserts of the lower Nile Valley may have reached the borders of Egypt by trade routes, handed on from one people to another, and this kind of commerce, centering in border towns, such as the one at the first Nile cataract and the chief port on the Red Sea (near modern Kosêr?), obtained also down through Egyptian history.[92]

[83] So Aylward M. Blackman in *Encyclopædia of Religion and Ethics,* edited by James Hastings, New York and Edinburgh, Vol. X (1919), p. 294, in article "Priest, Priesthood."

[84] See Breasted, *Records,* II, § 654.

[85] Schäfer, *op. cit.,* p. 15.

[86] Eventually certain of the regions of Nubia which yielded gold were officially recognized as belonging to the Theban god Amon; cf. the title quoted on p. 4.

[87] See, for instance, Breasted, *Records,* I, §§ 607, 610.

[88] Breasted, *Records,* I, § 764; Schäfer, *loc. cit.*

[89] Even these gifts in which Thutmose III took so personal an interest (Breasted, *History,* p. 310) and which are depicted in a relief at Karnak (see especially Sethe, *Urkunden,* IV, 633, 637), according to the legends in Menkheperreseneb's tomb were actually made in the workshops of the temple of Amon (Breasted, *Records,* II, § 775).

[90] Evidence cited by Sethe in Borchardt, *Sahu-re,* II, p. 93; but, on occasion, other divinities, too, who presided over the regions of the mines, promised the king metallic wealth; cf. Breasted, *Records,* III, p. 81, n. e.

[91] Borchardt, *op. cit.,* Pl. 18.

[92] Professor Reisner has pointed out that not even a beginning has been made in gathering the material on which a study of the ancient trade routes must be based: Boston *Bulletin,* Vol. XIII (1915), pp. 82-3. The

But soon after the organization of a united Egypt under Menes, the kings began to send expeditions to secure foreign supplies, probably first of all to the copper and turquoise mines in Sinai, where the series of inscriptional records commences with Semerkhet of the First Dynasty, vividly designated by Professor Breasted as "the earliest known mining promoter"![93] These inscriptions continue into the Twentieth Dynasty, that is, range from a time not later than 3200 B.C. to about 1150 B.C.[94] Only the resources of the king's government could make possible the exploitation on a large scale of the wealth of the desert mountains and even then the difficulties were very great, as mining equipment, food, and often water, must be transported long distances on donkey back, and the attacks of hostile tribes must be guarded against. Echoes reach us in contemporary documents of the hardships endured; one official's workmen complained of the excessive heat of the *evil summer season* during which, contrary to the usual practice, an expedition had been sent to Sinai, but, despite the difficulties, their commander claimed: *I led my army very kindly, and I was not loud-voiced toward the workmen.* Counsellors confer with the king Ramses II, suggesting the necessity of digging for water, a proposal actually successfully carried out on the desert route in question.[95] Ramses' father, Seti I, himself journeyed out two days on another desert road[96] to inspect conditions and established one or more wells on this road.[97]

Undoubtedly, too, it was the lure of gold which was the main incentive for the conquest of Nubia. Professor Reisner has found evidence of the presence of Egyptians as far south as the third Nile cataract (at the northern end of the present Dongola province) even as early as the time of the Old Kingdom and of the Egyptian administration of that region during the Middle Kingdom.[98] And many inscriptions testify to the frequent expeditions sent southward by the kings of Egypt. To some extent the kings themselves mined the gold of the northern Nubian deserts; largely, however, they exacted gold and minerals as tribute from the conquered tribes. An interesting commentary on these exactions may be read in the papyrus Koller of the close of the Nineteenth Dynasty, a papyrus containing sample letters to be copied by school-boys, for the sake of learning clear writing and elegant style. The third of these letters[99] purports to be from an Egyptian governor of the land of Ethiopia, writing to one of the local chieftains urging him to increase his tribute. It gives an idea of one source of the king's wealth in the *gold wrought into dishes, refined gold(?) in bushels(?), good gold, red jasper, amethyst(?), and crystal,* not to quote the

conditions essential for commercial relations between peoples are discussed in a paper, "Early Communication Between China and the Mediterranean," submitted to the American Philosophical Society, Philadelphia, April 21, 1921, by Wilfred H. Schoff.

[93] *The Scientific Monthly,* New York, Vol. IX (July-Dec. 1919), p. 569.

[94] Gardiner and Peet, *The Inscriptions of Sinai. Part I. Introduction and Plates* (Eg. Expl. Fund. XXXVIth Memoir, for 1913-14), London, 1917, p. 5.

[95] The Wadi Alâki, cf. p. 16. Seti I, in the same undertaking, had stopped just short of reaching water.

[96] The Redesiya road, see below, p. 16.

[97] See the fuller presentation of this material in Breasted, *History,* pp. 190, 191, 416, 421-2, with footnote references to the sources, published in translation in the same author's *Records.*

[98] *Ä.Z.,* Vol. 52 (1914), pp. 36, 49, Boston *Bulletin,* Vol. XII (1914), p. 23. Cf. *Excavations at Kerma,* Pt. I (in *Harvard African Studies,* Vol. V), Cambridge, 1923, p. 4.

[99] Gardiner, *Egyptian Hieratic Texts,* Series I: *Literary Texts of the New Kingdom,* Pt. I, *The Papyrus Anastasi I and the Papyrus Koller, Together with the Parallel Texts,* Leipsic, 1911, pp. 40-42; Erman and Fritz Krebs, *Aus den Papyrus der Königlichen Museen* (Handbücher der Königl. Museen. Berlin), 1899, pp. 96-7; Erman, *Die Literatur der Aegypter,* Leipsic, 1923, pp. 263-4.

other southern products, expected as tribute, and of the manner of its delivery in person by the southern chieftain, who is described as journeying to the Egyptian court, accompanied by a retinue with fans of gold and feathered headdresses, there to be received by the king, appearing above in the audience balcony: *Be mindful of the day when the revenues are brought, and thou passest into the Presence beneath the Balcony; the nobles ranged on either side in front of his Majesty, the chiefs and envoys of every land standing gazing and looking at the revenues. Thou art afraid and shrinkest(?), thy hand grows feeble, and thou knowest not whether it be death or life that lies before thee!* [100] As a consequence of the Asiatic conquests of the Eighteenth and Nineteenth Dynasties, the kings derived from Asia also gold, silver, and gemstones, as spoils of war and as tribute. Lists of this treasure are to be found in the royal annals [101] and many a pictorial record of the arrival of foreign tribute bearers, from all quarters of the ancient world, is contained in the paintings on the walls of Theban tombs.[102]

We turn now more particularly to the geographical sources of the materials represented in the objects of the present catalogue. Foremost among these materials is gold, known from Egypt first in the flourishing Second Predynastic period, around 4000 B.C., or earlier, having come into use apparently later than copper, and in the same general period with silver, lapis lazuli, turquoise, garnet, amethyst, and haematite.[103] The gold regions nearest to Egypt are in the Eastern Desert between the Nile Valley and the Red Sea, nearer to the sea. Their northern limit is about the twenty-eighth parallel [104] of north latitude, that is the latitude of Beni Hasan and the southern tip of the peninsula of Sinai, their southern limit the eighteenth parallel,[105] which passes somewhat south of Suakin on the Red Sea and the region of the Fourth and Fifth Cataracts of the Nile. Throughout this territory, given by the late Professor William Gowland as about two hundred and fifty thousand square miles,[106] the gold is contained principally in quartz veins of the crystalline rocks [107] and must be mined. In the ancient texts alluded to on pages 14 to 15, we hear of the gold mines accessible from the Koptos-Kosêr road and from the Redesiya-Gebel Zebâra route, leaving the Nile near El Kab, and of those in the Wadi Alâki in the northern Sudan—or Nubia, to use the common geographical term. All these, at one time and another, were worked by the Egyptians themselves. From around 1230 B.C., a map of one

[100] Translation of Gardiner, *op. cit.*, p. 42.

[101] Breasted, *Records,* II, §§ 431, 435-6, etc.; 790; III, §§ 106, 111, 151.

[102] So in the tomb of Puimre, recently published in full by the Metropolitan Museum of Art; Davies, *Puyemrê,* I, Ch. V, Pls. I, XXX ff. For translations of the accompanying inscriptions and bibliography of the available publications of the paintings of this character, see Breasted, *Records,* II, §§ 385-7, p. 159, notes c, g; §§ 760-61, p. 294, n. a; § 773, p. 300, n. a; §§ 1028-38, p. 420, n. a.

[103] The available evidence is only for certain villages of Upper Egypt: Petrie and Mace, *Diospolis Parva,* pp. 24-5, 29, and diagram Pl. IV; Edward R. Ayrton and W. L. S. Loat, *Pre-Dynastic Cemetery at El Mahasna* (XXXIst Memoir. Eg. Expl. Fund), London, 1911, pp. 11, 16, 30; Petrie, *Prehistoric Egypt,* pp. 27, 43-4.

[104] W. F. Hume, *The Topography and Geology of the Peninsula of Sinai (South-Eastern Portion),* Survey Department, Egypt, Cairo, 1906, p. 117.

[105] Stanley C. Dunn, *Notes on the Mineral Deposits of the Anglo-Egyptian Sudan,* Khartoum, 1911, p. 13.

[106] *The Journal of the Royal Anthropological Institute of Great Britain and Ireland,* London, Vol. XLII (1912), p. 255, in an important paper "The Metals in Antiquity."

[107] But for alluvial deposits, see Dunn, *Mineral Deposits,* pp. 47, 48, 51, 62; these are apparently for the most part "deep level," or "ancient, placers," in contrast to the numerous "shallow placers" of the southern Sudan.

of the gold regions is preserved, which hitherto has been valued chiefly as the oldest map known to geographers! Scholars have not yet come to an agreement about the locality shown, but Dr. Gardiner has made progress in translating its legends and in proving that what formerly was supposed to be two maps comprises really the parts of one, and he has pointed out the need of a new edition of this unique document.[108] Thus far, inscriptions *in situ* and other Egyptian texts have been the means of identifying only a few ancient gold mines, but in the surveys carried out by the Egyptian government and especially in the prospecting done for private mining companies, numerous ancient workings, together with the houses of the small mining towns near them and the apparatus used in extracting the gold, have been located.[109] Mr. S. C. Dunn writes[110] that at least eighty-five old workings which may certainly be attributed to the Egyptians or Mediæval Arabs prior to the tenth century after Christ, lie within Sudanese territory, north of the eighteenth parallel, north latitude. The accounts available of old workings are tantalizing, however, in the range of possible date given and we have no definite list of those gold mines which can be proved to have been worked by the Pharaohs.[111] The roll of modern mining companies which have attempted to reopen the old mines is a long one,[112] but generally the companies have not achieved financial success and one by one have given up their concessions. Various writers have mentioned, in addition to the difficulties of transport and of obtaining water with which also the Egyptians of old had to contend, the absence of that abundant forced labor which enabled the ancients to work poorer veins than can be mined profitably today.[113] Certainly, now, in much of this region, the gold is in minute particles, invisible to the unaided eye,[114] although no doubt the outcrops and superficial deposits of auriferous bodies exhausted in antiquity were richer in gold.

[108] "The Map of the Gold Mines in a Ramesside Papyrus at Turin" in *The Cairo Scientific Journal,* Vol. VIII, Alexandria, 1914, pp. 41 ff. Efforts to locate the mines of this map: H. T. Ferrar, *C.S.J.,* Vol. VII, pp. 247-51; E. S. Thomas, *C.S.J.,* Vol. VII, pp. 158-60. Original publication: J. Lieblein, *Deux papyrus hiératiques du Musée de Turin,* Christiania, 1868. Re-edited by Franz Joseph Lauth, "Die älteste Landkarte nubischer Goldminen" in *Sitzungsberichte der Königl. bayerischen Akademie d. Wissenschaften,* Munich, 1870, Vol. II, pp. 337-72 and "Die zweitälteste Landkarte," 1871, Vol. I, pp. 190-238. Excerpts reproduced in Erman, *Life in Anc. Eg.,* p. 467; Erman-Ranke, *Aegypten,* p. 557; Gowland, *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 255; Schäfer, *Von ägyptischer Kunst, besonders der Zeichenkunst,* 2nd ed., Leipsic, 1922, p. 181, Fig. 151.

[109] John Ball, *The Geography and Geology of South-Eastern Egypt,* Survey Department, Cairo, 1912, pp. 30, 31, 352; Charles J. Alford, "Gold Mining in Egypt" in *Transactions of the Institution of Mining and Metallurgy,* 11th session 1901-02, London, Vol. 10, pp. 11-12; cf. T. Barron and Hume, *Topography and Geology of the Eastern Desert of Egypt. Central Portion,* Geological Survey Report, Cairo, 1902, pp. 43, 226. Dunn, *Mineral Deposits,* especially pp. 45, 48, 50, 55-6, 62. The older literature on the Eastern Desert is given in detail in the bibliographies of the volumes issued by the Egyptian Government's Survey Department. For a vividly written popular description, see Weigall, *Travels in the Upper Egyptian Deserts,* Edinburgh and London, 1909.

[110] *Mineral Deposits,* p. 13.

[111] Mr. Dunn, *op. cit.,* p. 25, remarks on the absence of hieroglyphic inscriptions in the Sudanese mines; probably, then, the Pharaohs did not themselves work mines situated south of the Wadi Alâki.

[112] Ball, *op. cit.,* p. 28; especially Dunn, *Mineral Deposits,* with map of the various mining concessions, and the statement, p. 13, that "owing to the difficulties of transport and the absence of water in sufficient quantities, only one mine, Om Nabardi, is at present (1911) being worked"; cf. pp. 8-9, and 38 ff. The standing of the "Sudan Gold Field," the company which worked this mine, was still being given in the *Monthly Mining Handbook with Price Lists, etc.,* London, Mid-July, 1921, pp. 50-51. Cf. further G. Schweinfurth, *Annales,* Vol. IV (1903), pp. 268-80.

[113] Ball, *op. cit.,* p. 352; Alford, *Trans.,* Vol. 10, p. 4; Gowland, *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 255.

[114] Ball, *op. cit.,* p. 352. Cf. Alford, *Trans.,* Vol. 10, p. 24; Barron and Hume, *Eastern Desert. Central Portion,* p. 260.

At the mines [115] the gold ore was first broken into larger fragments which were rubbed with stones on rubbing mills into pieces no bigger than a pea, then ground to powder between two circular grindstones; this powder was washed on sloping boards, when the heavier metal remained behind on the boards. The water for the washing was sometimes obtained from natural basins in the mountains, where it gathered during the occasional heavy rains, oftener by driving wells.[116] At many mines the gold concentrates were melted and the earthy matter slagged off for the purpose of getting the metal into a more concentrated and easily portable shape. But melting went on also at convenient points where the roads from the mines emerged in the valley. Ore from the Om Nabardi mine, to the south of the Wadi Alâki, was perhaps melted in antiquity near Kerma at the Third Cataract, where large mounds of slag and broken crucibles testify to this industry of earlier days.[117]

The Egyptians obtained gold also from parts more distant than the Eastern Desert. Gold was fetched as early as the reign of Sahure (2740 B.C., or earlier) from the land of Punt,[118] usually identified with the Somali coast, to the southeast of Abyssinia, and in the days of Queen Hatshepsut (about 1475 B.C.) the *green gold of Emu,* procured in Punt, was highly prized.[119] Still other regions which come into consideration are the Sudan from somewhat south of the twelfth parallel to the borders of Abyssinia, with its alluvial deposits, and portions of western Asia Minor with streams bearing alluvial gold. Gowland cited [120] the stela of Sihathor, assistant treasurer under Amenemhet II, as proving that the washing of alluvial deposits in the Sudan was a flourishing industry in the twentieth century B.C. But in our view, Sihathor's words, *I forced the (Nubian) chiefs to wash gold,* do not necessarily apply solely, or even chiefly, to the recovery of alluvial gold. The same idiom occurs in the inscriptions of the temple on the Redesiya road.[121] On the Kubbân stela,[122] it is used with reference to the extraction of gold in the Wadi Alâki, and it may well have denoted the tedious, but essential, process of washing the powdered ore on sloping tables, the more so as the Egyptians had a parallel expression *to wash silver* [123] (page 14). Even in the absence of definite inscriptional proof, how-

[115] On these processes see: Gowland, *Journ. Royal Anthr. Inst.,* Vol. XLII, pp. 256-7; Dunn, *op. cit.,* 17-25; Alford, *Trans.,* Vol. 10, pp. 11-12; Erman, *Life in Anc. Eg.,* pp. 463-4; Erman-Ranke, *op. cit.,* pp. 553 ff.

[116] Dunn, *Mineral Deposits,* pp. 8, 24, 46; Alford, *Trans.,* Vol. 10, pp. 7-8, 13-14, 29; Wilkinson, *The Journal of the Royal Geographical Society of London,* London, Vol. II (1832), pp. 38, 39, 42, etc.

[117] Reisner, *Ä.Z.,* Vol. 52 (1914), p. 36; Dunn, *Mineral Deposits,* p. 23; both these authors refer to the "smelting" of gold ore in the Nile Valley, but do not particularize as to the process they suppose to have been used. Mr. Kenneth B. Lewis of the Morgan Construction Co. has pointed out to us that the washing described above would presumably yield the gold in the form of dirty dust after which no process properly called smelting was required, but only melting in crucibles to slag away the dirt.

[118] Sethe in Borchardt, *Sahu-re,* II, p. 126. Cf. Breasted, *Records,* I, § 161.

[119] Naville, *Deir el Bahari,* Part III (XVIth Memoir. Eg. Expl. Fund), London, 1898, Pl. LXXIV; Breasted, *Records,* II, § 265.

[120] *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 254. Cf. Breasted, *Records,* I, § 602.

[121] Breasted, *Records,* III, §§ 192-3.

[122] Breasted, *op. cit.,* III, § 286.

[123] Referring to the silver mines at Laurion in Attica, of later, but ancient, times, Gowland noted that "much of the ore apparently was poor and required concentration to free it from impurities and gangue. This was effected by a series of washings with water, the cisterns of which are very numerous on all the sites of the old mines"; see his paper "Silver in Roman and Earlier Times. I. Pre-historic and Proto-historic Times" in *Archaeologia or Miscellaneous Tracts Relating to Antiquity,* Vol. LXIX, for 1917-18 = Second Series, Vol. XIX, London, 1920, p. 149, citing also, p. 146, Edouard Ardaillon, *Les mines du Laurion,* Paris, 1897. It would seem that these processes of concentration by washing were taken by

ever, the likelihood that Egypt may have obtained a part of her gold from the regions of the Blue Nile is considerable.[124]

Whether or not Egypt received also alluvial gold from Asia Minor as early as the time of the First Dynasty, or at any time, can hardly be decided under the present lack of data bearing on the question. Professor Petrie [125] and Dr. J. H. Gladstone [126] influenced by the reputation of Asia Minor for yielding electrum, suggested this source for certain specimens of gold taken out of early Egyptian tombs which were found by analysis to be high in silver, but although such a possibility is not to be denied, the strength of their opinion depends on the assumption that gold high in silver was not readily obtainable from the desert immediately east of Egypt, or from the south, which is much to postulate.[127] The expressions *Asiatic gold* [128] and *Ketem gold,*[129] found in texts subsequent to 1300 B.C., have not been localized; they refer to gold brought to Egypt from Asia, some of which may conceivably have been extracted in Africa and sent to Asia to return as tribute or spoils of war!

Alluvial gold, because of the ease of its recovery, is often thought [130] to have at-

the Egyptians as typical of all the processes which went on at the mines. Cf. also Herbert Clark Hoover and Lou Henry Hoover, *Georgius Agricola. De Re Metallica,* translated from the first Latin edition of 1556, London, 1912, p. 279, note 8; the Egyptian scenes and their legends, however, which the authors, following Wilkinson, suppose to refer to the concentration of gold by washing have a different significance; they are workshop scenes of the utilization of gold after its extraction had been completed; the preceding metallurgical processes did not interest the artists of the Nile Valley and are never represented on Egyptian monuments. In this note the authors cite also the evidence preserved by Strabo (III, 2, 10) that, previous to the Christian era, in the mines of Spain, lead-silver ores were concentrated by five successive washings, during which the ore was handled in sieves.

[124] Professor Reisner, who writing in 1914 (see p. 18, n. 117), suggested the Om Nabardi mines as the probable source, or at least one source, of the gold found abundantly at Kerma, later, in 1915 (p. 14, n. 92), quoted Mr. Dunn as considering the alluvial deposits on the Abyssinian border the most probable source of this gold; cf. Breasted, *History,* pp. 136 ff. With reference to the conveying of the southern gold as far as Dongola, an observation of the Austrian mining expert, Russegger, has interest, inasmuch as modern conditions in backward countries are often a continuation of what has been going on for ages. At the request of Mohammed Ali, Russegger was sent in 1838 into the gold regions of the Blue Nile, and he reported the natives of the Dul range and neighboring mountains as under the influence of Dongolawi, to whom they much looked up, and with whom they carried on a trade in gold (Dunn, *Mineral Deposits,* p. 29).

[125] *Royal Tombs. II,* p. 40; *Ancient Egypt,* 1915, p. 15.

[126] In Petrie, *Dendereh. 1898,* (XVIIth Memoir. Eg. Expl. Fund), London, 1900, pp. 61-2.

[127] Analyses of gold obtained in modern times from Egyptian and Sudanese sources have not been accessible to us. Möller in the *Orientalistische-Literaturzeitung,* Leipsic, Vol. 18 (1915), col. 79, in a paper proving the Hittite word for silver to be derived from the Egyptian word for the same metal, referred to Nubian gold as "fairly high in silver"; cf. Gowland's suggestion, spoken of on our p. 21, involving a belief that Nubia yielded gold alloys high in silver. Mr. Dunn, *Mineral Deposits,* pp. 9, 28, 30, 34, reported the gold of the southern Sudan to be of a high degree of purity. But the French mineralogist Cailliaud, writing in the early part of the last century, said that two qualities were to be distinguished: that of Qamâmyl was the better; the other from the neighborhood of Mount Tâby was alloyed with silver and had a greenish-yellow color; see *Voyage à Méroé, au Fleuve Blanc, au delà de Fazoql, dans le midi du royaume de Sennâr, à Syouah et dans cinq autres oasis; fait dans les années 1819, 1820, 1821 et 1822,* Vol. III, Paris, 1826, p. 19. And what was the "green gold of Emu" if not a gold-silver alloy?

[128] Breasted, *Records,* IV, § 26; time of Ramses III. The files of the Berlin Dictionary, so Dr. Grapow informs us, include a passage from the Luxor temple in which Asiatic gold is mentioned, and this text is of the time of Ramses II.

[129] Erman, *Life in Anc. Eg.,* p. 464; Breasted, *op. cit.,* p. 117, note d, citing Dümichen, *Ä. Z.,* Vol. X (1872), pp. 44-5. We learn from Dr. Grapow that "Ketem gold" is heard of first in the great Harris papyrus and subsequently only in texts of the Ptolemaic and Roman periods.

[130] T. Kirke Rose, *The Metallurgy of Gold,* 6th ed., London, 1915, p. 1, quoting Gowland; Berthelot, *Annales,* Vol. II (1901), p. 157, in an article: "Sur l'or égyptien."

tracted man's attention before gold or other metals were mined, but the earliest Egyptians of whom we have knowledge[131] lived after the men of their world had learned the art of smelting and probably had begun to mine metals. For, simultaneously with gold, silver made its appearance in Upper Egypt[132] and since silver is unlikely to be found in any quantity native in surface deposits, and its extraction presupposes mining operations, we may reasonably infer that the earliest known gold from Egypt, also, may have been mined in parts of the Eastern Desert accessible from the Koptos-Kosêr road, near the Nile Valley terminus of which it was found. Over the same road, quite possibly, silver, too, first entered Upper Egypt. Gowland expressed the view that silver from the first was probably extracted from ordinary lead ores, or from silver ores associated with lead ores, involving two processes, one to free the argentiferous lead and a second tedious process to extract the silver from the lead.[133] On account of the more difficult mining and metallurgical operations thus necessary for obtaining silver, as compared with those employed to free copper and gold, the question of the place of origin of the earliest examples of this metal from Egypt has a special interest. Are we to think of the Egyptians, or of more distant peoples, as the leaders in these practical arts? The amount of silver which was deposited in the predynastic cemeteries of the villages along the Nile, even when allowance is made for its liability to be converted into silver chloride, and in this form to be overlooked by excavators, is still markedly less than that of gold. Its relative scarcity[134] has led to the opinion that from the time of its earliest occurrence

[131] Unlike Crete, where, at Knossos, a great neolithic accumulation underlies the deposits of the Bronze Age, Egypt's Neolithic period has left no readily accessible traces. Copper occurs sparingly in Egyptian graves of the earliest known type, although not by any means in all these graves, and Professor Petrie even denies that Egypt ever had a neolithic culture (*Journal of the Manchester Egyptian and Oriental Society, 1918-19,* Manchester, 1920, p. 13). Professor Breasted, however, believes that its later products are yet to be recovered from cemeteries underlying the cultivation at the outer edge and that its earlier stages are in part represented by pottery found in boring down through the alluvium at Memphis and Heliopolis (*The Scientific Monthly,* Vol. IX, pp. 307-11).

[132] Petrie and Mace, *Diospolis Parva,* pp. 24-5, 29, and diagram, Pl. IV; Petrie and Quibell, *Naqada and Ballas,* London, 1896, pp. 45-6, 48, Pl. LXV; Ayrton and Loat, *El Mahasna,* pp. 16, 30; Petrie, *Prehistoric Egypt,* pp. 27, 43, including "silver in fused buttons." See also reference to silver in MacIver and Mace, *El Amrah and Abydos,* p. 49. Cf. below, n. 134.

[133] *Archaeologia,* Vol. XIX (1920), pp. 121-3. He regards the possibility that silver was discovered native in any quantity by early man or extracted by one smelting from keragyrite (silver chloride) as almost negligible. Pertinent to the discussion is the fact that both lead and its principal ore galena occur in predynastic Egyptian graves, although the former is not plentiful (Petrie and Mace, *Diospolis Parva,* p. 25; Naville, *The Cemeteries of Abydos. Part I.,* XXXIIIrd Memoir, Eg. Expl. Fund, London, 1914, pp. 17, E 370, E 381 and 28, tomb 86; Petrie, *Ancient Egypt,* 1915, pp. 16-17, and *Prehistoric Egypt,* pp. 27, 43). The problem is clearly defined in H. C. and L. H. Hoover, *Agricola,* p. 390, note 23, but the writers were without sufficient data from Egypt.

[134] Gowland in *Archaeologia,* Vol. XIX, pp. 135-6 rightly emphasized this relative scarcity, but his enumeration of examples of silver from Egypt is far from exhaustive, even for examples which have been published, and takes no account of the presumable existence in various collections of unpublished pieces, such as the two silver rings of the XVIIIth Dyn., now made available in this catalogue as Nos. 26-7. Since his article was written some silver jewelry has been found with the mummy of the baby princess Maït of the XIth Dyn., see p. 237, under e. And we have a long list of occurrences of silver in the XIIth Dyn. Möller listed twelve early occurrences of silver known to him, ranging from the Second Predynastic period to the beginning of the IIIrd Dyn. (*Orientalistische Literaturzeitung,* Vol. 18, col. 78), which include nearly all the examples of our n. 132 above, and in addition: Quibell, *Archaic Objects* (Cairo *Catal.*), Cairo, 1905, Nos. 14514-6, Pl. LVIII; Petrie, *The Royal Tombs of the First Dynasty. 1900. Part I* (XVIIIth Memoir. Eg. Expl. Fund), London, 1900, p. 28, "traces of silver objects" in the tomb of Mersekha; and silver beads published by Mace, *The Early Dynastic Cemeteries of Naga-ed-Dêr,* Part

in Egypt silver was an Asiatic product.[135] But this relative scarcity might be due to a relatively limited near supply of the metal, or to the fact that an immense amount of ore must be mined to yield a very little silver.[136] The late Professor Georg Möller made the suggestion [137] that unimportant silver mines may have existed in Nubia in early times, which, then, were exhausted before the Eighteenth Dynasty when the Egyptians began regularly to derive silver from Asia; his opinion was based on texts of the Ptolemaic and Roman periods [138] naming silver as one of the products of Nubia—texts which he regarded as derived from earlier sources. But since the mines have not been located in the country, one may question whether silver really was mined there, or only reduced from native alloys of gold and silver, after the ancients had learned to part the two metals (compare, however, below, note 174). Indeed, Gowland at one time entertained the thought that the earliest known silver from Egypt might have been reduced from Nubian electrum; [139] but at that time he was under the impression that no silver antedating the Eighteenth Dynasty had been found in Egypt. Perhaps of value for this discussion is the fact that "old workings" of lead ore were discovered by Mr. Alford about forty miles north of Kosêr, where silver was present in the ore in the proportion of three ounces to the ton [140] and that lead ore has been found also at Gebel Rossas, sixty-eight miles south of Kosêr; [141] we seem, therefore, hardly warranted in excluding the possibility that the silver of earliest date found in archæological excavations in Egypt came from the near Eastern Desert. According to a hypothesis of Mr. Ernest A. Floyer,[142] cited by Mr. Dunn,[143] in primitive times, desert tribes whose chief occupation was mining lived in the mountains near the Red Sea. If this was so, then the "Bedouins" pictured in a relief on a rock wall of the Wadi Maghâra of the Sinaitic peninsula as smitten by the Egyptian king Semerkhet (compare page 15) may have been similar local tribes of miners. Not until the beginning of the Fifth Dynasty is silver mentioned in surviv-

II (Univ. of Calif. Publications. Egypt. Arch., Vol. III), Leipsic, 1909, pp. 26, 48, Pl. 48 b. Further, Möller called attention in Schäfer, *Goldschmiedearbeiten,* under No. 7, to "silver oxide" on parts of a cylinder seal of the IVth Dyn. and we doubt not that such evidence of the use of silver has often escaped notice.

[135] Petrie, *Ancient Egypt,* 1915, p. 16 and *Prehistoric Egypt,* p. 27.

[136] In predynastic times, if ever, gold was available in the Eastern Desert in abundant deposits and then, if not later, the yield may have been large in proportion to the amount of ore mined. Cf. above, p. 17.

[137] *Orientalistische Literaturzeitung,* vol. 18, cols. 78-9. Whether Möller had in mind mines of slight extent or those containing only low-grade ore is not made clear.

[138] Cf. Sethe in Borchardt, *Sahu-re,* II, p. 93, giving the ancient sources.

[139] *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 269.

[140] *Trans.,* Vol. 10, p. 14; Barron and Hume, *op. cit.,* p. 259. The percentage of silver found is very low (cf. Gowland, *Archaeologia,* XIX, pp. 122, 148), but one must consider the possibility that in antiquity ores richer in silver than any now known may have existed in these regions. Mention may be made also of the occurrence in the copper mines of Lake Superior, often close to the surface, of nodules of native silver enveloped in native copper; see Frank Wigglesworth Clarke, *The Data of Geochemistry* (United States Geological Survey, Bulletin 695), Washington, 4th ed., 1920, pp. 653, 661. We are not aware, however, that native silver has ever been found with the copper of the Sinaitic peninsula or with that of the Eastern Desert.

[141] Hume, *Catalogue of the Geological Museum,* Cairo, 1905, pp. 8, 27.

[142] *Journal of the Royal Asiatic Society,* London, Vol. XXIV (1892), pp. 811 ff., in a paper "The Mines of the Northern Etbai," especially pp. 822-3, 833. One may entertain Mr. Floyer's main contention without following him in supposing that these desert tribes were negroid in their racial characteristics. Cf. Alford, *Trans.,* Vol. X, p. 5.

[143] *Mineral Deposits,* p. 13.

ing Egyptian inscriptions;[144] then it was procured from some country reached by the king's sea-faring vessels, whether possibly from a port along the Red Sea coast, or, as Professor Breasted suggested, "from Cilicia in Asia Minor."[145]

Among the gem-stones represented in the objects of the present catalogue, turquoise is the one about whose source we are best informed. This gem was mined in the peninsula of Sinai and is known to occur in two places, Gebel Maghâra and Serabit el-Khâdim,[146] about six days' journey on camel-back from Suez. In 1919, Mr. Peet, who is collaborating with Dr. Gardiner in editing the Sinaitic texts, delivered an address "New Light on Ancient Mining in Sinai" before the Manchester Egyptian and Oriental Society, in which, as summarized later in technical journals,[147] he said that natural turquoise is seldom found in Egyptian jewelry; it was used freely in the extant royal bracelets of the First Dynasty,[148] but he was unacquainted with indubitable examples from later periods and he reported M. Vernier, who catalogued the Egyptian jewelry in the Cairo Museum, as being "uncertain," even with reference to the princesses' jewels from Dashur, "whether the turquoise is natural, or made of ground turquoise and glass-moulded." Mr. Peet referred to the tendency of turquoise from Sinai to deteriorate, saying further that probably "the Egyptians used it chiefly as a colouring matter for their glazes and paints, after crushing it down." Interest therefore attaches to Mr. Whitlock's verdict that the lighter colored inlays of our No. 104 consist of the mineral turquoise.[149] It is to be hoped that in time M. Vernier's observations will be supplemented by examination on the part of mineralogists of supposed examples of turquoise scattered in Egyptian collections, until a consensus of opinion is reached; thus far the identity of the turquoise in the Lahun jewels, which, like the jewels from Dashur, date from the nineteenth century B.C., has not been questioned. Further, an authority on turquoise, Mr. J. E. Pogue, after mentioning[150] the reputation of the Nishapur stones for permanency of color and those from Sinai for fading, added: "In general, however, each locality has furnished stones of permanent color, as well as those that soon altered." The question of imitation versus real turquoise is given additional importance by its bearing on the history of the making of glass in Egypt. The tendency of recent opinion is to carry back the origin of glass as distinct from that of vitreous glazes to very early times, indeed into the fourth, if not the fifth, millennium B.C. Professor Petrie, who in 1910 wrote that "there does not seem to have been any working of glassy material by itself, apart

[144] Cf. above, p. 14. To the scene described is to be added the legend giving the material, "silver," of vessels pictured in Sahu-re's funerary temple; Borchardt, *Sahu-re,* II, p. 126, Pl. 61 e; also a legend on a relief from the Sun-temple at Abu Gurob, mentioned by Möller, *loc. cit.*

[145] *History,* p. 94.

[146] Barron, *The Topography and Geology of the Peninsula of Sinai* (*Western Portion*), Survey Department, Egypt, Cairo, 1907, p. 209; Joseph E. Pogue, *The Turquois* (National Academy of Sciences, Washington, Vol. XII, Part II, 3rd Memoir), 1915, pp. 8, 28-9; Petrie, *Researches in Sinai,* London, 1906, pp. 36, 49, 61, 69-70.

[147] *Journ. Manchester Egypt. and Or. Soc. 1918-1919,* 1920, pp. 21-2; more briefly, *J. E. A.,* Vol. VI (1920), p. 284.

[148] Cf. p. 23, n. 154.

[149] Mr. Whitlock tells us also that he has examined Egyptian scarabs which consisted of the mineral turquoise.

[150] *Op. cit.,* p. 24. We should, perhaps, not fail to mention Mr. Pogue's suggestion (p. 30, note 3) that some of the turquoise from ancient Egyptian tombs may have come from Persia, a suggestion made on the assumption that lapis lazuli was derived from Persia and that turquoise may have traveled equally far.

from a base of stone or pottery, until after 1600 B.C.," [151] in 1920 described a blue glass head of Hathor from the Predynastic period,[152] and Professor Newberry, also in 1920, published a paper [153] in which he discussed the history of glass and accepted M. Vernier's verdict that some of the sky-blue beads of the early bracelets mentioned above were made of glass imitating turquoise,[154] and cited a few other objects of early date which he believed to be glass. The frequency with which in Egyptian texts the name of a gem-stone is accompanied by the adjective *real,* as in the passage quoted on page 13, is plausibly explained by the practice of using side by side with the minerals good artificial substitutes for the minerals, but we need further information about the beginnings of this practice.

Unlike turquoise, which is confined to a few localities on the earth's surface, carnelian (Nos. 3, 89), a form of quartz, is abundantly distributed. The Egyptians may have got a part of their supply close at hand on the desert, another part may have been procured from Arabia, whence today much of the carnelian worked into beads in the Netherlands and sold in New York is reported to come; and Cailliaud mentioned [155] picking up carnelian as well as onyx (No. 84), another compact form of quartz, in the Nubian desert near Abu Simbel. Jasper, belonging in the same category of minerals, was mined in antiquity in the Wadi Hammamat, reached from the Koptos-Kosêr road, where the supply today is of good quality but small in quantity; [156] whether, however, our specimen, No. 88, came into Egypt in ancient or modern times is uncertain. Steatite (Nos. 17, 20) [157] was obtainable in the Eastern Desert and presumably green felspar or amazon stone (No. 23),[158] too, was mined there. Mr. Whitlock informs us that garnet may occur in almost any granitic rock and it has actually been reported as present in a number of localities of the Eastern Desert and of Sinai.[159] Early in the last century a notable specimen was published which Cailliaud

[151] *The Arts and Crafts of Ancient Egypt* (The World of Art Series), Chicago, pp. 119-20.

[152] *Prehistoric Egypt,* p. 43.

[153] "A Glass Chalice of Tuthmosis III" in *J. E. A.,* Vol. VI, especially p. 159, with n. 3.

[154] In *Bijoux,* I, M. Vernier, cataloguing these bracelets, inclined to consider the large majority of the blue beads of No. 52008 as *pâte de verre,* although to deny the existence among them of some made of the mineral he thought would be rash; with respect to the light blue beads of No. 52009, he hesitated; those of Nos. 52010-11 he designated simply as "turquoise," referring the reader, however, for the last number, to his remarks under 52008.

[155] *Voyage à l'oasis de Thèbes et dans les déserts situés à l'orient et à l'occident de la Thébaïde, fait pendant les années 1815, 1816, 1817, et 1818,* edited by M. Jomard, Paris, 1821, p. 80.

[156] Barron and Hume, *Eastern Desert. Central Portion,* pp. 52, 261, 266. But the Wadi Hammamat was presumably not the only, although it may have been the earliest, source for jasper. Cf. our p. 15 and Gardiner, *Anastasi I,* p. 41, n. 10, also G. A. Hoskins, *Travels in Ethiopia above the Second Cataract of the Nile,* London, 1835, pp. 27, 35, 266. In modern times jasper has been observed in the Wadi Saga of the Egyptian Eastern Desert and "old workings" of jasper have been found in the region of Gebel Hadrabia; see Barron and Hume, *op. cit.,* pp. 221, 228.

[157] In Ball, *South-Eastern Egypt,* p. 348, the occurrence of "old mines" of steatite near parallel 25° N. is mentioned, but this is unlikely to be the only source of supply of so common a mineral and Mr. Ball named some other deposits.

[158] The abundant use of this mineral in Egyptian jewelry bespeaks for it a near source of supply, presumably among the pegmatitic occurrences in the Eastern Desert. The only deposits to which we have found reference are at Gebel Migif, somewhat south of parallel 25° N. See Ball, *South-Eastern Egypt,* p. 272, referring to "crystals of green microcline, similar to the well-known Pike's Peak mineral."

[159] Hume, *A Preliminary Report on the Geology of the Eastern Desert of Egypt Between Latitude 22° N. and 25° N.,* Survey Department, Cairo, 1907, pp. 44-5; Barron and Hume, *op. cit.,* pp. 170, 218; Hume, *Sinai (South-Eastern Portion),* p. 173.

had bought at Elephantine [160] and in the accompanying account of his travels he states that he often saw perfect crystals of garnet for sale among the natives at Elephantine and at Assuan, but could not learn from what region the stones were procured, although he did not suppose their source to be far distant. Emerald, imitated in the pendants of No. 65, was mined near Gebel Zebâra on the Red Sea, somewhat south of the twenty-fifth parallel. The ancient mines were discovered by Cailliaud,[161] who was sent out in 1816 by Mohammed Ali to search for them; Mohammed Ali did not, however, succeed in exploiting them. More recently Mr. Alford expressed a favorable opinion of the chances for mining there [162] and for a time mining was resumed in the ancient workings.[163]

Lapis lazuli, included in Nos. 3, 16, and 104, is not known to occur in nature nearer to Egypt than Persia. The Egyptian name, *Tefroret,* later *Tefror,* of the region from which it came is preserved, but the location of Tefroret is still undetermined.[164] Lapis lazuli is less common in Egyptian jewelry than carnelian and amazon stone, being more often represented by substitutes. In Senebtisi's jewels, beads of genuine lapis lazuli occur only in her finest girdle,[165] although her other jewels contain genuine carnelian and amazon stone; in some or all of the latter pieces, the color of lapis lazuli was represented by a composition, apparently not glass. Comparatively rare and expensive as it always remained, lapis lazuli was not late in reaching Egypt, but was available there [166] in the Second Predynastic period, and sporadically even earlier, a fact of importance for our conception of the amount of intercourse, direct or indirect, which was going on between peoples of the Near East and of northern Africa in the fourth or fifth millennium B.C. Indeed, all consideration of the geographical sources of the materials of Egyptian jewelry is of greater interest in its relation to economic and cultural conditions than in bringing forth isolated pieces of information! But, as Mr. Peet gave warning,[167] much caution is necessary in using such evidence; a substance supposed to be absent from a given region may later be discovered there, and only cumulative evidence of this kind may be trusted. These larger relations of the subject of jewelry and its materials would take us beyond the limits which must be set to this Introduction and we leave them, referring the reader, however, for the early period, to Professor Breasted's engaging picture of Egypt as El Dorado of early man, where many of the practical arts were first developed,[168] and to a paper by Professor M. Rostovtzeff,[169] which, as characterized by

[160] Cailliaud, *Voyage à l'oasis de Thèbes,* Pl. IX, Fig. 7; p. 80, referring to garnet also in the region of Gebel Zebâra. These statements and the references of the preceding note render unnecessary Mr. MacIver's view that garnet was perhaps obtained from afar, MacIver and Mace, *El Amrah and Abydos,* p. 49.

[161] Jomard in *Voyage à l'oasis de Thèbes,* p. XI, and Ch. II with Cailliaud's notes.

[162] *Trans.,* Vol. 10, p. 15.

[163] Hume, *Catal. Geol. Mus. Cairo,* p. 27.

[164] Gardiner, *J. E. A.,* Vol. IV (1917), p. 37, with n. 4. Just as Egypt was famous for its gold, so the countries of the Near East had an abundant supply of lapis lazuli. In the correspondence preserved in the Amarna letters, the kings of Babylonia and Mitanni mention gifts of lapis lazuli which they are sending to the Egyptian king and beg for return gifts of gold. See J. A. Knudtzon, *Die El-Amarna-Tafeln* (*Vorderasiatische Bibliothek*), Leipsic, 1915.

[165] Mace and Winlock, *Senebtisi,* pp. 68-9.

[166] Petrie and Mace, *Diospolis Parva,* p. 27, diagram Pl. IV; Möller, *Mitteilung der D. O. G.,* Berlin, No. 30 (1906), p. 20; Petrie, *Prehistoric Egypt,* p. 44.

[167] In a paper "Early Relations of Egypt and Asia," *Journ. Manchester Egypt. and Oriental Soc.,* 1915, p. 32.

[168] "The Origins of Civilization" (Lectures on the William Ellery Hale Foundation) in *The Scientific Monthly,* Vol. IX, pp. 289-316, 416-32, 561-77, Vol. X (Jan.-June, 1920), pp. 86-105, 182-209, 249-68.

[169] "The Sumerian Treasure of Astrabad," *J. E. A.,* Vol. VI (1920), pp. 4-27.

Mr. Griffith,[170] "seems to point to a culture spread widely in the nearer East and differentiated gradually in the various centres during the fourth millennium B.C."

We come now to a consideration of the alloys of gold and silver found in ancient jewelry from Egypt. The general use of "fine," or pure, gold is often attributed to the Egyptians, although the color of the earlier jewelry is against such a view. Until a late time the Egyptians used, not fine gold, but in their better jewelry, gold of high carat, from about seventeen to twenty-two,[171] and even such gold has a rich lovely hue and a beauty of surface which give a special charm to the personal ornaments made of it. The Egyptian practice is in contrast to that of the present day when fourteen carat is a good standard quality, eighteen is used comparatively little, and any ornament of gold exceeding eighteen carat must be made as a special order. The Egyptians employed, however, also gold of lower carat. Just what qualities are covered by the term "base gold," occasionally found in the writings of Egyptologists,[172] awaits determination by analysis. But the present catalogue includes a number of pieces of which the gold certainly falls below seventeen carat, as may be seen in the following approximate determinations,[173] expressed in carats: 9.6 (No. 31); 12.0 (No. 33); 12.6 (No. 28); 13.3 (No. 115); 17.0 (No. 45); 19.7 (No. 81); 20.1 (No. 29); 20.7 (No. 25); 21.3 (No. 34).

[170] *J. E. A.,* Vol. VI, p. 283. Professor Rostovtzeff himself, however, in *Iranians and Greeks in South Russia,* Oxford, 1922, Ch. II, places his "copper age" culture in the IIIrd millennium B.C. This estimate for the Egyptian material involved is later than the most conservative dating current among Egyptologists.

[171] We have calculated the carat from all the published analyses of gold found in Egypt on which we could lay our hands. We tabulate the results here, giving references for the publication of each analysis and in parentheses the name of the analytical chemist.

A. Ist Dyn.: three gold-silver alloys, 19.1, 20.15, 20.2 carat (Gladstone); Petrie, *Royal Tombs. II,* pp. 39-40.

B. VIth Dyn.: two gold-silver alloys, trace of copper in second, 18.7, 19.6 carat (Gladstone); Petrie, *Dendereh,* pp. 61-2.

C. VIth (or XIth?) Dyn.: two gold-silver alloys, 22.12, 22.15 carat (Berthelot); *Annales du Service,* II, p. 158; *Journ. Royal Anthr. Inst.,* XLII, p. 253; *Annales de chimie et de physique,* 7th series, Paris, Vol. XXI (1900), p. 203; *Comptes rendus hebdomadaires des séances de l'Académie des Sciences,* Paris, Vol. CXXXI (1900), p. 462.

D. XIIth Dyn.: six gold-silver alloys, 18.5-22.2 carat (Berthelot); *Annales du Service,* II, pp. 158, 160.

E. XIIth Dyn.: two gold-silver-copper alloys, 19.9, 20.6 carat, 0.5 per cent. of copper in the first, 0.3 per cent. in the second (Berthelot); De Morgan, *Dahchour,* I, p. 145; *Annales de chimie,* Vol. IV (1895), pp. 572-3.

F. XVIIIth Dyn.: three gold-silver alloys, 17.5, 21.5, 23.1 carat (W. B. Pollard); three gold-silver-copper alloys, 17.3, 19.75, 19.79 carat, containing respectively 13.1, 1.5, 8.9 per cent. of copper (Pollard); Quibell, *Tomb of Yuaa and Thuiu* (Cairo *Catal.*), Cairo, 1908, pp. 78-9.

G. XVIIIth Dyn.: two gold-silver alloys, time of Amenhotep II, 19.46, 20.03 carat (Gladstone). *The Chemical News,* London, Jan. 11, 1901, and *Proceedings of the Society of Antiquaries of Scotland,* Edinburgh, Vol. XXX (1896), p. 33.

[172] See reference p. 96, n. 93; also Petrie and Mace, *Diospolis Parva,* p. 25; Petrie, *Royal Tombs. II,* p. 23.

[173] The percentage of gold in Nos. 45 and 81 was obtained by quantitative analysis. For all the other numbers it was calculated by Mr. Nyland from the specific gravity, making use of the results of Matthiessen as given in William T. Brannt, *The Metallic Alloys,* 3rd ed., Philadelphia, 1908, p. 79. The Matthiessen tables indicate the slight contraction which takes place in alloying gold and silver. We are indebted to the Bureau of Standards, Washington, for the warning that it does not appear to be possible to arrive at an exact determination of the carat by the density method. The Bureau made some density determinations on samples of gold alloy, and the gold content as determined by that method and by the assayer varied by approximately one carat. A certain margin of error is therefore to be reckoned with in the different carats enumerated above. The Bureau of Standards informs us that the method of analyzing gold by means of the spectrum is difficult of application to ancient objects because it is not certain that the standard samples available today are at all comparable with the composition of the ancient alloys. On this method, see *Scientific Papers of the Bureau of Standards, No. 444; Practical Spectrographic Analysis,* Washington, 1922.

That fine gold is not found in the earlier Egyptian jewelry is due, we doubt not, to inability on the part of the earlier metallurgists to separate the silver generally present with the gold in nature. Eventually a method of parting became known which depended upon the action of chlorine contained in common salt on the silver of native gold to form a silver chloride, from which the silver could be separated later by a second operation, one of smelting.[174] These processes in their essential action continued in use down to modern times and Agatharcides' slight description of them,[175] as carried on at the mines in Nubia, which was written with only a layman's understanding of such matters, has been elucidated by Gowland's account of the technique of the processes as he found them surviving in Japan as late as 1872.[176] Whether the Egyptians, or others, first learned to part gold and silver is unknown. The earliest recorded specimen of fine gold from Egypt is of the Persian period,[177] and the four determined in our collection (Nos. 38, 40, 97, 143) are all very late, although No. 38 may somewhat antedate the time of the Persians. The Egyptians had a term (*nb nfr*), however, which Lepsius first proposed to regard as meaning *fine gold,* and which has often been so translated by Professor Erman and Professor Breasted. Dr. Gardiner in the passage which we quoted from the papyrus Koller kept to the more literal and non-committal translation *good gold.* The term occurs first in the time of Ramses III,[178] and if it really signifies fine gold, the process for part-

[174] Some difference of opinion exists as to whether the ancients recovered the silver or whether it passed into the slag. On this point, see Möller, *Orientalistische Literaturzeitung,* Vol. 18, col. 79, and Rose, *The Precious Metals, Comprising Gold, Silver and Platinum,* New York, 1912, p. 128, referring to F. Hoefer, *Histoire de la chimie,* Vol. I, Paris, 1866, pp. 117-18. Gowland assumed that the silver was recovered; cf. our p. 21 and *Archaeologia,* Vol. XIX, pp. 136, 137.

[175] As given in Diodorus III, 14. The process was described also by Strabo (III, 2, 8) and Pliny (XXXIII, 25).

[176] *Archaeologia,* Vol. XIX, pp. 137-8 and briefly, *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 257. Cf. Berthelot, *Annales,* II, p. 157; Rose, *Precious Metals,* pp. 5-6, *Metallurgy of Gold,* 6th ed., p. 436. Möller, *loc. cit.,* supposed the parting to have been accomplished in late antiquity by melting with antimony sulphide, but in H. C. and L. H. Hoover, *Agricola,* p. 458, note 21, the various methods of parting known in the Middle Ages are reviewed, and the statement made that no ancient text has been found which seems to refer to the sulphide processes; in the view of these authors cementation with salt is the only process certainly alluded to by Greek and Roman writers; "the Romans amalgamated gold with mercury, but whether they took advantage of the principle to recover gold from ores we do not know." (p. 297, note 12).

It has interested us to find that at the International Exposition held at Philadelphia in 1876, the exhibit of Etruscan jewelry was divided into groups of "primitive" jewels of "uncupellated gold" and ornaments of "pure, cupellated gold"; see: *Special Catalogue of the Collection of Antiquities Exhibited by Signor Alessandro Castellani of Rome in Rooms U, V, W, Memorial Hall,* Philadelphia, 1876.

[177] Berthelot, *Annales du Service,* II, p. 158; *Annales de chimie,* 7th series, Vol. XXI, p. 204; *Comptes rendus. Académie des Sciences,* Vol. CXXXI, p. 463. The sample of gold foil or leaf analyzed contained 99.8 per cent. of chemically pure gold, equalling a quality of 23.95 carat. Modern "fine" gold, that which is called "commercially pure," is never quite pure chemically, but often attains to 99.98 per cent. of the chemically pure metal. The purest gold used in antiquity may well have been that refined for coinage. Barclay V. Head in *The Numismatic Chronicle and Journal of the Numismatic Society,* London, 3rd Series, Vol. VII (1887), p. 303, reported a gold stater of Croesus as having a specific gravity of 20.09, above that of ordinary fine gold, which is 19.3. The compression due to striking the coin and other factors may have influenced the density of the metal. Cf. also G. F. Hill, *A Handbook of Greek and Roman Coins,* London, 1899, p. 13, and references there given. Mr. Hill cites examples ranging in content from 95.8 to 99.8 per cent. of pure gold, none quite equal to modern fine gold. We do not overlook Gowland's suggestion in the *Journ. Royal Anthr. Inst.,* Vol. XLII, p. 253, that even Berthelot's sample may possibly have been of vein gold. All authorities agree, however, that native gold containing as much as 98.8 per cent. of pure gold is of very rare occurrence: cf. Clarke, *Data of Geochemistry,* p. 648.

[178] It was not used before the XXth Dyn., according to the evidence of the Berlin Dictionary (communication of Dr. Grapow).

ing gold and silver must have been known in the twelfth century B.C., but we must take account of the possibility that the term refers merely to the richer grades of native gold. In order, possibly, to determine when a process of separation came in, it is desirable to obtain a series of analyses of reliably dated gold from the period between the Eighteenth and Twenty-seventh Dynasties (1350-525 B.C.). Dated gold objects representing this period, except from the Nineteenth Dynasty, are not all too plentiful, but now that, by the microchemical method, gold may be tested accurately without injuring appreciably the object from which the minute sample is taken, there is more hope that such analyses may one day be made.

The metallurgical methods in use in antiquity were inadequate to eliminate the hard, white metals of the platinum group sometimes present in very small quantities with native gold.[179] Cailliaud, in the last century, called attention[180] to the occurrence of "platiniferous gold," yellow-gray in color, in the southern Sudan, but it would seem that platinum and kindred metals occur too frequently uncombined, as minute grains, associated with native gold, to admit of any successful attempt to locate the source of the ancient gold containing these impurities. Rarely, the Egyptians even obtained a native platinum alloy in a quantity to be beaten into sheet, for Berthelot found a narrow strip of such an alloy inlaid in a metal case for an ivory tablet;[181] its resistance to tests was not only greater than that of gold, but greater than that of pure platinum, and he considered it a complex native alloy, containing several of the metals of the appearance of platinum, and even some gold; it was perhaps thought to be a kind of silver by the Egyptians. Presumably the specks of white metal in ancient gold have been noticed by many observers, but they have seldom been referred to in archæological writings. We have seen only Professor Petrie's references[182] to osmiridium as occurring in gold dated to the Twelfth Dynasty and Mr. Pollard's remark that no evidence of platinum was found in the samples of gold from the tomb of Queen Tiy's parents.[183] White metallic particles were found of late abundantly present in the gold of a remarkable Greek bowl dated to the seventh century B. C.[184] and we noticed similar specks of white metal in a gold earring of the type of our No. 44, from Memphis, now in the University Museum, Philadelphia. Many gold objects of the present catalogue, in all about two dozen, contain such particles; the specks vary in size from those noticeable to the unaided eye down to those so small as to be visible only with a microscope; usually, however, after one's attention has been called to them, they are seen without the microscope. These impurities are perhaps of importance with reference to the subject of forgeries. To say that their presence in its material is proof of the antiquity of an object would be hazardous, since they have been known to occur sometimes in modern commercially refined gold,[185] and

[179] Gowland, *The Metallurgy of the Non-Ferrous Metals,* 3rd ed., London, 1921, p. 254; Clarke, *Data of Geochemistry,* p. 648 under C, D, E.

[180] *Voyage à Méroé,* Vol. III, p. 19.

[181] "Sur les métaux égyptiens. Etudes sur un étui métallique et ses inscriptions," pp. 121-41 in: *Monuments et mémoires* (Fondation Eugène Piot), Vol. 7, Paris, 1900; also in *Archéologie et histoire des sciences,* Paris, 1906, pp. 25 ff. Cf. Vernier, *Bijouterie,* p. 1.

[182] *Ancient Egypt,* 1915, p. 23; *Naqada and Ballas,* p. 66.

[183] In Quibell, *Tomb of Yuaa,* p. 78.

[184] In the Museum of Fine Arts, Boston, published by Mr. L. D. Caskey; Boston *Bulletin,* Vol. XX (1922), pp. 65-8.

[185] Rose, *Metallurgy,* 6th ed., p. 435.

their absence must not be taken as condemning a piece, but it is perhaps not too much to assert that their presence in the gold of an object of doubtful authenticity is reassuring and should have weight in considering its claims to be accepted as ancient.[186]

Thus far, our discussion has started from alloys in which gold predominates. We turn now to silver, and give first the analysis of a sample taken from the silver beads found in a predynastic tomb at El Mahasna, which were presented to the Musée du Cinquantenaire in Brussels.[187] This sample is probably the earliest silver utilized by man to be analyzed, dating as it did from at least the fourth, if not the fifth, millennium B. C. The analysis, kindly made by M. Huybrechts, professor of analytical chemistry in the University of Liége, follows:

"Silica (SiO_2) ..... 2.55 per cent.
Metallic silver ..... 4.07 " "
Ferric oxide (Fe_2O_3) ..... 2.55 " " (corresponding to
1.67 " " of iron, Fe)
Some traces of calcium in the form of the carbonate."

The 90.83 per cent. remaining consists of compounds resulting from the alteration of the silver, notably of chloride of silver (soluble in ammonia, out of which it can be precipitated by sulphuric acid) and a little carbonate of silver (the coating of the beads effervesces with the acids). The amounts of silica and of ferric oxide are actually the same, but this is mere chance, for in the unaltered object the iron was present not in the state of ferric oxide, but in the state of metallic iron of which the weight is 0.7 of that of the oxide; the proportions of iron and silica in the metallic silver, consequently, were not equal."

It is not within our province to judge whether the absence of lead from this earliest Egyptian silver is unfavorable to the view previously mentioned, that from the first, silver was reduced from lead ores. But however this silver was obtained, it would seem that Egypt may never have gone through the stage of using coarse alloys of silver and lead such as those found much later in Cyprus in the Second Bronze Age (about 2000-1500 B. C.).[188] Further, three samples of silver from objects of the nineteenth century B. C., analyzed by Berthelot,[189] were without lead; and a sample of silver of about 1400 B. C. analyzed by Mr. Pollard, contained 8.4 per cent. of gold, and 4.3 per cent. of copper present with the silver, but no lead.[190] Among the silver alloys represented in our pieces, four, to be sure, contain lead, but only in very small quantity: Nos. 26, 30, 32, and 151. The late ring shank, No. 21, is apparently of fine silver, dating from a time when, probably, metallurgical

[186] Only, however, when distinctly irregular in form. As explained to us by the United States Assay Office at New York, there is little possibility, if any, of these crystals occurring in gold refined by the electrolytic process used in all our government refineries, although they may occur in the sulphuric acid method of parting. We had noticed a bright white spot in one of our modern experimental pieces made of rolled gold and with reference to this were told: "Where refined gold is subjected to mechanical treatment such as rolling, there is always danger of contamination. Gold rolled out on rolls which have previously been used on silver or platinum will very often show bright spots of these metals no matter how much care has been used in cleaning the rolls. A drop of nitric acid will readily determine silver."

[187] Ayrton and Loat, *El Mahasna,* p. 30, G.

[188] John L. Myres, *Handbook of the Cesnola Collection of Antiquities from Cyprus* (*M.M.A.*), New York, 1914, p. XXIX.

[189] De Morgan, *Dahchour,* I, p. 146; *Annales de chimie,* Vol. IV, pp. 573-4.

[190] Quibell, *Tomb of Yuaa,* p. 78.

methods were equal to freeing the silver not only of lead, but of all other impurities. The silver alloy of No. 35 contains 10 per cent. of gold. Hitherto unknown from Egypt is a silver-tin alloy, No. 27, in which the tin is present to the amount of 15.2 per cent. Strangely, even fewer analyses of silver from Egypt have been published hitherto than of gold; we have seen only the four mentioned above and in view of this dearth give the following analysis of a sample which we owe to Mr. Lythgoe's interest in this investigation and which was taken from a fragmentary silver vessel of the time of Ramses II (1292-1225 B. C.):

Weight as received.....	0.48312	grams		
" of gold found.....	0.00648	"	= 3.24	per cent.
" " silver "	0.18493	"	= 92.46	" "
" " copper "	0.00770	"	= 3.85	" "
" " lead "	0.00090	"	= 0.45	" "

Of this alloy, Dr. Whitfield, who analyzed it, wrote to us: "It is without doubt a gold-silver alloy with the copper and lead added for strength and hardness, and it compares well with one variety of the modern 'White Gold'."

Dr. Whitfield's opinion that in this ancient silver alloy the copper and lead were deliberately added brings us to another problem, one of great interest for the study of man's progress in the industrial arts, and that problem concerns the time when alloys made by man and adapted to specific purposes were introduced. Undoubtedly for centuries, possibly for millenniums, only alloys found native were in use. Undoubtedly the first experiments were made in combining these alloys, long before man was in possession of the pure metals; indeed, at the present day, alloys are not always put together exclusively of commercially pure metals, but other alloys may enter into the new combination. Some ancient alloys put together by man may be indeterminable as such, because approximating to combinations found in nature. This, we presume, is the reason why Berthelot, after querying whether or not certain alloys of the nineteenth century B. C., which contained gold, silver, and copper, were man's work,[191] gave only an inconclusive answer.[192] But it should be possible to trace the coming in in Egypt of alloys identifiable by their composition as the products of human experiments and this has not been thoroughly done. Dr. Gladstone was of the opinion that native alloys were used exclusively until into the Eighteenth Dynasty,[193] but none of the analyses he published revealed more than a trace of copper. The earliest alloys of gold, silver, and copper, known to us, which contain copper in such a quantity as to render it improbable that they were found native do indeed date from the Eighteenth Dynasty, around 1400 B. C.[194] Berthelot's three analyses of silver of about 1900 B. C.[195] all revealed the presence of copper, of which the highest percentage was 2.18, but we take it that this amount of copper would not be surprising in silver found native or reduced

[191] See references, n. 171, above, under E.

[192] Cf. Götze in Dörpfeld, *Troja und Ilion,* Vol. I, p. 366, who pointed out that no investigations had been made, which would enable one to decide whether the electrum of strata II-V at Troy was native or artificial.

[193] *The Chemical News,* Jan. 11, 1901.

[194] See above, n. 171, under F.

[195] See above, n. 189.

from lead ores.[196] The alloys determined in the present catalogue do not solve the question, for none among them, except possibly the late No. 35, is of a character to compel the view that it was artificially made.

An exhaustive study of Egyptian gold-silver alloys would require the consideration of the terms used in Egyptian texts for different varieties of gold. We have already commented briefly on the term *good gold* and wish here to touch on only one other, that still supposed, outside the ranks of Egyptologists, to be connected etymologically with the Greek word *asemos,* and, like it, to be about equivalent in its principal meaning to that other vague word for a gold-silver alloy, electrum, which has come down from Greek through Latin into our modern vocabulary. When Richard Lepsius long ago wrote the valuable monograph [197] which has remained the point of departure for all study of the literary and inscriptional evidence about the metals and gem-stones used by the ancient Egyptians, the word in question was supposed to contain the consonants *wśm;* Lepsius vocalized the word *asem* and in this form it occurs frequently in the writings of Berthelot and others who have interested themselves in the history of the metals in Egypt. But the earlier reading of the hieroglyphs with which the word is written has been proved to be incorrect,[198] therefore the supposed derivation of *asemos* from the ancient Egyptian word falls to the ground. The supposed meaning of the Egyptian word, "electrum," also probably is not correct. It seems indeed sometimes to be appropriate, but the distinction between the word *nb, gold,* and this one, *ḏCm,* which is the subject of our remarks, probably has nothing to do with composition or color. The one is the common prose word for *gold,* the other a poetical, even at times, affected, word also for *gold.*[199] Presumably through many centuries both words could be applied to all gold-silver alloys which were not pale enough to be called preferably *white* (metal),[200] that is, *silver;* there is, however, a rare term *white gold,*[201] which occurs in the Harris papyrus, and which it would seem, must mean *electrum.*

In order to indicate roughly the apparent relative character of the alloys of the present catalogue which have not been submitted to chemical analysis—as these alloys appeared to our eyes after being freshly cleaned with mineral oil [202]

[196] Gowland, *Archaeologia,* Vol. XIX, p. 131, says that native silver has been found to contain up to ten per cent. of copper, and on p. 143 he speaks of copper as universally present in cupelled silver and gives an analysis of silver, supposedly obtained from argentiferous lead by cupellation, which contained 3.23 per cent. of copper.

[197] *Die Metalle in den aegyptischen Inschriften* (*Abhandlung der Königl. Akad. der Wissenschaften zu Berlin, 1871*), Berlin, 1872.

[198] Gardiner in *Ä.Z.,* Vol. 41 (1904), pp. 73-6; Sethe, *Ä.Z.,* Vol. 44, p. 132.

[199] Gardiner, *Recueil de travaux relatifs à la philologie et à l'archéologie égyptiennes et assyriennes,* Paris, New Series, Vol. II (1912), p. 205, apropos of Sinuhe 308; p. 154 in Erman, *Aegyptisches Glossar,* Berlin, 1904, now superseded by Erman and Grapow, *Aegyptisches Handwörterbuch,* Berlin, 1921; see p. 219.

[200] The noun to which "white" applies is not expressed; we do not see the necessity of supposing it to be "gold," as many commentators have done, for the whiteness of silver is a striking enough characteristic to have given a name to the metal, without implying a comparison with gold, and it is entirely uncertain whether in Egypt gold was known before silver. Like the writing of the word gold, that of silver terminates with a picture of an archaic bead necklace, which may have been conceived as made entirely of silver, even if the supply of silver was inadequate to the production of very many such necklaces. We are, however, ignorant of economic conditions in the north of Egypt in the early time when these terms came into existence.

[201] It is not, however, of late origin, but occurs in the Old Kingdom, as Dr. Grapow has informed us, citing Petrie, *Medum,* London, 1892, Pl. 13. Cf. now, Erman-Ranke, *Aegypten,* p. 554.

[202] A mineral oil dissolves sulphide of silver which is the chief ingredient of the ordinary tarnish on silver.

and pure grain alcohol—we have used the following terms: gold, pale gold, electrum, silver. "Gold" is confined to the pieces of high carat of which the color is a rich yellow; when the color is actually that of fine gold we have said so in our text. "Pale gold" indicates a somewhat paler yellow, and "electrum" an alloy only slightly tinged with yellow, intermediate in color between "pale gold" and "silver." The surface appearance of gold is sometimes affected by foreign matter adhering to it in a very thin film, and such matter is especially liable to be present on jewels which were once in contact with the mummy or on foil once gilding an object by means of an intermediate layer of plaster.[203] Dr. Gladstone, on the other hand, found on samples of ancient gold a tarnish attributable to chemical change, of which he wrote as follows: "Some of the foil is much tarnished, and this I found to be due to the formation of chloride of silver, which of course turns dark in color when exposed to the light. As this appears as a superficial crust, we seem here to have an instance of the slow diffusion of one part of the alloy—the silver—till it reaches the outside surface where it meets with the chlorides that exist in the sands of the desert." [204] But even after jewels have been cleaned in the manner named above, a slight red-brown to dark discoloration may gradually creep over the whole or part of their surface, especially over those of the lower carats. This was the cause, one time, of a mistaken conviction on our part, that some of the pieces of the present collection contained copper. Mr. Whitlock kindly tested one of them, No. 114, in a flame, when copper, if present, would have imparted a greenish tinge to the flame, and this test which resulted adversely to the presence of copper, was later confirmed by Mr. Nyland's analysis of the gold of the companion piece, No. 115. We are indebted to Mr. Nyland for the following statement: "I do not know what the reddish color may be due to. I feel sure it is no separate metal, but it may be that interference colors on a thin film of impurity (grease, moisture) produce this. If the Egyptians used a flux in soldering (like a chloride salt) as in the gold diadem (No. 2), the alloy may have changed a little by this action. These are two suggestions which are both plausible to my mind."

The last subject to be considered in a general way in this Introduction is that of the technical processes represented in the jewels of the present catalogue. We shall, indeed, leave the majority of these processes, such as chasing, engraving, casting, striking in dies, and gilding, to be taken up incidentally, so far as they are illustrated in our gold and silver objects, but about a few of them, the inlaying of gold, the production of granulated decoration, soldering, coloring, wire-making, and the making of artificial pearls, some discussion here is desirable.

Möller called attention to an amulet case of the First Dynasty as affording the earliest known example of gold inlaid with another substance.[205] The exact nature of the inlay has never been determined, although the description of it as a "dark blue paste" suggests that it may have been worked in a soft state into the depressions prepared for it. The characteristic Egyptian inlays for gold, however, which are well illustrated here in Nos. 3 and 104, were semi-precious stones, which were fitted to their destined positions by grinding. When glass was used instead of

[203] So Berthelot in *Annales du Service,* II, p. 159.

[204] *The Chemical News, loc. cit.*

[205] In Schäfer, *Goldschmiedearbeiten,* p. 61, n. 2; original publ.: Reisner, *Naga-ed-Dêr,* I, pp. 31, 143, Pl. 6, No. 1.

gem-stones it was made ready in the same way, by grinding the cold, hard glass into pieces of the required shapes; and glazed pottery was similarly employed.[206] The Egyptians were very skillful in utilizing glass by this method, for some marvelous portrait heads have survived which have been patiently worked out of pieces of a glass found in nature, obsidian.[207] The term "cloisonné work" may be applied to the inlaid jewelry from Egypt without doing violence to its derivation, since the cloisons are present in the Egyptian work, but it really connotes quite a different technique. In genuine cloisonné work, the cells are filled with enamel, a vitreous substance, which is put into them in powdered or sand-like form and then fused into place, when it fills the cells completely and unites very firmly with the gold; finally the visible surface is ground smooth.[208] No heat was applied to the great majority, if to any, of the comparable Egyptian jewels after the gold shell with its cells had been completed (No. 98 b), nor was the visible surface ever given the smoothness and continuity of modern cloisonné work. The Egyptian inlays were held in place principally by the bed of cement in which they were laid; in the better pieces they fitted closely enough to be held also, in small part, by the gold walls of the cloisons, but they never filled the cells so completely as does the enamel of cloisonné work. The Egyptian technique was invented in the Old Kingdom or earlier, for it is found imitated in dummy ceremonial vessels from the funerary temple of the Fifth Dynasty king Neferirkere;[209] also in many of the pictures of royal adornments on coffins of the period around 2000 B. C., which had their inspiration in the king's jewels as developed by the close of the Old Kingdom, it is suggested in their form, colors, and materials (given in legends).[210] Mr. Marc Rosenberg has commented on the fact that this technique of inlaying gold and silver with stone and glass is only one branch of a technique much practised in ancient Egypt, which included the similar inlaying of wood, stone, and other materials.[211] He has also discussed some other, less well understood, Egyptian inlays, those which were not ground out in one piece from solid material, opposing the theory that they constituted true enamel,[212] although he would regard them as forerunners of enamel, and suggesting that they consisted of powdered substances mixed with

[206] Good examples in Schäfer, *op. cit.*, No. 92.

[207] Notably a head of Amenemhet III, formerly in the MacGregor collection, which in 1922 passed for the sum of £10,000 into a private collection; see Burl. Fine Arts Club, *Catal. Egypt. Art,* 1922, Pl. I; *J. E. A.,* Vol. IV (1917), Pl. XIV. Another example of lesser merit is in the Metropolitan Museum of Art; see Mace, *The Murch Collection of Egyptian Antiquities* (Supplement, *Bull. M. M. A.,* Jan. 1911, reprinted 1916), p. 26 and Fig. 17.

[208] The technique as practised by modern craftsmen is described in Herbert Maryon, *Metalwork and Enamelling. A Practical Treatise on Gold and Silversmiths' Work and Their Allied Crafts,* London, 1912, Ch. XXIII and H. Wilson, *Silverwork and Jewelry. A Text-Book for Students and Workers in Metal* (No. II in "The Artistic Crafts Series of Technical Handbooks," edited by W. R. Lethaby), 2nd ed., New York, 1912, Ch. XXIV; Henry Cunynghame, *On the Theory and Practice of Art-Enamelling upon Metals,* Westminster, 1899. A fuller treatment from the historical point of view is contained in Marc Rosenberg, *Zellenschmelz II. Technik* (in *Geschichte der Goldschmiedekunst auf technischer Grundlage*), Frankfurt am Main, 1921.

[209] Borchardt, *Das Grabdenkmal des Königs Nefer-ir-ke-re* (11te wissenschaftliche Veröffentlichung der D. O. G.), Leipsic, 1909, pp. 59 ff., Pls. I, IV; also Breasted, *Ancient Times, a History of the Early World. An Introduction to the Study of Ancient History and the Career of Early Man,* Boston and New York, 1916, frontispiece.

[210] Evidence exists also in Old Kingdom representations of contemporary jewelry.

[211] *Aegyptische Einlage in Gold und Silber,* Frankfurt am Main, 1905.

[212] *Zellenschmelz I. Entstehung,* 1921.

a binder, which were pressed into the cells to give them the right shape and then taken out and heated,[213] or, within the cells, perhaps, were subjected to a low heat,[214] not sufficient to fuse them. Even the enameled bracelets from Meroë, dating from the first century after Christ, differed from the eventual developed cloisonné enamel in not having smoothly ground surfaces,[215] although their cells were filled by fusing powdered glass into them. Mr. Rosenberg has also discussed [216] certain metallic inlays in Queen Ahhotep's jewelry, which he regards as the earliest known niello. All this subject of the inlays other than gem-stones, glass, and glazed pottery, appearing in Egyptian jewelry,[217] requires further investigation, and a study of the new, abundant material from the royal ateliers of the late Eighteenth Dynasty, of which the newspaper reports are just appearing as our text undergoes its last revision, may be expected to clear up definitely many of these questions.

The subject of granulations, such as those which form the main, or subsidiary, decoration of Nos. 1, 19, 64, 69, 82, 83 and 95, has been much discussed—in recent years, especially by Mr. Rosenberg and Mr. C. Densmore Curtis; to the important monographs of these authors [218] we refer the reader for a general treatment of granulated work and for references to the earlier writings on the subject. Mr. Curtis, who had the opportunity to examine the entire series of Egyptian granulated jewels preserved in the Cairo Museum, and brought to this study an intimate acquaintance with other ancient granulated work, has commented in a valuable and informing way on the technique and varying artistic merit of the several pieces. We have not had the opportunity, nor ever the purpose, to go into the subject in the same comprehensive manner, but the presence in the Abbott collection of one granulated piece (No. 1) which is apparently as old as any in Cairo, and, indeed, as any piece known from antiquity, has led us, in accordance with the general plan of this catalogue, to inquire how the granulations were made.

This inquiry includes two main questions: first, how the grains of gold were produced, second, how they were fastened in a pattern to the object to be decorated. The first question is comparatively unimportant, because the tendency of molten metal to gather and then solidify in spherical form may be taken advantage of in very many ways. Our preparator readily produced grains found when tested

[213] *Zellenschmelz I*, p. 7 and p. 8, n. 1.

[214] *Op. cit.*, p. 11. Cf. summary of development leading to true cloisonné enamel on p. 44.

[215] *Op. cit.*, p. 42.

[216] *Geschichte der Goldschmiedekunst. Abteilung: Niello*, Darmstadt, 1907, p. 3. Cf. our p. 239, also M. Vernier's account of a kind of niello of Dyn. XXVI, discovered by Berthelot, in *Bijouterie*, p. 30. This was found in the tablet case mentioned by us on p. 27, with references to Berthelot's discussion of it.

[217] Of great interest in this connection are the parts of a bead collar found at Enkomi on the island of Cyprus, of which the units are strikingly Egyptian in design, but the technique is different from that of any work actually found in Egypt thus far studied. Here, as described by Mr. Rosenberg, the cells are filled with enamel, but are defined not by strips of gold sheet but by wires which project on the surface above the level of the enamel. Authorities are not agreed as to whether these pieces were made in Cyprus under Egyptian influence or imported from Egypt. See: Rosenberg, *Zellenschmelz I*, pp. 12-14, 44; Marshall, *Jewellery*, No. 581, and the references given there. Cf. M. Vernier, who recognizes that Egyptian inlaid work requires further study: *Bulletin de l'Institut Français d'Archéologie Orientale*, Cairo, Vol. VIII (1911), pp. 39-40.

[218] Rosenberg, *Geschichte der Goldschmiedekunst. Abteilung: Granulation*, Frankfurt a. M., 1918. Curtis, *Ancient Granulated Jewelry of the VIIth Century B.C. and Earlier* (in Vol. I of the *Memoirs of the American Academy in Rome*), Bergamo, 1917; also an earlier paper "An Early Græco-Etruscan Fibula" in *The Journal of Roman Studies*, London, Vol. IV (1914), pp. 17-25.

with a micrometer caliper to be as small, and when compared under the microscope to be about as well formed, as those of the amulet No. 1; he made these grains by cutting sheet gold into tiny rectangles, which he then arranged on a charcoal block and melted by directing a blow-pipe flame vertically upon them. Another technique, that used by Mr. Heins, will be described presently, and in the literature of the subject many possible ways of obtaining the grains are suggested. Probably during the many centuries and in the many countries in which ancient granulated decoration was produced, more than one procedure for fastening the grains to the gold object was developed. Whatever the variations in the details, however, all methods reduce to two principal ones, that of fusing, or sweating, the grains in place and that of soldering them to their ground, and for both these ways some kind of adhesive matter was usually necessary to hold the grains in position until a metallic union could be effected. The majority of the experiments attempting to discover the secrets of the ancient processes have been made with solder. So far as the Castellani firm revealed their methods of making the "Etruscan jewelry", once so popular, their process of attaching the grains was one of soldering.[219] Mr. A. H. Smith, in the article "Jewelry" in the eleventh edition of the "Encyclopædia Britannica", went so far as to imply that the Castellanis solved the problem which so long had puzzled students of ancient jewelry; but this is too much to say for their work.[220] Mr. Rosenberg illustrated side by side, in the size of the originals and enlarged, an ancient head of Pan and the Castellani reproduction of it, showing how the grains of the modern piece are half embedded in the solder, in contrast to the ancient grains which are free over about three-fourths of their surface, and how in other particulars the modern piece fails to reach the high standard of the ancient work. Mr. Rosenberg suggested that the ancient grains were fused in place and expressed the view that this fusing was made possible by an absorption of carbon into the grains while they were being manufactured, which enabled their surfaces to melt at a slightly lower temperature than that of the gold to which they were to be attached.

[219] One searches the writings of Augusto Castellani in vain for the slightest hint of how he really operated; Thomas B. Wigley in *The Art of the Goldsmith and Jeweller,* 2nd ed., London, 1911, p. 122, remarked: "Unfortunately, Signor Castellani has not revealed to us the methods and processes he adopted, so that any further attempt to imitate the Etruscan style of jewellery must be preceded by a thorough study of the subject." But Alessandro Castellani (see passage quoted by Marshall, *Jewellery,* p. LIV, n. 4) speaks of "substituting arseniates for borax as solvents and reducing the solder to an impalpable file-dust." Nor have the methods used by Messrs. Tiffany and Company in reproducing jewelry from the island of Cyprus ever been described. Mr. H. W. Kent and Miss Winifred Howe kindly called our attention to a passage in the *Annual Report of the Metropolitan Museum of Art, for the year ending May 1, 1878:* "Messrs. Tiffany and Company, of this city, were authorized to make reproductions of some of the finest specimens of old jewelry; and the necklaces, bracelets, rings and other beautiful works in gold which they have made in *fac-simile* have been widely scattered, conveying in many directions the ideas and instruction of Phœnician and Grecian artists." In the years 1877 and 1878 many pieces of jewelry were temporarily committed to their care for precise study and reproduction. These reproductions awakened much interest at the Paris International Exposition of 1878. No doubt, for many years, the demand in New York for the so-called Etruscan jewelry, referred to in Mrs. Wharton's *The Age of Innocence,* Ch. XII, was partially met by these American-made jewels, inspired by ancient Cypriote pieces!

[220] The Castellani brothers never claimed so much. Mr. Rosenberg cites Augusto Castellani as saying in 1862 in his *Dell' oreficeria antica* (a rare pamphlet published in Florence of which the New York Historical Society possesses a copy) that they had solved the problem only "in massima parte," and Alessandro Castellani in the passage referred to in the preceding note, after telling of the achievements of his workmen from the Abruzzi, continued: "Nevertheless, we are convinced that the ancients had some special chemical process for fixing these strings of small grains of which we are ignorant; for, in spite of all our efforts, we have been unable to reproduce some exquisitely fine workmanship. . . ."

Mr. Curtis, commenting on Rosenberg's suggestion, said that the method of fusing could not have been generally used because in examining ancient granulated work under magnification, one is able constantly to see the solder, and in his discussion of individual ancient pieces of granulated work, he referred again and again to the solder. When we first examined with a microscope the most elaborately granulated jewel of the present collection, the amulet No. 1, we, too, thought we saw the solder. But Mr. Heins has taught us that after grains have been fused in place their appearance when magnified may be the same as if they had been delicately soldered, that is, they are held to the ground and in many instances to one another, by bridges of metal which one would readily suppose to consist of solder.

We have no intention to generalize as to how ancient granulated work was done, but think it may be useful to show that Mr. Heins did secure, in experiments here, by the method of fusing, a close approximation to the appearance of the ancient work on our Egyptian amulet. Three of his small experimental pieces are reproduced in their actual size in our Plate XXXVII, B to D, and the piece D is given in the same plate, at A, enlarged to the scale of the double row of grains on Plate II, g. The plates fall far short of being as convincing as is an examination of the actual pieces, in various positions, by daylight, with the help of a microscope, because in the plates only a single illumination of each piece is caught, and we must ask the reader in part to take our word for it that the resemblance of the experimental pieces to the ancient work is very close. The piece D is actually a more successful job, as the amount of connecting metal is less than in our ancient example. The piece B is more nearly of the quality of the decoration of our amulet, but as the photomicrograph of it was less successful than that of piece D, we have reproduced the latter. For the piece B, Mr. Heins made the grains in depressions in a block of charcoal and afterwards used only the ordinary flux, borax, to hold them in place until they could be united with one another and the ground by fusing. The technique of the piece D and Mr. Heins' explanation of it, we give in his own words: "Through careful manipulation of the blow-pipe, a thin sheet of high carat gold may be heated to such a degree that merely the surface will melt, without causing the metal to shrivel or blister. Since it is possible to liquefy the surface layer of the gold, it is quite obvious that the molten metal may act as solder. The grains of this experimental piece all range between 0.0175 and 0.0180 inches in diameter and their gold is of twenty-two carat. They were made in the following way: first, small pieces of equal length were cut from very fine wire and placed on the curving walls of a large hollow in a charcoal block; from the bottom of the hollow a hole had been pierced downward through the block, and the snippets of gold, immediately on becoming globular under the blow-pipe flame, by which they had been brought to a white heat, rolled down toward the hole and fell through it, plunging into a cup of water, placed below the block to receive them. The movement of the hot grains helped to conserve their spherical form which was then solidified by the sudden cooling; the grains were now pickled and afterwards well rinsed in water. No flux wa used because gold of high carat forms very little 'oxide', and borax, the usual flux, would have had the effect to hold the grains to the charcoal block as they formed, preventing them from rolling. I have found by comparison under the microscope that grains made in this way are more nearly spherical and smoother of surface than those made in minute depressions in a char-

coal block. A small piece of sheet gold, 0.042 inches in thickness, was next placed on a charcoal block and to the surface of the gold was added a drop of gum tragacanth. The grains were put into the gum where they assembled in a mass, after which excess gum was removed with a blotting paper, and the grains were pushed with a wire until arranged after the manner of one of the zigzags on the ancient amulet, with every grain, except those at the ends, touching four others. The gold was now heated from above with a small blue flame—gently at first, to dry the gum; had it been heated rapidly the sizzling gum would probably have displaced the grains. The heating was continued until both the sheet and the grains reached a brilliant light-orange hue, or until the surface metal began to shimmer and glisten. Too much heat will cause the grains to run together and to combine with the sheet, but if the work is brought to just the right degree of heat, the molten metal from the surfaces of the sheet and grains flows by capillary attraction to the points of contact, as if it were solder, and the grains become 'fused' to one another and the sheet. The difficulty of fastening grains to a cylindrical surface may be obviated by first fusing the grains together into a 'beaded' wire, and then carefully bending this beaded wire to conform with the contour to which it is to be applied (Plate XXXVII, C) and fusing it in place; this method requires close attention because the grains are submitted to two heatings, and the spaces which should remain open may very easily become filled with excess metal, ruining the appearance of the work. Large numbers of grains completely covering a given area can be fused in position in one heating. Joints, too, if the gold is of high carat, can be fused together, and wires and bezels, if also of high carat and to be applied to gold of the same, or of only slightly varying, high carat, can be fused in position by the same operation of heating as that employed for the grains. Thus the craftsman has the opportunity to create a limitless number of designs. The advantages of fusing are the ease with which it can be done and the uniformity of color which it insures to the work." To this account we may add that although soldering is without question the most practical way to unite larger pieces of gold, when numerous minute grains are to be soldered, the operation is no longer a simple and easy one; the technical books for craftsmen give detailed directions for a somewhat troublesome process [221] of soldering to be employed in the case of grains which are not so small as our ancient ones. Mr. Heins, at least, thinks it impossible by soldering to keep the work as delicate in appearance, with as much of the surface of the grains left free, as is possible by fusing.

In the course of writing this catalogue, we have often been asked whether the ancient craftsman had magnifying glasses and if not how he was able to do such minute work. There is no evidence from Egypt of the use of magnifying glasses in antiquity. Glass lenses utilized as bull's eyes and belonging to the Roman period have been found,[222] and, conceivably, men of earlier times may have chanced upon pieces of rock crystal which would magnify, but we doubt if any such ancient use of rock crystal was ever, at the most, more than accidental and exceptional. Indeed there was far less need of magnifying glasses than the casual observer thinks. The experimental pieces of our Plate XXXVII were made without any such aid. We,

[221] Wigley, *op. cit.*, p. 124; Maryon, *Metalwork,* pp. 64-6; cf. on soldering very fine twists of wire, R. Ll. B. Rathbone, *Unit Jewellery,* London and New York, 1921, p. 237.

[222] Petrie, *Hawara, Biahmu, and Arsinoe,* London, 1889, p. 12, Pl. XX, 9, 10.

truly, endeavoring to find out how the ancient work was done, are helped by seeing it magnified, but it was not necessary to see its details so clearly in order to produce it. Well practised routine processes were employed in its manufacture and by these, many effects were obtained which the ancient craftsman did not see so well as do the modern students of his work. He was led to use such tiny units because he instinctively liked the resultant refinement of style. Accordingly, our Plate XXXV, "Ancient Mishaps and Repairs," is somewhat unfair to him! As we have magnified his mischances, they never looked to him and his contemporaries, but the purpose of the plate is to make easily evident that the ancient workman did not always reach the high pinnacle of perfection to which he is sometimes supposed to have attained, and to show what some of his occasional troubles were. In No. 3 d we see a panel of solder which was heated only enough to make it stick to the gold loop, while the joint below, which it should have closed, gaps wide open; in No. 9 c we observe where a panel of solder melted, to be sure, but instead of closing the joint, gathered in a little oval mass outside it; the other enlargements illustrate the patches of sheet gold which, at least as early as the Eighteenth Dynasty, were skillfully soldered, or fused, over burned places; and in No. 86 b, further, the wires are seen to be buried in an excess of solder—or in their own once molten metal, if, in this piece, as we think possible, the process of fusing was used unsuccessfully.

From the preceding discussion, it will be evident that we are by no means in a position always to distinguish between soldered and fused joints. A modern jeweler relies upon fine finish to render the joints unnoticeable; in an overlapping seam all the visible solder may be polished away and in a contact joint, as in the shanks of finger rings which have had to be altered, it may be reduced to a fine hair line of paler color which the ordinary observer entirely overlooks; but the ancient craftsman did not so much value a minute, smooth finish to his soldered work and often left it in what would be called today the "first stage".[223] The pertinent evidence, then, in ancient work is not entirely obliterated. Sometimes, especially in less prominent situations, when a distinctly paler hue is observable in the joint—and the present writer has seen this difference of color again and again in Egyptian jewelry—we may be reasonably certain that the joint was soldered. When the color is uniform throughout the work, however, we are not to infer that necessarily its seams were fused; instead, the work may have been soldered and then submitted to some coloring process to eat out the baser metal from the surface and thus to leave a film of fine gold over the entire piece; the chief methods for coloring suggested by modern writers as having been used in antiquity are that of cementation[224] and that of immersion in an acid bath. M. Vernier even expressed the opinion that the Egyptians regularly "colored" their jewelry to bring the solder

[223] We called attention to this point in the *Bull. M. M. A.*, Vol. X (1915), p. 118.

[224] This method, an application of the method for parting gold and silver, was suggested with reference to electrum coins which often show a fine gold color in depressions which have not been subject to wear; K. B. Hofmann, *Numismatische Zeitschrift,* Vienna, Vol. XVI (1884), p. 55. Cf. Rosenberg, *Geschichte der Goldschmiedekunst auf technischer Grundlage. Einführung,* Frankfurt a. M., 1910, p. 37, with n. 2, and prescription No. 25 in the Leyden papyrus X, as translated and interpreted in: Berthelot, *Collection des anciens alchimistes grecs,* Paris, 1887-88, Vol. I, pp. 35, 57-8; also Gowland, *Journ. Royal Anthr. Inst.,* XLII, p. 253, commenting on Barclay V. Head's conclusions from color and specific gravity, given in *The Numismatic Chronicle,* 3rd Series, Vol. VII, pp. 298-308.

to a like hue with that of the surfaces joined, and he brought out the idea that the coloring process is similar in nature to "pickling" by which the burned flux and the oxides which gather on work in soldering are removed, although in coloring, the agents used are stronger and attack the alloy itself. In M. Vernier's opinion, vinegar served the ancient Egyptians as pickle, but for coloring they had nearly all the agents employed in modern times [225]—until the process was superseded by electro-gilding, in which a layer of fine gold is superposed over the alloy. There seem, however, to be simpler possibilities with regard to ancient methods of coloring. Gowland pointed out [226] that the Japanese effected the same result with the juice of unripe plums and the Egyptians may have had some fruit acid strong enough to utilize in like manner. Then the "fire skin" which modern craftsmen occasionally produce may have had its parallels in ancient Egypt. As described to us by Mr. Heins, the piece of jewelry is heated to a dull red, then allowed to cool somewhat, after which it is dropped into a cold sulphuric acid pickle, consisting of about one part of acid to twelve of water. This procedure is gone through with many times in succession, and with each heating some of the alloy forms an oxide on the surface, and with each acid bath this oxide is removed, until eventually the work may be brought nearly, or quite, to the color of fine gold.[227] We do not intend to suggest that the Egyptians had sulphuric acid, which would have been difficult for them to store, even if they ever discovered it, but they may have come empirically to the knowledge that they could improve the color of their work by continued alternation of heating and quick pickling—in vinegar or whatever else they used; the method takes advantage of the fact that the oxides of silver and copper may be reduced by a weaker agent, one more commonly at hand, than that necessary to attack the silver and copper in a gold alloy.

At the present time the use of solder is systematized. In the various grades, metals are combined in fixed quantities and the melting points of these alloys are definitely known. The Egyptians for many centuries can only have used as solder, alloys found native, and, guided by experience, have judged by the color and surface feeling what ones would be suitable for given pieces of work. Professor Petrie considers the units of the royal bracelets of the First Dynasty, which he discovered, to be soldered together with marvelous skill; [228] on the other hand, Professor Reisner refers to pieces of the Naga-ed-Dêr gold find,[228] also of the First Dynasty, as fused; and it is interesting to note that Mr. Richard Seager, in the early gold objects from the small island Mochlos, situated off the northeastern coast of Crete, found not a single instance of soldering; [229] he refers to the delicate links of

[225] *Bijouterie,* pp. 71-5; M. Vernier mentions saltpetre, salt, and alum, or again saltpetre, salt, and ammonia, and refers to saltpetre (nitrate of potassium) as obtainable in abundance in Egyptian territory. Here we would call attention to the notes on the salts known to the ancients, contained in H. C. and L. H. Hoover, *Agricola,* Bk. XII, footnotes. For the commercial processes of "dry" and "wet" coloring, in general use a generation ago, see Wigley, *Art of the Goldsmith,* Ch. XVII. In "wet" coloring, hydrochloric acid was used with saltpetre and salt, instead of alum.

[226] *Loc. cit.*

[227] Cf. Maryon, *Metalwork,* p. 24, who advises boiling the soldered piece in a solution of eight parts of water to one of nitric acid; by this method the nitric acid acts directly on the alloy, etching out the silver or copper from its surface.

[228] References given p. 237, under a.

[229] *Explorations in the Island of Mochlos* (American School of Classical Studies at Athens), Boston and New York, 1912, p. 12. These ornaments are from the periods Early Minoan II and III, corresponding to a large part of the IIIrd millennium B.C.

small chains as "welded" together. We have seen larger pieces of fine gold welded together by a modern jeweler and have also seen gold, as it were, soldered together with small cuttings of the same gold, in the manner described by Mr. Rosenberg,[230] but we believe that the usual methods in antiquity were soldering with another alloy and fusing. Nothing is known of the fluxes used by the Egyptians, but according to M. Vernier it is not impossible that they had borax.[231] We have been unable, even by the microchemical method, to obtain analyses of Egyptian hard solder, for it is difficult to isolate it with certainty from the alloys united by it, but we may draw attention to the analysis of the soft solder of the late earring, No. 55, which confirmed the results of previous investigations, that in Classical antiquity tin was used as a soft solder.[232]

How early the Egyptians systematized and reduced to writing the accumulated results of experience in all technical methods employed in jewelry-making is difficult to say. The Leyden Museum owns in Papyrus X of its collection [233] a book of goldsmith's recipes dating from the third century after Christ, but actually a compilation of older material of varying and uncertain age. The book was intended for the use of a cheating goldsmith, but is of great interest in the extended practical knowledge of alloys to which it affords evidence. It has been chiefly and quite rightly studied as one of the earliest documents bearing on the history of alchemy; the ideas of mediæval alchemy are rooted in the soil of earlier Egyptian beliefs about magic, but this book has only a few and very slight suggestions of mystical beliefs, and it may well be a late survival, the only one which has come down to us, of a long line of Egyptian goldsmith's prescription books. Just as the physician had his technical literature, so worthily represented in the Edwin Smith papyrus, a treasured possession of the New York Historical Society, so, we suppose, the goldsmith and jeweler were not without their books of directions.

The question has long been a mooted one whether or not the Egyptians knew how to draw wire.[234] Professor Petrie once declared that he had seen from ancient Egypt only wires which were faceted by hammer blows [235] and he is now well known as an advocate of the view that in antiquity all wire was produced by hammering; on the contrary, M. Vernier argued that the drawing of wire is too much of a commonplace in jewelry-making conceivably to have been unknown to the Egyptians and, further, stated that he had seen evidence of many kinds of Egyptian drawn wire—solid wires and tubes of round section and hollow wires of sections other than

[230] *Einführung,* p. 100, n. 1.

[231] *Bijouterie,* pp. 70-71. Cf. H. C. and L. H. Hoover, *Agricola,* p. 560, note on "Borax," according to whom, for a long time, the borax of Europe was imported from central Asia.

[232] Gisela M. A. Richter, *Greek, Etruscan and Roman Bronzes* (*M. M. A.*), New York, 1915, p. XXII, and the authorities there cited.

[233] In addition to Berthelot's publication of this papyrus cited in n. 224 above, see Edmund O. von Lippmann, *Entstehung und Ausbreitung der Alchemie mit einem Anhange: zur älteren Geschichte der Metalle,* Berlin, 1919, pp. VIII, IX, 1-27, and the further literature given there; also Hastings, *Encyclopædia of Religion and Ethics,* Vol. I (1908), article "Alchemy," p. 288.

[234] The earliest known wire seems to be a gold wire ring from the Second Predynastic period; copper wire also occurs before the Ist Dyn.; see Petrie and Mace, *Diospolis Parva,* p. 25, and Petrie, *Prehistoric Egypt,* p. 27, § 62. The Ist Dyn. jewelry listed on p. 237 includes some wire, and as an example from the Old Kingdom we may cite two filigree ornaments of copper wire published by Petrie and Mace, *op. cit.,* p. 37, Pl. XXV, D 7, now in Philadelphia. From later periods wire is fairly plentiful in extant jewelry.

[235] Petrie and Mace, *Diospolis Parva,* p. 25; cf. Petrie, *Arts and Crafts,* pp. 85, 86, 90.

round.[236] Möller published gold wires of the First or Second Dynasty which were pronounced by technical experts in Berlin to be drawn wires, and he called attention to later hollow wires, not round in section, which, following Vernier, he supposed to have been made with a draw-plate.[237] We care to consider the question only so far as the present collection may offer some contribution to the discussion.

Our collection includes some wires of small gauge and remarkably even diameter which it is difficult to believe could have been produced by hammering and subsequent burnishing. It includes also one clear instance of tubes (Plate XXII, 80 b) of such small diameter that their existence presupposes the employment of some kind of a draw-plate, for there is no other known means by which they could have been made. A microscopical examination of our ancient wires, however, shows in every case a very different surface from that of modern commercial drawn wire (Plate XXXVII, H). Prominent in a large number of these ancient wires is a seam which lies in the long axis of the wire; it may turn in places at a slight angle to the long axis, but it does not wind around the wire. This longitudinal marking of the wire, of which examples are shown in the photomicrographs of Plates IV, 2 d (on small wire), XXII, A, D, and XXX, 143 b, must be taken account of in any working theory as to the way the wires were produced. If we assume that they were hammered and burnished we must suppose that the marking was made by some roughness in the burnisher, or by grit that got drawn along with it; the same roughness or grit might be postulated also for a draw-plate; but the longitudinal markings are too persistent and regular a characteristic to be satisfactorily explained as having a fortuitous origin.

Let us consider for a moment present-day methods of wire production. Modern commercial drawn wire, which is always solid, is rolled hot from a rectangular, or square, usually to a round, section, and then cold-drawn through metal dies by power driven machinery to the desired size and section; if it is to be of very small gauge, it is transferred to a machine equipped with a series of ruby, sapphire, or diamond draw-plates. Craftsmen, when they do not use commercial drawn wire, often hammer wire out from a strip of gold or silver cut from heavy sheet, as we were once taught to do, and then pass it through the successive holes of a draw-plate to give it an even surface and to reduce it further. It is to be noted that in these modern methods the wire is drawn down from solid metal of larger section, involving, to reduce it, a violent contortion of the crystalline structure of the metal, and, in consequence, a heavy strain on the draw-plate.

The commercial methods have only become possible with the introduction of modern machinery and something similar to the craftman's method has been assumed as the ancient way of drawing wire by those who believe that in antiquity wires were produced with the aid of the draw-plate.[238] No actual draw-plates have been recognized among ancient objects, but M. Vernier visualized these presumable ancient tools as comparable to the draw-plates used commercially today for the finer grades

[236] See especially *Bull. de l'Inst. Franç.*, Vol. XII (1916), pp. 40-41 and Vol. VIII (1911), p. 29; also *Bijouterie,* pp. 58-62.

[237] In Schäfer, *Goldschmiedearbeiten,* p. 14, note 1, and p. 26, No. 21.

[238] The earlier discussions of Ægean wires of the Bronze Age and Greek and Roman wires are cited and their conclusions summarized in Hugo Blümner, *Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern,* Vol. IV, Leipsic, 1887, pp. 250-51. Cf. also Götze in Dörpfeld, *Troja und Ilion,* Vol. I, p. 369.

of solid wire, that is, as consisting of hard stones pierced with holes of the appropriate section.[239] Undoubtedly the Egyptians had stones hard enough for this purpose and were accustomed to drill them in making beads, but as yet there is no proof that they applied this technique to the making of draw-plates, and, in our opinion, even though one grant that many of the ancient wires of smaller gauge probably were drawn, it does not necessarily follow that the draw-plates used were of stone.

Mr. Heins has a suggestion to make about the way the smaller ancient solid wire may have been produced which we regard as very illuminating, inasmuch as it accounts for the longitudinal seam and involves only a moderate strain on the draw-plate. He has made a sampler illustrating several stages of this technique which is exhibited with the Abbott jewelry, although we received it too late to include it in the plates of this book. For such solid wire a strip of gold is cut wider than would be necessary for a tube of the same desired diameter; the wide strip is next converted into a larger tube by pressing it around a rod of suitable size or by drawing it at once through one of the holes of the draw-plate; then one edge of the sheet is deliberately guided under the other, and in further reducing, the sheet coils on itself, forming a spiral in cross section, and, gradually, as the work of the draw-plate continues, the interstices are diminished until the wire becomes solid. If the material is gold of high carat the exterior edge may be flattened out and merged with the surrounding gold, disappearing altogether, but in other instances this edge is not obliterated and may be traced continuously, or here and there, running roughly parallel with the length of the wire. In his experiments Mr. Heins secured some wire made in this way,[240] which when cut transversely had lost all traces of the convolutions and looked quite as solid as do the wires of the circlet No. 2 at the breaks, where we have had them lifted for a short distance to bring the cross section into the light.[241] To make solid wire by this method exerts far less strain on the draw-plate than to reduce it from solid gold of larger section, because as long as the metal sheet has room for lateral movement and has not yet become a solid mass, there is little lengthwise contortion of its internal structure; and it reaches the desired diameter soon after a real strain begins;[242] if reduced at all after the wire has become actually solid, at least the amount of strain is less than when from the beginning of the operation the wire is drawn down from a metallic rod already greatly compressed. Mr. Heins' method also obviates the necessity of first producing hammered wire as a preliminary stage in making drawn wire! For this kind of work, draw-plates of bronze, or even of bone or hard wood, would suffice, and if less durable than steel or hard gem-stones, they are very quickly and easily made.

Mr. Heins' first experiments were carried out with great exactitude; the strips of sheet were cut with nicety to secure uniform width and straight, parallel edges and

[239] *Bijouterie*, p. 59; cf., however, p. 61 where for large hollow wires he supposes the draw-plates to have been of bronze or iron.

[240] The thickness of the modern sheet used by Mr. Heins was 0.0041 inches (0.1041 mm.). From a piece 0.3125 inches (7.938 mm.) wide, except at the tapered end, and 1.75 inches (4.45 cm.) long, a solid wire about 4.5 inches (11.43 cm.) long and 0.0252 inches (0.640 mm.) in diameter was secured by the method of drawing described above. The wire became to all appearances solid, before the external seam entirely disappeared.

[241] This has been done since the photomicrograph of Pl. IV, 2 d was made.

[242] Some "cold working," causing a modification of the metallic structure in a lengthwise direction, there is, for the resultant solid wire is considerably longer than the initial strip of sheet. Cf. n. 240 above.

the greatest care was used in drawing them into wire; but later he experimented with scraps of sheet and with more casually cut single strips and manipulated them in the draw-plate with less attention, thus securing serviceable wires in which various surface irregularities similar to a few observable on the plain wires of the circlet No. 2 were to be seen. Two seams would appear along one section of the wire, the result of the sheet folding over on itself instead of coiling spirally; or again two seams were occasioned by the use of two strips of sheet; and the single seam would undulate because of curves in the visible edge of the strip used. If, as we think possible, the method described above was the principal one used in antiquity for making smaller solid wires of the precious metals, such occasional variations in the surface appearance of ancient wires are to be expected; wire was necessary for jewelry in considerable quantities and was no doubt made rapidly, without superfluous exactitude in the method; the seams were not noticeable to the unaided eye and therefore irregularities in them were not felt to be defects.

We have referred above to our one certain example of hollow wire, No. 80, which is of the late period. In addition to the open end visible in Plate XXII, there are two other openings at breaks, into which, under the microscope, it has been possible to insert a fine fibre or hair, and one opening in the surface may be detected where the seam has parted. Generally, however, the wire ends are closed, for in cutting hollow wire into short lengths suitable for appliqués, the very process of cutting presses the walls together when severed, closing the openings, and, further, in soldering or fusing these fine wires to the gold ground both the ends and surfaces of the wires often become somewhat coated, obscuring their original appearance. Thus it is difficult to detect fine hollow wire unless a break, subsequent in date to the making of the piece of jewelry, can be found, and even the breaks, when the wire is still in position are not readily studied. It is possible that some of the other wires which have longitudinal seams are hollow rather than solid; the chain of the late earring No. 55 appears to us to be composed of tubing, and in the ring shank No. 38, also of late date, we have an indubitable instance of a larger tube of fine gold which was burnished or drawn down until the seam is no longer visible on the exterior, although it was at one time clearly evident through a break, overlapping within the tube in a lengthwise direction; but Nos. 18, 19, 23, 24, and 143 [243] cannot be adequately examined. It is to be hoped that other observers will be on the lookout for definite proof whether the earlier Egyptians to any extent made use of fine tubes instead of solid wires. To make what a craftsman calls a tube [244] is an entirely easy and simple process and economy is effected in the use of material. The coil of modern hollow brass wire reproduced in Plate XXXVIII at A, which is finer than any ancient wire of our collection, was drawn from a strip of sheet brass, and gradually reduced in an improvised draw-plate also of sheet brass, made simply with a pointed small nail

[243] On Plate XXX, which was made before the completion of our text, the wires No. 143 are labeled "hollow," followed by a question mark; since we have found that the wires of No. 2 are solid, we incline to the view that these, too, may be solid, or nearly so.

[244] So Wilson, *Silverwork and Jewelry,* pp. 42-4, who describes the process of drawing a strip of sheet into a "tube"; also Maryon, *Metalwork,* pp. 46-7, who employs both the terms which we have adopted, "hollow wire," and "tube." Mr. Kenneth B. Lewis has kindly explained to us that in the technical language of commercial steel production "when a flat strip is curled up by drawing through a die so that the edges meet for welding, the product is called 'pipe.' The term 'tubing' or, as it is sometimes called, 'seamless tubing,' implies that a billet was pierced and then lengthened by true wire-drawing to produce a tube which not only shows no seam but never had one."

and a hammer. By driving the nail to varying depths in the sheet brass and then grinding off the resultant bosses produced on the reverse, our preparator secured a gradation of holes and in such draw-plates, made a series of lengths of hollow wire or tubing, corresponding in diameter to many of the sizes of a Brown and Sharpe gauge.

In Plate XXII, A to F, are represented gold wires from the tomb of the Second Dynasty king Khasekhemui, which, if we are right in suggesting them to have been made in the manner described above, carry the technique of drawing wires from strips of sheet gold back at least to 3200 B.C. The wires are much incrusted, and we cannot attempt to say whether they are solid or to some extent hollow, but, despite the incrustation, places where the seams parallel with the length of the wire are visible may be found; these seams are especially evident in D and in the end of the wire in focus in C, also just above the letter A. These wires, which tie down the gold sheet cover of a dainty toilet vase of stone, are of interest also because they afford the earliest known instance of right- and left-handed twists placed side by side to make a braided pattern,[245] a motif much used in wire appliqués down through the history of Egyptian jewelry into Greek and Roman times. Just above them on Plate XXII we have placed an example of Greek Hellenistic work, perhaps of the third century B.C., in which the right- and left-handed twists appear; this is the No. 80 referred to above because of its hollow wire. The same motif is to be seen in an Eighteenth Dynasty(?) ring of Plate X, 19 b, and in pieces of jewelry of the last centuries before Christ, illustrated in Plates XVIII, E, XXIII, 87 c, XXVI, 95 a, XXIX, 95 c, and XXXV, 86 b.

Other kinds of wires, too, are represented among the later pieces of our collection; these are made of one (Plate XX) or two (Plate XIX) strips of gold, twisted in some cases over a slender rod which was afterwards removed (compare Plate XXXVII, E-G[246]), in other instances, when the sheet was necessarily somewhat heavier, without such support (see sampler, Plate XXXVIII, D[247]-F). The last-mentioned variety is often marked by the prominence of the seams and the buckling of the coils inward (Plates XXIII, 87 c, at left, XXIX, 95) or again by an overlapping seam (Plate XXIII, 87 c, at top right). Characteristic of these wires made without the draw-plate is the way the seam coils around and around the long axis of the wire. This coiling seam sometimes shows very clearly and regularly, as on the individual wires of Nos. 72 and 83 (Plate XX), or it may partially disappear; perhaps effort was made in some cases to obliterate it. In the experimental pieces of Plate XXXVII, E to G, the seam may be followed in piece E, but has disappeared partially in piece F, and entirely in piece G; the means used was that of fusing; these experimental pieces were also made to taper slightly, corresponding to a special ancient variety of this kind of wire sometimes used in earrings (Plate XIV, 74 b; compare XXXVIII, B, C). We are acquainted with wires made of twisted strips of sheet gold only in jewelry of Greek and Roman style, and it is a matter for further

[245] Single twists are seen in the first example of wires cited above in n. 237 and in the wires on two tiny vases of the now dispersed MacGregor collection; Burl. Fine Arts Club, *Catal. Egypt. Art,* 1922, p. 5, No. 19, p. 6, No. 28, Pl. XXIV. For the modern craftsman's use of twists to form a braided pattern, see Rathbone, *Unit Jewellery,* p. 242, Fig. 99, and the accompanying text.

[246] In Plate XXXVII, we were unable to eliminate the photographic background of pieces E-G, because of the deep shadow on one side of each wire.

[247] With the slightly twisted section to the left of the strip D, cf. the 4th cent. Greek diadem No. 1607 in Marshall, *Jewellery,* Pl. XXVII; also the early gold ornaments of Seager, *Mochlos,* Figs 8, 9.

investigation whether or not they originated earlier and are to be found in jewelry of pure Egyptian design and workmanship.

Several of the late earrings (Nos. 59-61, 66) are set with imitation pearls of glass and Dr. Gustavus A. Eisen, whose valuable studies of ancient beads and glass are well known,[248] has been so kind as to write the following account of the pearls: "With the possible exception of No. 59 [249] these are blown beads with a reflecting layer. They possess the following surface characteristics: the outer surface is striated in the longitudinal axis of the bead; the ends of the beads are rounded off but the region around the opening of the bead core is slightly drawn out, so that the bead appears to have a very low neck at each end; this form is partly due to the necessity of preventing the two layers of the bead from separating. The interior characteristic is a layer of silver or electrum, which is seen under the surface of the beads but not under the ends. And it is important to note that the reflecting layer leaves the edges of the bead free so that these are covered only with glass. The technique of this bead type was as follows: first, a narrow tube was drawn and its surface was covered with leaf silver or electrum by means of some adhesive, probably albumen or balsam; when dry, the whole was inserted in a similar tube of plain glass but slightly larger, so that the surface of the metal touched the inner surface of the outer glass tube; the two tubes were now heated to slight fusion and while in this state the future beads were marked off and the tube contracted by pinching with some suitable instrument at each marking, thus forming a continuous row of beads which only needed to be broken off at the markings from each other to become separate beads. The constriction of the bead ends was absolutely necessary, otherwise the two tubes would in time separate from each other and the inner one fall out, or the wall of the outer one would split and fall off in pieces, as often happened. The technique, which included the similar use of gold leaf (No. 149) and enamel, was invented in the time of the Ptolemies, became fashionable in the time of Augustus, retained its prominence until the end of the second century after Christ, and remained in favor to the eleventh century after Christ. The later beads of the sixth to tenth centuries were made with added caps at the ends to keep the two layers from falling apart."

[248] *The Art Bulletin* (Quarterly of the College Art Association of America), Providence, Vol. II (1919-20), pp. 87-119, with selected bibliography; for Roman beads with layer of gold, silver, or enamel, see especially pp. 93, 113.

[249] This one Dr. Eisen regards as a plain glass bead; it has now somewhat deteriorated.

CATALOGUE

A.—Various Earlier Pieces

Very few pieces of jewelry antedating the period of the Egyptian Middle Kingdom have survived to modern times and in the New York Historical Society's collection, as in many other collections, pieces made in the late period, after Egypt's great days were past, are comparatively numerous. Some jewels of a time earlier than 663 B. C., the beginning of the Saite or Twenty-sixth Dynasty, are catalogued in the following sections B to D, but others which do not fall within the scope of those sections and which include several of the Society's most valuable and beautiful examples of Egyptian jewelry are described here. Among them, No. 1 is an admirable specimen of Middle Kingdom work and No. 2 a unique and striking creation of the New Kingdom.

No. 1 (Plates I, a-e, II, XXXVIII, h, i; compare Plates I, A, B, XXXVII, A-D). Cylindrical case and two rough-cut garnets found in it.

Outer case, gold; originally provided with an inner strengthening cylinder of copper or bronze. Second half of the Twelfth Dynasty, nineteenth century B. C. From Sakkara. Weight (including garnets, before repairing), 49.50 grains (3.208 grams). Length, 1.89 inches (4.8 cm.).

POINTS OF INTEREST: The piece is one of the earliest examples of granulated work in existence; the significance in antiquity of the class of objects to which it belongs has not hitherto been determined; it is, further, the most ancient of the jewels published here and one of the most precious, affording an illustration of the delicate workmanship characteristic of some royal adornments in the period of the highest attainment of the Egyptian jeweler's craft.

Plate I a shows the appearance of the case at the time when the present catalogue was undertaken. The entry in the old catalogue (see below under Bibliography) indicates that it came into Dr. Abbott's possession in a damaged condition. The preparator was able to smooth the crumpled walls, to find one fit in the edges, determining the length of the entire object, and to insert a shellacked wooden cylinder to hold the two gold parts in position (Plate I b). Within, when his work began, so caught in the oxidized inner cylinder that they presumably belong to its original contents, were the two garnets of Plate I b. The number of grains now on the object is by actual count 691, and 4 others are preserved detached; by calculation there must once have been more than 1400 to complete the pattern of 7 zigzags and 8 triangles; 3 detached grains were sacrificed to secure a microchemical analysis, which proved the absence of copper from the alloy and the presence of silver to an amount not less

than 5 per cent. Five of the original 7 detached grains were in condition to be measured with a micrometer caliper and the measurements secured were as follows: 0.0190 inches (0.4826 mm.); 0.0188 inches (0.4775 mm.); 0.0173 inches (0.4394 mm.); 0.0172 inches (0.4369 mm.); 0.0169 inches (0.4293 mm.). The diameters of these five grains, representative of the large majority on the case, were thus found to be just under 1/50 of an inch, and between the largest and the smallest of them, the difference detected was only 21/10,000 of an inch! But the case does exhibit a few grains which stand out as markedly smaller than the average; such an especially tiny grain may be seen in Plate II, 1 f, toward the top and a little to the left of the center.

We have discussed the technique of granulated work in our Introduction, pages 33 to 36, and the treatment of this individual example therefore may be brief. A rectangular piece of sheet gold was cut out and then folded over a cylindrical mandrel and soldered together; the vertical joint may be followed readily; it is somewhat jagged where the solder flowed unevenly between the two edges and the upper edge was afterwards trimmed. That the grains were attached to this curved surface, rather than to the sheet before it was converted into a cylinder, is clear from the fact that they cross and re-cross the seam. We do not think the grains were first fused together and bent to the curve, as Mr. Heins has found it possible to do, because in the midst of many of the zigzags adjacent grains are seen to be unconnected. We conclude that a few grains were fused on at a time, and that as fast as the work progressed it was given a protection of loam or clay to avoid injuring the finished parts of the decoration or causing the seam to open. The photomicrographs of Plate I reveal a peculiar and hitherto unnoted condition of the surface where grains have dropped off. Understandable is the nearly circular small area of which the surface is slightly rough and has the appearance of a break; this is where the metallic union between the gold ground and the lost grain was ruptured. But what is the nature of the outer oval or circular marking which in diameter is about two-thirds to three-fourths of the diameter of a grain? At first we supposed these markings to be the outer edges of depressions made by pressing a sharp instrument of bronze or flint into the sheet of gold while it was still flat, in order to lay out the pattern of triangles and zigzags, and it is tempting to regard them as constituting a preliminary sketch for the decoration. But it has been suggested to us that they were formed in some way under the intense heating of the metal incident to the process of fusing. Whatever their origin the markings occur quite consistently over the cylinder wherever grains have dropped off, and Mr. Heins has been unable to reproduce them, encountering the same difficulty which Mr. Rosenberg mentioned[1] with respect to ancient grains, that of being unable to pry loose his experimental grains without injuring them and the surface to which they had been attached.

[1] *Granulation,* p. 8.

The way the caps were made is evident; each consists of two parts cut from heavier sheet than that composing the gold cylinder; of these the circular top, about 0.315 inches (8 mm.) in diameter, was soldered on the large end of the second part, itself formed from a piece of sheet of the shape shown in the sampler, Plate XXXVIII at 1 h and i. It is not to be supposed that the ancient jeweler found the curves by mathematical calculation, but rather that he cut them by eye, fitting the part in place and trimming the edges, as indeed the lack of symmetry suggests. At one end, the loop by which the object was suspended, made of a strip of gold 0.354 by 0.079 inches (9 by 2 mm.) in size, is soldered to the middle of the cap. This loop is now somewhat thinner and narrower at the top as the result of wear during the lifetime of its ancient owner.[2] The hard solder, paler than the gold, is discernible to the practised eye in the one side seam of each cap and about the loop, but the joint between the circular part and the other was scraped and burnished until almost invisible; this difference in color in the visible solder is in contrast to the uniformity of hue of all parts of the granulated decoration. The gold cylinder having been adjusted over the inner strengthening cylinder, the caps were pushed on; they were not soldered, and we did not find any certain evidence that they were cemented, in place, although it would seem that this must have been necessary. These caps were probably not intended to be removed when once the case had been filled.

No agreement has yet been reached as to the original purpose of cylindrical articles similar to this one. Two found at Dashur,[3] were published as receptacles for eye-cosmetic. Professor Petrie in his work on Egyptian amulets[4] classed them under "charm cases," meaning thereby cases for written charms, an interpretation perhaps derived, so Mr. Mace has suggested to us, from the tiny leather charm cases that the modern Arab uses. Professor Petrie designated the examples from Dashur, the earliest which he mentioned, as "imitation charm cases," thus implying for this period or an earlier one the existence of the thing imitated, cases which really held a magic formula written on papyrus, although nothing of the kind is preserved. Professor Garstang, to be sure, seemed to have reached the same solution when he announced of each of the two pieces he found[5] that it contained a tiny roll of papyrus.

[2] For a more striking instance of wear, see below under note 9.

[3] (a) De Morgan, *Dahchour,* I, p. 70, No. 55, Pl. XXIV; Petrie, *Arts and Crafts,* p. 90, Fig. 101. From the burial equipment of the "King's daughter, Mereret," a gold case such as the one published here, decorated with granulations in a pattern of zigzags and triangles. Both caps are now removable and the case empty (communication of Mr. Quibell). 19th cent. B.C. Length, 2.08 inches (5.3 cm.). Wt., 138.89 grains (9 grams). In the Cairo Museum. (b) De Morgan, *op. cit.,* p. 70, No. 56, Pl. XIX, cylinder made of gold, lapis lazuli, and amazon stone in horizontal disks, also from the treasure of Mereret. Length, 1.97 inches (5 cm.). In the Cairo Museum. Cf. below, n. 11 a.

[4] *Amulets. Illustrated by the Egyptian Collection in University College, London,* London 1914, p. 29.

[5] (a) John Garstang, *El Arábah: A Cemetery of the Middle Kingdom* (VIth Publ. Egypt. Res. Acc. 1900), London, 1901, pp. 4, 29, Pl. I, tomb 108. An electrum case, made of sheet of sufficient thickness to render an inner case unnecessary. The cylinder extends the full length of the object and the caps are slipped over it covering the two ends. The exposed part of the cylinder is decorated with forty larger grains set at equal intervals in four rows running lengthwise; each grain is elevated above the surface of the cylinder;

The specimen which he discovered at El Araba is now in the Museum of the University of Pennsylvania, and the Curator of the Egyptian collection, Mr. Clarence F. Fisher, kindly permitted the writer to examine it and was instrumental in furnishing the photograph[6] reproduced in Plate I at A. The case does not contain a papyrus but has at each end of the cylinder, where the caps are loose, a plug of clay, 0.079 to 0.118 inches (2-3 mm.) long, which on hasty examination might conceivably be taken for a tightly rolled bit of papyrus. The case was from a disturbed tomb, and it would seem that its original contents had been lost and damp clay had lodged and hardened in the injured ends. M. Lacau and Mr. Quibell, who were so kind as to look at some of the pieces in Cairo for us, report of the case from Beni Hasan: "We did not see any papyrus; Garstang may have, though!"[7]

Through the courtesy of the late Professor William H. Goodyear we were able to examine and we reproduce here (Plate I, B) still another case,[8] the property of the Brooklyn Institute of Arts and Sciences. This one has an inner bronze or copper cylinder of which both ends are now open; lodged in one end is a garnet which is larger than either of the two garnets from the Abbott case and must originally have fitted closely; now it is held still more firmly by the oxide from the inner cylinder. The Brooklyn case and our own, then, were unquestionably containers for garnets, and Mrs. Richardson tells us that she saw a third case still retaining a garnet in the collection of the Oriental Institute of the University of Chicago.

In addition to the gold cases,[9] there exist solid cylinders of various stones,[10]

the solder is hidden and the case further decorated by twenty short lengths of wire, five to a row, coiled each about a pair of grains. The loop for suspension with the top of one cap has been lost; the other cap may now be readily removed. From a tomb dated by the excavator to the XIIth or XIIIth Dyn., but we believe it to be even later, perhaps of Dyn. XVIII. (b) Garstang, *The Burial Customs of Ancient Egypt as Illustrated by Tombs of the Middle Kingdom, Being a Report of Excavations Made in the Necropolis of Beni Hassan during 1902-3-4,* London, 1907, pp. 113, 226, Figs. 104-5. A gold case decorated in granulated work, found in tomb 487, that of a private woman named Senb. In the Cairo Museum.

[6] We are indebted also to Miss McHugh, secretary of the Museum, for the final photograph used.

[7] Mr. Quibell wrote further: "A rod apparently of metal, dark-coloured, can be seen inside the sheath of gold which carried the incrustation of globules."

[8] Peet and W. L. S. Loat, *The Cemeteries of Abydos. Part III. 1912-1913* (XXXVth Memoir. Eg. Expl. Fund), London, 1913, pp. 27, 28, Pl. VIII, No. 11, from the plundered tomb D 303. A pale gold case decorated with five plaits in relief running lengthwise. Parts of both caps are preserved but are out of position; the end of the cylinder opposite the garnet has a plug of clay such as those observed in the case in Philadelphia.

[9] Mrs. A. S. Richardson, Assistant Curator in the Egyptian Department of the Metropolitan Museum, has called our attention to another example published in *A Catalogue of the Egyptian Antiquities in the Possession of F. G. Hilton Price,* London, 1897, No. 1184, as a "pendant, a hollow cylinder, intended to hold some small talisman, furnished with a cap at one end to which is attached a loop, now worn through with use." The decoration, consisting of six rows of twelve grains each, reminds one of the example from El Araba (Plate I, A). Material, silver.

[10] (a) De Morgan, *Dahchour,* I, p. 61, No. 16, Fig. 131, Pl. XVIII. Solid rod of lapis lazuli tapering a little toward the top; with gold caps and suspension-loop. From the treasure of the "King's daughter, Sit-Hathor." 19th cent. B.C. Length, 1.38 inches (3.5 cm.). Cairo Museum. (b) Carnarvon and Carter, *Five Years' Explorations,* p. 53, Pl. XLV, D. From the plundered tomb 24, a "green stone cylinder mounted in gold." It was found with the other contents of a small jewel box, which had escaped the robbers' attention, and probably dates from the close of the XIIth Dyn., early in the 18th cent. B.C. (c) Carnarvon and Carter, *op. cit.,* Pl. XLV, E, "a broken agate cylinder mounted in gold," found with b.

provided with gold caps at the two ends and with a loop for suspension, which are similar in size and form to the cases; no one could doubt that they bear some relationship to the cases. They have been most frequently designated as "pendants," a term carrying with it possibly an implication of an exclusively ornamental use. Finally, examples are known of beads of gold and stone or faience strung on a wire and provided with caps and one loop,[11] which are approximately of the size and general appearance of the cases and stone cylinders. Of these the specimen found at Diospolis Parva was published as an "imitation amulet case," the others as "pendants."

It is further to be noted that no certain instance is on record of one of these objects being found in a man's funerary outfit. Some were recovered from disturbed tombs containing burials of both sexes, but the determinable instances are of ownership by women. Two princesses of the royal blood, the well-to-do lady Senb of Beni Hasan, an unnamed woman buried at Abydos,[12] and possibly Senebtisi of Lisht,[13] whose equipment for the next life has been shown to bear many resemblances to that of the Dashur princesses, all possessed one or more of the little cylindrical objects.

The one general explanation which would account for all these pieces —cases, solid cylinders of stone, and assemblages of beads—seems to us to be that the gold[14] and stones composing them had an amuletic value. The faience beads, too, may have been properly amuletic, or may have been cheaper substitutes, which their owners' anxious desire endowed with all the magical value of the real amulets. Data might be given for the magical

[11] (a) The piece of n. 3 b above belongs in this category; Mr. Quibell wrote of it: "It is probably solid, a rod with rings of two kinds of stone and gold slipped over it. Were the rod hollow, the space would be minute necessarily." The condition of the object precluded thorough examination. (b) Hilton Price *Catal.*, 1897, p. 136, No. 1430 a. A piece with gold caps and cylinder made of alternating amethyst and gold parts, probably of about the same date as the one described under a. (Reference given us by Mrs. Richardson). (c) Sale *Catalogue of the MacGregor Collection of Egyptian Antiquities,* London, 1922, p. 185, a similar object in lot 1422, Pl. XXXIX, "formed of circular gold, turquoise, and lapis lazuli beads threaded on a metal pin, 1⅛ inches (2.86 cm.) long." From Dashur. Caps missing. (d) Petrie and Mace, *Diospolis Parva,* p. 43, Pl. XXVII. From a plundered tomb, W 38, XIIth Dyn., "a wire with beads of coloured stones (imitation amulet case)." The illustration shows it to have caps and a loop for suspension. (e-g) Garstang, *Burial Customs,* p. 113, Figs. 104-5. The lady Senb, mentioned above in n. 5 b, possessed in burial also "three specimens of the characteristic pendants formed by a number of varicoloured beads threaded on wire, with caps of gold to complete each: the beads are carnelian, green and black glaze, and gold." (h) Mace and Winlock, *Senebtisi,* p. 75, No. 4: "Five cylindrical beads which had originally been strung on copper wire." No caps are preserved and we may or may not be right in conjecturing that this piece is analogous to the preceding ones; 20th cent. B.C.

[12] Peet, *Cem. of Abydos. II,* p. 45, No. 44; Pl. IX, Fig. 2. A "small cylindrical object, made of a spiral of fine silver wire on a matrix of black material," accompanying a female burial of "about the XIIth Dyn." It has lost the cap from one end. Ashmolean Museum, Oxford.

[13] Mace and Winlock, *op. cit.,* pp. 21, 75, No. 6 and Pl. XXVI, A. An object of silver, once wholly or partially gilded, possibly a case or solid cylinder of the nature of those described above. When found it had lost one cap and an extraneous broken bead had become attached to the cylinder, which had apparently been converted into silver chloride; 20th cent. B.C. Cf. above, note 11 h.

[14] The princess Sit-Hathor (cf. above, n. 10 a) had such an object composed solely of gold, namely a short gold chain provided with gold caps and loop. De Morgan, *op. cit.,* p. 61, No. 17, Pl. XVII. Length, 1.38 inches (3.5 cm.). Cairo Museum. In our opinion the gold cases, as well as their contents, were regarded as having magical properties, that is, the entire object was an amulet.

properties ascribed by Classical authors to various stones [15] and to gold, and for the superstitions gathered about them in post-Classical times, but we must limit the discussion in this catalogue to the contemporary evidence of two Egyptian documents.

Of these, the Westcar papyrus [16] was written perhaps shortly before the Eighteenth Dynasty, but contains folk-tales which originated as early as the Twelfth Dynasty. In one of these tales, the scene is the palace lake. The king, Snefru, for the story is set in the olden time, is watching twenty beautiful maidens rowing, when suddenly the rowing ceases because one of the maidens has dropped into the water her turquoise jewel in the form of a fish. The king bids her proceed, he will replace the jewel; all in vain—she is obdurate, and finally a magician is summoned, who parts the waters and recovers the treasured piece. The girl's terror and obstinacy are plausibly accounted for by the assumption that the jewel was an amulet and the particularity with which in the various passages (V, 16, 21; VI, 2, 5) it is stated to be of turquoise suggests that its potency lay not only in its form, but also in its material. Further, characteristic pieces in women's graves of the period of the Twelfth to Eighteenth Dynasty are small jewels, presumably amulets, in fish form,[17] some composed of gold, silver, or electrum, some with body of amazon stone, turquoise, or other stone, and the fins and tail of one of the precious metals, and still others carved entirely out of stone.

The second document is the Berlin papyrus No. 3027 containing a series of magical texts for the benefit of mothers and their children.[18] It dates from the first half of the Eighteenth Dynasty but the contents are a compilation of older material. The incantation of verso II, 2 to 7 is to be spoken over *beads(?) of gold, rings of amethyst, a cylinder, a crocodile, and a hand.* Another charm includes these lines to be addressed by the mother to her child: *Thy protection is a protection of gold, thy protection is a protection of the ibheti* (an unidentified semi-precious stone) (verso IV, 7), and the last incantation is to be recited over seven rings of the same stone and seven of gold, strung on seven linen threads, seven times knotted, the whole to be put about the child's

[15] On the amuletic virtue of garnets and other stones, see Petrie, *Amulets,* p. 52. See also the interesting account of an Egyptian pebble-amulet in gold setting, of uncertain date, by the late Mr. Oric Bates in *Varia Africana II* (*Harvard African Studies,* II), Cambridge, 1918, pp. 316-17. Cf. ideas associated with certain stones in Egyptian texts of the Ptolemaic and Roman periods, referred to by Grapow, pp. 24-5 in: *Vergleiche und andere bildliche Ausdrücke im Ägyptischen* (*Der alte Orient,* 21st Year), Leipsic, 1920.

[16] Erman, *Die Märchen des Papyrus Westcar* (Königl. Mus. zu Berlin. *Mitteilungen aus den orientalischen Sammlungen,* V, VI), Berlin, 1890; Erman in *Papyrus,* Handbook, Berlin Mus., pp. 30 ff.; Sir G. Maspero, *Popular Stories of Ancient Egypt,* translated by Mrs. C. H. W. Johns (A. S. Griffith) from the 4th French ed., and revised by Maspero, New York and London, 1915, p. 28, n. 2; Erman, *Literatur,* pp. 67-9.

[17] Examples: Petrie and Mace, *Diospolis Parva,* p. 43, Pl. XXVII, from tombs W 32, 38; Garstang, *Burial Customs,* p. 113, Figs. 104-5, from the tomb of Senb, and *El Arâbah,* p. 4, Pl. I; Schäfer, *Goldschmiedearbeiten,* under No. 22. Mr. Mace tells us that he found one at Lisht which is composed of gold and turquoise.

[18] Facsimile of cursive text: *Hieratische Papyrus aus den Königl. Mus. zu Berlin,* Vol. III (1911), pp. 26-34; hieroglyphic transcription, translation, and commentary: Erman, *Zaubersprüche für Mutter und Kind.* (*Abhandlung der Königl. Preuss. Akad. der Wissenschaften*), Berlin, 1901; see also Erman in *Papyrus,* Handbook, Berlin Mus., pp. 76-81.

neck and body. It is clear from these texts that in the simple faith of Egyptian mothers of the period of the Eighteenth Dynasty and earlier, gold and various stones had magical properties of protection and healing if the right charm were spoken over them.[19] We may perhaps go even farther and recognize in the word translated above *cylinder,* which occurs also in four other incantations (verso II, 7-III, 3; III, 3-7; III, 8-IV, 2; IV, 2-6), the very subject of our investigations. To be sure the sign pictures and commonly denotes a cylinder seal, but at least the question may be raised whether it may not have been applied also to the woman's cylinder-amulet,[20] which would seem a more likely object for the mother trying to guard her baby to hang about its neck (as the directions in the papyrus stipulate) than the cylinder seal, encountered elsewhere chiefly as worn or owned by officials. There is no great unlikelihood involved in a supposed mention of our amuletic cylinders in extant Egyptian literature. Professor Erman began the identification of the active elements to which these incantations gave efficacy by calling attention to ancient knotted cords from Egypt;[21] Professor Schäfer connected the passage of verso, II, 2 to 7, referred to above, with a scarab-seal having the device of a crocodile and a hand;[22] while Dr. Gardiner saw in the "crocodile" and "hand" a reference to small amulets in the shape of crocodiles and human hands, of which there are specimens extant.[23]

The age of our piece, fixed by its likeness to the granulated gold case belonging to one of the princesses buried at Dashur,[24] is about thirty-eight hundred years, and, further, the extraordinary intricacy and nicety of its workmanship favor the view that it, too, was made in the king's workshops. Probably it was a royal gift to some woman of high position and, having been her pride and stay during life, was buried with her in the Sakkara cemetery, that in the next life she might not be deprived of its magic help.

Unfortunately it is not possible as yet to establish the range of date for the entire class of objects to which this amulet belongs. Only a few pieces are approximately dated to the twentieth, nineteenth, and eighteenth centuries B. C. by the conditions of their discovery,[25] and others because of their re-

[19] Cf. Gardiner, article "Magic (Egyptian)" in Hastings, *Encyclopædia. Religion and Ethics,* Vol. VIII (1916), especially p. 266 under "The Manual Rite."

[20] Professor Breasted, with whom we consulted, thought the idea alluring and worthy of mention tentatively; its correctness would depend on the original root meaning, whether referring to shape or the act of sealing; if the former, the word might well have denoted also other cylinders than the cylinder seal. Professor Erman first translated the word simply "Cylinder" (*Papyrus.* Handbook), but changed in *Zaubersprüche* to "Siegel" and Dr. Gardiner, too (*loc. cit.*), gave the translation "seal."

[21] *Zaubersprüche,* p. 31. Cf. those pictured in Petrie, *Amulets,* Pls. XVII, XVIII.

[22] *Ä. Z.,* Vol. 39 (1901), p. 88.

[23] *Loc. cit.*

[24] See reference above, n. 3 a. The present difference in the weight of the two pieces is largely accounted for by the deterioration of the inner strengthening cylinder of our amulet; the Dashur piece is a trifle longer and accordingly has nine zigzags instead of seven, and two rows of grains encircling the cylinder above the upper triangles; the angle of slope of the caps differs in the two amulets, but despite these minute variations one from the other, to be expected in hand-made objects, they seem as alike as two peas!

[25] Those of notes 3 a, b, 10 a-c, 11 h, 13, above.

semblance to these pieces may be assigned with confidence to the same centuries.[26] This leaves a few specimens[27] which are not of the type of the various approximately dated designs. Some or all of them may well be later, and it would not be surprising if these women's amulets lasted at least until the mid-Eighteenth Dynasty (1500 B. C.) when so many changes in Egyptian provisions for life before and after death set in. If they fell into disuse at that time, they may possibly have been revived in the late period, to judge by some apparent late examples found outside Egypt. Of these, we may mention first two small solid cylinders, respectively of red jasper and "quartz", with gold caps at both ends and loop for suspension at the upper end, which were discovered in far-away Susa,[28] in a woman's grave, dating from the sixth to the fourth century B. C.; these pieces are quite in the style of the earlier Egyptian examples. But Professor Reisner found at Meroë, in position on the breast of a child, in a part of a cemetery contemporary with the reign of Aspalta (about 573-543 B. C.), a hollow cylinder of gold, which is shorter and has a greater diameter than the pieces previously under consideration, but was suspended in like manner by a loop soldered to a gold cap; when found it was empty.[28a] Another gold case of similar proportions is in the Metropolitan Museum of Art, belonging to the Murch collection, and contains only caked mud.[29] One would like to believe that these late cylinders belong in the tradition of the earlier period, but it is necessary to await more abundant evidence, especially the finding of late specimens in and out of Egypt, before the interpretation and chronology of all these amulets can be regarded as determined.

BIBLIOGRAPHY: Abbott catalogue,[30] editions 1853 ff., No. 1025; edition 1915, No. 1021.

No. 2 (Plates III, a-c, IV, d; compare XXXVIII, e). Circlet for the head.

Gold. Nineteenth Dynasty, around 1275 B.C.(?). From Sakkara(?). Circumference, 20.625 inches (52.38 cm.). Width of band, 1.02 inches (2.6 cm.). Thickness of plain part of band, 0.0061 inches (0.1549 mm.). Weight, 825.00 grains (53.460 grams).

POINTS OF INTEREST: This is the first actual circlet probably of the period of the Eighteenth to Twentieth Dynasties to be published; its design has not been

[26] Those listed above in notes 5 b, 11 b-g.
[27] Listed above in notes 5 a, 8, 9, and 12.
[28] De Morgan, *Recherches archéologiques* (Délégation en Perse. *Mémoires*. Vol. VIII, 3rd series, 1905), Paris, p. 56, Pl. IV, 10, 11.
[28a] This cylinder is still unpublished and we are indebted to Professor Reisner for permission to mention it here.
[29] Accession No. 10.130.1536. Length, 0.845 inches (2.4 cm.); diam., 0.512 inches (1.3 cm.).
[30] Titles in full, pp. 230-31.

represented hitherto in Egyptian jewelry; it illustrates especially well the technique of appliquéing wires, as practised by the Egyptians.

Except for a slight breakage near the soldered joint and insignificant injury to the wires, the piece is in excellent condition. Its provenience from Sakkara is open to question, as other objects were included with it under the old catalogue number.

The method of production was probably about as follows: a stock bar of gold, which had been cast in an open mould and was shorter and thicker than the desired band, was beaten, and thus stretched chiefly lengthwise, until it had approximately the right length and width.[31] By polishing and burnishing, the traces of casting and subsequent beating were removed and the band was now of remarkably uniform thickness, for the measurement 61/10000 of an inch may be obtained repeatedly. Working over a yielding bed, the ancient craftsman chased lengthwise a guiding line, dividing the band into an upper and lower part; this line shows in slight relief on the reverse where not obliterated by the following process and is also visible on the obverse, here and there, where the border of appliquéd wires has slipped out of position. The band was then turned over and the papyrus design, exclusive of the inner drawing, was executed with small punches, four in number, one for the stems, one each for the larger and smaller umbels, and one for the disks. We reach this conclusion from the small variations in the relative positions of umbels and stems everywhere observable, variations which would repeat themselves in a definite order, were the design produced in a die. The free-hand work was continued on the obverse of the band by chasing in the details of bracts, filaments, and ties, for in this particular also, no two umbels are precisely alike. Further, from the obverse, the relief of the stems, umbels, and disks was emphasized by punching down the ground about their outlines, and the openings in the pattern and the upper edge were cut out by chisel strokes; the ragged edges with burr were afterwards left untouched. To the band were now soldered, not solidly, but at intervals, long strips of sheet gold ornamented with wire appliqués, which form the borders of the burnished lower part of the circlet; and to give a finish comfortable for wearing, the lower edge of the band was burnished over the bottom edge of the lower border. A practical way of imitating the ornament of wires is illustrated in our sampler, Plate XXXVIII, at 2 e, but on the ancient circlet, as investigation subsequent to the printing of the plate has proved, solid wires were used and they were not soldered directly to the circlet; rather, as we indicated above, the appliqués had been separately prepared in long strips, each with its own underlying ground of sheet metal; the strips were possibly cut of uniform width but in the process of soldering the twists and plain wires to them, the visible wire work became slightly variable in width, and all projecting edges of the underlying strips were afterwards burnished upwards over the plain wires.

[31] Or the jeweler may have had in stock sheet metal of the right thickness from which he cut the band.

The method of making the individual wires has been discussed in our Introduction, pages 40 to 42; the greater prominence of the seams on the wires of the two twists in each border is perhaps due to the strain incident to the twisting. To the best of our judgment, and in this Mr. Heins agrees, the plain wires are not pieced, but were made long enough to go around the circlet; the wires exhibit under the microscope a few long diagonal markings, but these seem more like folds or overlaps without solder than like joints, and we have offered on page 42 an explanation of them. Nor have we found any certain instance of a spliced wire in the twists, although there, in places, the furrows in the wires as magnified are more suggestive of soldered joints and it would not be surprising if these twisted wires were not units throughout their entire length. Finally, in making the diadem, the band was bent into circular form and soldered together; on the inner face of the joint, where the flame was applied, are some splotches of solder, but the exterior was carefully finished and its present rude appearance at the joint is due to later partial tearing open. A microchemical analysis proved the gold to contain some silver, but no copper, lead, zinc, tin, or mercury.

The circlet is a form of personal ornament which may be traced in Egypt, worn by both men and women, from the First Dynasty down through the historical periods. The earliest extant specimen, one of about 3200 B. C., is a plain narrow hoop of gold.[32] But in the third millennium, the characteristic Egyptian form was developed. This form was possibly a translation into metal of a ribbon of flexible material tied in a bow-knot;[33] it consisted of a broad and ornate hoop of metal, adorned further with one or more bows[34] and streamers which were also of metal with colored inlays. Such circlets, known from the Pyramid Age only in representations, are seen to be of metal by the way people are pictured handling them and by their presence in scenes of goldsmith's products.[35] The next period, around 2000 B. C., is that from which the greatest number of actual circlets and coronets have come down to us, some of the stereotyped design developed earlier,[36] others of novel and charming forms,[37] which are generally marvels of cunning craftsmanship. The type

[32] Reisner, *Naga-ed-Dêr,* I, pp. 31, 144, Pl. 9, Fig. 54, found in contact with a part of the skull.

[33] This may be inferred from some of the earlier representations of such circlets. In the scenes of the award of jewelry in the Vth Dyn. pyramid-temple of Sahure, as well as in a relief from a private tomb of the Old Kingdom, the bow-knot form is unmistakable; see Borchardt, *Sahu-re,* II, Pls. 53-4, Fig. 9, p. 63. Usually, however, the two loops were stylized as papyrus umbels, later sometimes as lotus flowers. For representations of what seem to be flexible head-bands, tied in a bow-knot, or in a knot with single loop, see Petrie, *Medum,* Pl. IX, and Borchardt, *op. cit.,* Pls. 5 ff. Other head-bands of obviously utilitarian purpose were tied in a reef knot; Borchardt, *Statuen,* I, Nos. 110, 114, text cuts.

[34] Borchardt, *Sahu-re,* II, Fig. 9 = Klebs, *Die Reliefs des alten Reiches,* Fig. 13, design with two bow-knots. De Morgan, *Recherches,* I, cut on p. 199 = Klebs, *op. cit.,* Fig. 68 = Breasted, *History,* Fig. 41, design with three bows. The commonest design, that with one bow at the back, is found by the beginning of the Vth Dyn.; Borchardt, *op. cit.,* Pls. 35-7.

[35] Borchardt, *op. cit.,* Fig. 9, Pls. 53-4; De Morgan, *loc. cit.*

[36] (a) De Morgan, *Dahchour,* I, p. 112, No. 1, Pl. XXXVIII, G, F, found in position about the skull; Rosenberg, *Aegypt. Einlage,* Fig. 10; (b) De Morgan, *op. cit.,* p. 100, Pl. XXXVIII, C, E; (c, of slightly later date) first item under g, p. 239.

[37] (a) Lythgoe, *Bull. M. M. A.,* Dec. 1919, Part II, Fig. 6; Brunton, *Lahun I,* pp. 26, 27, 42, Pl. V, a deriva-

with bow and streamers lasted well into the subsequent great period of the Eighteenth to Twentieth Dynasties (1580-1150 B. C.), to judge by its repeated occurrence in paintings and sculpture.[38] But especially frequent at this time are diadems of equally broad bands without the bow and streamers, which most commonly have an ornament of inverted lotus sepals and petals; some of these are complete hoops,[39] like our circlet; others pass about three-fourths of the way around the head and are tied on;[40] occasionally an additional piece joined with the circlet in front follows the part in the wig partially or entirely over the crown of the head.[41] And most elaborate of all, are tall erections on the head composed in large part of nodding flowers on slender stems.[42]

The circlet under consideration probably belongs somewhere in the last-mentioned period, certainly not earlier. The clues for dating it are to be sought in an analysis of its design and in the quality of its workmanship. The circlet, as we have seen, is complete and almost uninjured and no mark on it suggests that it ever had bows, streamers, or other ornament attached to it. We may note first the resemblance of the lower part, the plain burnished band bordered by wire appliqués, to certain bracelets of Queen Ahhotep[43] (about 1580 B. C.). The openwork pattern of alternating tall and short papyrus umbels, however, is unprecedented among extant Egyptian jewels, although it has a familiar look, because of its frequency in wall-decorations, in

tive of the type with bows and streamers. (b) Mace and Winlock, *Senebtisi*, pp. 18, 58, 59, Fig. 28, Pls. XV, A, B, and XXI, found in position on the wig. (c) De Morgan, *Dahchour*, II, p. 61, No. 19, Pls. IX, X; Breasted, *History*, Fig. 97. (d) De Morgan, *op. cit.*, pp. 61-2, No. 20, Pls. X, XI; Breasted, *History*, Fig. 98. (e) De Morgan, *op. cit.*, barely mentioned p. 74. (f) The character of the "gold fillet" which "clasped" the wig of plaited hair of a mummy of the close of the XIIth Dyn., excavated at Thebes by the late Earl of Carnarvon, is not apparent, for lack of illustration or further description; Carnarvon and Carter, *Five Years' Explorations*, p. 55.

[38] For instance: Davies and Gardiner, *Amenemhēt*, Pl. XI, top row; XVIIIth Dyn. Perrot and Chipiez, *Histoire de l'art*, Vol. I, *L'Egypte*, Paris, 1882, Fig. 474 = E. A. Wallis Budge, *The Mummy. Chapters on Egyptian Funereal Archæology*, Cambridge, 1894, cut on p. 41; XIXth Dyn.

[39] For example, on a wooden statuette in Cairo, pictured: Walter Wreszinski, *Atlas zur altägyptischen Kulturgeschichte*, Leipsic, 1914 ff.; text to Pl. 39, No. 8; also statuette of Naï in the Louvre, with gold leaf preserved on the circlet, proving that the circlet was conceived as made of gold; Maspero, *Egyptian Art. Studies*, translated by Elizabeth Lee, New York, 1913, pp. 172-3.

[40] Frequently seen in wall-paintings, as those of Wilkinson, *Manners and Customs*, ed. Birch, Vol. I, p. 440, No. 213, p. 476, No. 242, etc.

[41] So the circlets represented on two ushebtis of the N. Y. Hist. Society's collection, pictured in the *Quarterly Bulletin*, Vol. I (1917-18), p. 95; in Yui's circlet the piece following the part in the wig is joined to the hoop also at the back; in that of the ushebti in the dress of life, the circlet, still covered with gold leaf, has the shorter additional piece joined to the hoop only in front; in both these instances, and often, this piece following the part of the hair represents stalks of lotus with flower and buds drooping over the forehead.

[42] Wreszinski, *Atlas*, Pl. 25[a] = Maspero, *Art in Egypt* (Ars una: species mille, General History of Art), New York, 1912, Fig. 289, XVIIIth Dyn.; Schäfer, *Die altägyptischen Prunkgefässe mit aufgesetzten Randverzierungen. Ein Beitrag zur Geschichte der Goldschmiedekunst* (Vol. IV, Pt. 1 in Sethe, *Untersuchungen*), Leipsic, 1903, Fig. 25 = Prisse d'Avennes, *Histoire de l'art*, Atlas Vol. II, "Peinture," Pl. 21, time of Ramses II; Schäfer, *op. cit.*, Fig. 53 = Champollion, *Monuments*, Pl. 200, 1 = Prisse d'Avennes, *op. cit.*, Atlas Vol. I, Pl. 45, time of Ramses III.

[43] Vernier, *Bijoux*, I, Pl. X, 52074.

somewhat more extended form, as the background of sporting scenes.[44] But in the instance of our circlet this formalized papyrus thicket has the addition, on the taller umbels, of disks, which are probably an abbreviated rendering of flowers, such as often occur in this period standing erect on the rims of large and elegant gold and silver vessels[45] or on the towering coronets of precious metals,[46] to which we made reference above. These wonderful and intricate creations of the goldsmith's and jeweler's art have all vanished, but some record of them is contained in wall-paintings, where the same conventions rule as in the relief of our circlet; and the flowers are drawn, as if seen from above, with circular outline and inner parts conventionalized to a rosette, while only the stems are shown in profile; in other instances[47] some flower stems are hidden, as here, by the plants in front of them. Regarded in this way, our design becomes comprehensible. The origin of the disks as flowers, however, may not have been clear to the maker of the circlet, since in contrast to the papyrus umbels the disks are left without inner details. The two horizontal lines below each papyrus umbel may have been taken over from the ties on columns representing a cluster of papyrus plants, for these ties had become a frequent, though illogical, addition to representations even of single papyrus stalks. Altogether, there is a lack of clarity in the design, pleasing as it is, which seems to accord with the artistic taste of the dynasties immediately following the Eighteenth. Moreover, comparing the wire appliqués on the circlet with available dated examples of the same ornament, we find them much more even and carefully made than those on Ahhotep's bracelets and very nearly resembling in quality the appliqués on the sumptuous bracelets of the time of Ramses II (1292-1225 B. C.), which are in the Cairo Museum.[48] In the royal jewelry of the close of the Nineteenth Dynasty, about 1200 B. C., there was retrogression in technical skill and wire appliqués were even rudely imitated in repoussé.[49] Accordingly we suggest 1275 B. C. as possibly about the time when our circlet was made.

The circlet was presumably found in a tomb, but is substantial enough to have been worn in life. If actually so worn, its smallness indicates that it must have belonged to a somewhat petite individual, perhaps to one of the

[44] Good examples of the XVIIIth Dyn. represented in colors in Norman de Garis Davies, *The Tomb of Nakht at Thebes* (M. M. A. Robb de Peyster Tytus Memorial Series, Vol. I), New York, 1917, Pl. XXIV and in Nina de Garis Davies and Gardiner, *Amenemhēt,* Pl. I A. See also Breasted, *History,* Fig. 156.

[45] Schäfer, *Prunkgefässe,* Figs. 35, 50-52, 77, 78, 101, and 113.

[46] See references above in n. 42.

[47] Schäfer, *op. cit.,* Figs. 53, 55.

[48] See pp. 240-41, third item under i.

[49] Vernier, *Bijoux,* II, No. 52577, Pl. XX; Theodore M. Davis' Excavations, *The Tomb of Siphtah; the Monkey Tomb and the Gold Tomb,* London, 1908, plates "Silver Bracelets of Queen Tauosrît." The quality of work in the earrings of the XXth Dyn., pictured in Vernier, *op. cit.,* Pl. XXVII, is hardly equal to that of our piece, although here actual appliqués are used. If it be objected that the quality of work is an unsafe criterion of date, that good work and poor work were done in every age, we acknowledge the general objection, but regard comparisons made exclusively between pieces of Egyptian jewelry produced under royal patronage as nevertheless possibly of some value, since such pieces presumably were up to the level of the best work of their respective periods.

numerous princesses of the royal house. To be sure, it has none of the insignia of royalty sometimes seen in jewels belonging to members of the ruling family, but its intrinsic value and artistic merit would lead one to ascribe it to a person of considerable position.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., included under No. 1037; edition 1915, under No. 1033.

No. 3 (Plates V, a, b, XXXV, c, d). Part of a clasp from a piece of jewelry.

Gold, carnelian, and lapis lazuli. Probably Eighteenth or Nineteenth Dynasty, about 1580-1300 B. C. From Sakkara. Thickness 0.12 inches (3 mm.). Present weight, 22.76 grains (1.475 grams).

POINTS OF INTEREST: It affords a good example of the method of inlaying gold with other materials practised in the sixteenth to thirteenth centuries B. C.; it is an illustration of one of the earliest types of clasps known in the history of jewelry.

Except for the loss of the inlay surrounding the central bosses and some denting of the gold, the piece is in good condition.

The main part is a shallow box of sheet gold with side walls partly in one piece with the bottom, partly soldered on. Within the box, strips of gold, curved, or bent at a sharp angle, were soldered on edge to outline each lotus leaf and stem and to form the cylindrical pedestal on which each round boss is set. The bottom piece shows on the reverse in relief the impress of the walls of the cloisons thus formed. Each of the bosses we suppose to have been made by pressing sheet gold into a carefully executed shallow depression in a stone or wooden block. The four loops consist each of a strip of gold about 0.138 inches (3.5 mm.) wide and 0.236 to 0.276 inches (6-7 mm.) long, soldered in place with little dexterity, as compared with the fastening of the sides of the box, for here the solder is readily seen, an unmelted minute panel of it even remaining in one place, and the lower loop at the right had to be strengthened subsequently by a tiny piece of thin gold. That the patch is not a later repair is clear from the fact that one end, soldered against a cloison wall, extends down into the box where it could have been fastened only before the inlaying of the piece began. When the frame was ready the cells were filled to more than half their depth with a cement, composed, it appears to us, in part of wax; in this bed thin slices of carnelian and lapis lazuli were laid, of which the former were used for the red stems of the lotus and the latter for the leaves. Only two of the cloisons are filled with a single stone; in all the others, there is somewhat clumsy piecing, and the inlays depend on the cement and not at all on exact fitting[50] to hold their position; indeed, the inlaid work of this period, although effective, compares in technique unfavor-

[50] For this type of inlaid work, cf. Rosenberg, *Aegyptische Einlage,* Figs. 16, 17, and description p. 8.

ably [51] with the beautiful and finished work of the nineteenth century B. C. and with some later work (see No. 104; also our Introduction, pages 31 to 33). The gold has the color of fine gold.

This piece originally interlocked with two others, each of which had a single loop. On the one side a pin passing through the three loops was permanently fixed; the pin on the other side was removable, to permit opening and closing the bracelet or necklace. The permanently closed side, we may remark, was one of the forerunners of a kind of hinge still in common use among craftsmen, in which the several parts are made of drawn tubing connected by a pin.[52] Back of it, in ancient Egypt, lay a long struggle with the special problem of how to fasten pieces of jewelry. A set of bead bracelets from about 3300 B. C. shows the earliest court jewelry of history to have been executed without a knowledge of clasps, for these various bracelets either were fastened by a loop and button or were tied on the arm.[53] In the succeeding period of the third millennium B.C. there is no clear evidence of the invention of clasps; end-pieces into which were gathered the several threads of bead collars were elaborated and given artistic form; from these the threads issued in a single twist and were tied in the reef or square knot, which the Egyptian river-folk employed at a very early date.[54] This knot, in time, was imitated in a two-piece gold sliding clasp, of which the earliest surviving example dates from shortly after 2000 B.C.[55] Numerous sliding clasps, beautiful in design and elaborately and skillfully made, have come down to us from the nineteenth century B.C.[56] Some of these require a certain amount of room in which to operate, that is, as has been pointed out,[57] the piece of jewelry must be drawn in for an instant in order to slide the tenon on the one part of the clasp into the corresponding groove in the other; this characteristic was no drawback for a necklace or a girdle, but was inconvenient for a close-fitting bracelet or throat-band. Accordingly in the same century we find another type of sliding clasp used for bracelets; here the sliding part is an additional separate piece slipped from above or below into two other pieces into which it dovetails. Also in this period the clasp such as ours, which was like the three-piece sliding clasp in requiring no overlapping of the jewelry in fastening, came into favor [58] and

[51] Will the newly found examples from the tomb of Tutenkhamon cause a revision of this statement?

[52] Wilson, *Silverwork and Jewelry,* pp. 134-5, Figs. 71-4; cf. Maryon, *Metalwork,* pp. 149-155.

[53] See p. 237, first item under a.

[54] For representations of jewelry as worn tied on, showing the reef knot, see Borchardt, *Statuen,* I, text cuts accompanying Nos. 139, 269.

[55] Mace and Winlock, *Senebtisi,* p. 62 under 4, Pls. XXII, XXIII, XXVIII, A-C. Now in the Metropolitan Museum of Art.

[56] Vernier, *Bijouterie,* p. 88, Figs. 82-3, Pls. X, 2, 3, 5, 6 and XVI, 2, 3; *Bijoux,* I, p. 18, Fig. 19, Pl. VIII, 52019-19 bis, 52041-2, 52044-5; De Morgan, *Dahchour,* I, Pls. XV, XVI, 2, 3, 13, 14, XVII, 8, 9, XX, 15, 16; *Dahchour,* II, Pl. V, 9, 12, etc. Lythgoe, *op. cit.,* Fig. 11 (below) = Brunton, *op. cit.,* pp. 34-5, Pls. IV, XIII. Petrie, *Arts and Crafts,* p. 91.

[57] By Mr. Winlock in *Ancient Egypt,* 1920, p. 84.

[58] De Morgan, *Dahchour,* I, Pl. XXXVIII, A, B, D, 18th cent. B.C. Von Bissing, *Ein thebanischer Grabfund aus dem Anfang des neuen Reichs,* Berlin, 1900, Pls. V, 2, 4, VII, 3 = Vernier, *Bijoux,* I, Pl. IX,

soon nearly superseded the sliding type.[59] It is uncertain when the simple hook and eyelet represented in a few earrings of this collection (Nos. 67, 83, 84, 88, 89) first appeared in Egypt; the oldest example known to the writer is of the early years of the sixteenth century B. C.[60]

The range of date which we have given for this number is suggested by the jewelry of Queen Ahhotep in the Cairo Museum,[61] which includes inlaid work of similar technique, and earrings in the Berlin Museum[62] which show an analogous combination of gold scales (similar to the bosses here) and colored inlays.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1029; edition 1915, No. 1025.

Nos. 4, 5 (Plate V, a, b). Beads in the form of flies, from a piece of jewelry.

Thin gold exteriors with sandy(?) filling to give strength. Eighteenth Dynasty, about 1400 B.C., or later (?). Thickness at head, 0.079 inches (2 mm.). Present weight of No. 4, 1.94 grains (0.126 grams); of No. 5, 2.14 grains (0.139 grams).

The gold is worn through on prominent parts revealing the dark filling and No. 4 has lost the tip of the left wing. No trace remains of the "piece of enamel let into their backs," which is mentioned in the old catalogue.

Each fly was made in two parts; the obverse and sides in one piece were formed by pressing sheet gold into a die having the design in intaglio. The gold is so thin that the filling of fine dark sand(?) mixed with a binder must have been put in before removing it from the die. The filled upper parts were closed on the bottom by flat pieces of the thin sheet; the solder joining the two parts is invisible but there are marks of burnishing where the seams were worked smooth. Two round threading holes were pierced through the neck after each fly had been put together. The work is simple but is executed with remarkable skill.

Small flies occurred as units in strings of beads even in predynastic times[63] and were quite usual in the Twelfth to mid-Eighteenth Dynasties,[64]

52069, 52070-71 = Vernier, *Bijouterie,* Pls. IV, 1, 3, X, 7, early 16th cent. B.C. *Bijoux,* II, Pl. XVIII, 52575-6; *Bijouterie,* Pl. VII, 2; Davis' Excavations, *Siphtah, loc. cit.* = *Bijoux,* II, Pl. XX, 52577-8, 13th cent. B.C.

[59] For a comparatively late Egyptian sliding clasp, see C. C. Edgar in Maspero, *Le Musée Egyptien,* Vol. II, Pt. 3 (1907), p. 105, Pl. LIII, from Tell Basta, 13th cent. B.C.

[60] Von Bissing, *op. cit.,* col. 9, Pl. VI, 2.

[61] Von Bissing, *op. cit.*

[62] Schäfer, *Goldschmiedearbeiten,* No. 92, Pls. 1a, 14.

[63] Petrie and Mace, *Diospolis Parva,* p. 34, cf. p. 26, of lapis lazuli with gold head. Many of less valuable material have been found.

[64] Petrie, *Amulets,* p. 12, Pl. II; Reisner, Boston *Bulletin,* Vol. XIII (1915), p. 81, Fig. 16, No. 18, silver flies with gold heads, around 2000 B.C. Von Bissing, *Ein thebanischer Grabfund,* Pl. VI, col. 10, Nos. 3a, 3b, gold and electrum, early XVIIIth Dyn., about 1580 B.C. Also two undated sets of gold flies: Möller,

2000 to 1500 B.C. But later specimens are known also [65] and bear more resemblance to these pieces than do the earlier flies. There are several of gold in the treasure of Queen Tewosret [66] from the close of the Nineteenth Dynasty, about 1200 B.C., which are inferior in workmanship to the present specimens, but similar in design, that is, the markings are few and confined to the body. Some close parallels found on the island of Cyprus and probably importations from Egypt have been attributed to the "Later Bronze Age" (following 1500 B.C.)[67] and to the "Mycenæan Age." [68] The dark filling is known to us in jewels of the second half of the Eighteenth Dynasty (Nos. 46, 47) and in later economically made gold objects (Nos. 8, 9).

The motif of the fly is to modern taste a curious one. In Egypt it probably often had amuletic or symbolic significance, although we are far from thinking that every small bead-fly of the type of these specimens was so regarded; in Egypt, as elsewhere, many art-motifs originally symbolic were used eventually without thought of their original meanings. It hardly seems possible, however, that the Egyptians, any more than the Greeks,[69] could have missed noting the appropriateness of the fly as a symbol of persistent and untiring attack, and it may be mere accident that the fly does not occur in figures of speech in surviving Egyptian literary texts; other insects, the honey bee, the dung-beetle, and the grasshopper have been found used figuratively.[70] There is inscriptional evidence, to which Professor Sethe has called attention,[71] that, in the early Eighteenth Dynasty, the gold given as a reward for military prowess was sometimes wrought into the form of flies; perhaps these military rewards were of large size as only a few flies—two and six in the recorded instances—were given. Yet the most splendid of surviving Egyptian gold flies, three in the Cairo Museum,[72] which measure each 3.66 inches (9.3 cm.) in length, were the possession of a woman, the queen Ahhotep, and thus are more likely

Amtliche Berichte, Vol. XXXIV (1912), pp. 22-3, Fig. 6 and C. L. R[ansom], *Bull. M. M. A.,* Vol. X (1915), pp. 117-20. The 2nd and 3rd references are to examples somewhat larger than the ordinary fly-beads.

[65] The latest of the Egyptian series known to us is that on a knotted cord from Kafr Ammar, Dyn. XXIII-XXV; Petrie, *Amulets,* Pl. XVIII, 131 e. The motif of the fly was used also outside of Egypt in jewelry of the Greek and Roman periods: Marshall, *Jewellery,* Nos. 2628, 2840 and *Catalogue of the Finger Rings, Greek, Etruscan, and Roman, in the Departments of Antiquities, British Museum,* London, 1907, Pl. XXVI, No. 1014.

[66] Davis' Excavations, *Siphtah,* p. 39, No. 13, plate "Amulets and Rings."

[67] Myres, *Handbook. Cesnola Coll.,* p. 376, Nos. 3057-9 = I. H. Hall, *A Descriptive Atlas of the Cesnola Collection,* New York, Vol. III (1903), Pl. IV, Nos. 14, 16.

[68] Marshall, *Jewellery,* No. 663, Pl. V, = A. S. Murray, A. H. Smith, and H. B. Walters, *Excavations in Cyprus,* London, 1900, Pl. VIII, 14 gold flies from Enkomi; wt., each, 1.5 grains (0.10 grams).

[69] Möller, *loc. cit.,* called attention to the Homeric passage, Il. XVII, 570.

[70] Grapow, *Vergleiche,* pp. 5, 7.

[71] *Ä. Z.,* Vol. 48 (1910), pp. 143-5. Cf. passage quoted on our p. 2.

[72] Von Bissing, *op. cit.,* Pl. VI, col. 9-10, No. 2 = Vernier, *Bijouterie,* Pl. XIV, p. 97. Cf. MacIver and Woolley, *Buhen* (Univ. of Pennsylvania. Egypt. Dep. of Univ. Museum. Eckley B. Coxe, Jr. Expedition to Nubia. Vols. VII, VIII), Philadelphia, 1911, Pl. 51, No. 10,347, pp. 175, 225, two flies, 4.33 inches (11 cm.) long, electrum and ivory; XVIIIth Dyn., sex of burial not given. In the proof, we add a reference to Reisner, *Kerma,* Pt. IV (*Harvard African Studies,* Vol. VI), 1923, p. 131, whose examples of the Middle Kingdom include two pairs of larger flies found with bodies of men wearing swords.

to have been amulets or mere decorative pendants than symbolic military decorations.

BIBLIOGRAPHY: Bonomi catalogue,[73] 1843, p. 35, under No. 54. Abbott catalogue, editions 1853 ff., Nos. 1070-71; edition 1915, Nos. 1066-7.

No. 6 (Plate V, a, b). Bead in the form of a crocodile.

Gold. Mid, or late, Eighteenth Dynasty, 1500-1350 B.C.(?). Weight, 9.18 grains (0.595 grams).

Across the bottom may be seen the impress in relief in the soft gold of the cord or wire on which the bead was once strung.

It was made hollow, in two parts, of sheet gold heavy enough to require no filling and to admit of being chased on the upper part, which had first been impressed in a die. The longitudinal markings were chased in first, followed by the cross-markings, which are less deep and have a burr overhanging the previously cut, long channels. The soldered joints were finished to invisibility along the animal's neck, but are to be seen elsewhere. Except for high lights due to wear, the bead has a pleasing matt surface produced by polishing with some fine sand or other abrasive. It is one of the most exquisitely wrought small pieces in the collection.

The animal represented appears to us to be a crocodile rather than a warren, as stated in the Abbott catalogue. The body, it is true, is somewhat pudgy, but this is due to the conventionalization, bringing the tail unnaturally close to the body, to make a compact, approximately rectangular bead. The markings on the back are surely those of the crocodile.[74] Except for one or two questionable examples the warren has not been identified among Egyptian figures, but the crocodile, owing to its significance as the embodiment of an Egyptian water-god, was an ever-popular motif.

We have suggested the middle, or latter part, of the Eighteenth Dynasty as the time from which the bead dates, because in delicacy of conception and workmanship it is analogous to numerous small amulets and seals in animal form which enrich the minor arts of those years.[75]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1072; edition 1915, No. 1068.

No. 7 (Plate V). Pendant in the form of the minor goddess, Teweret.

Pale gold. From Sakkara. Nineteenth Dynasty, about 1200 B.C.(?). Height, including eyelet, 0.748 inches (1.9 cm.). Weight, 10.20 grains (0.661 grams).

[73] Title in full, p. 229.

[74] In J. Anderson, *Zoology of Egypt: Reptilia and Batrachia,* London, 1898, cf. Pl. I (*Crocodilus niloticus*) and Pl. XVIII (*Varanus niloticus*).

[75] Newberry, *Scarabs. An Introduction to the Study of Egyptian Seals and Signet Rings,* London, 1906, pp. 87-8.

The pendant is hollow and made in two parts of which the front was impressed in a die. The eyelet is a bent-over strip of sheet, 0.049 inches (1.25 mm.) wide, probably cut separately[76] and soldered to both main pieces. The form was sketchily rendered in the die, but some supplementary markings were added to the hippo body from the obverse with a sharp punch. Under the figure's jaw is a small vent hole, necessary during the process of soldering the two parts together; the soldered seams are well finished.

Representations of Teweret which antedate the Eighteenth Dynasty are rare,[77] but during the Eighteenth Dynasty this goddess' grotesque form, usually, as here, that of a hippopotamus walking erect on her hind legs with her fore legs humanized as arms, adorned mirror handles, furniture, and all manner of household articles and became a frequent motif in jewelry. Teweret, like the equally ugly and cheerful god Bes (Nos. 10, 11), was very close to the hearts of the common folk; often she supports before her the hieroglyph meaning *protection,* an indication of her supposed usefulness to mankind,[78] and she was appealed to by women for succor in childbirth.[79] We have suggested a date about 1200 B.C. for this piece because of its stylistic resemblance to pendants in the treasure of Tewosret.[80]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 47. Abbott catalogue, editions 1853 ff., No. 1075; edition 1915, No. 1071.

No. 8 (Plate V, a, b). Pendant representing the lioness head of a goddess, Sekhmet or Bast.

Gold. Twenty-second to Twenty-third Dynasty, 945-718 B.C. (?). From Sakkara. Weight, 15.22 grains (0.986 grams).

The muzzle is crushed in; other surfaces are somewhat dented, and the eyelet is broken off.

The animal head and collar were impressed in a die from a single piece of sheet gold. The lower edge of the collar was turned under and hammered

[76] Often in making such amulets the eyelet was cut in one piece with the flat reverse, as in Nos. 91 and 92.

[77] See: *Ancient Egypt,* 1916, p. 53, for a supposed representation of Teweret from about 3400 B.C.; *A Catalogue of the Egyptian Antiquities in the Possession of F. G. Hilton Price,* Vol. II, London, 1908, p. 41, Pl. XXXIV, for a typical figure of about 2000 B.C. engraved on a funerary boomerang of ivory; Boston *Bulletin,* Vol. XII (1914), p. 20, Fig. 22; p. 40, eight Teweret figures from Nubia, Hyksos period, about 1650 B.C.

[78] Erman, *A Handbook of Egyptian Religion* (translated by A. S. Griffith), London, 1907, p. 76; *Die ägyptische Religion* (Handbuch der Königl. Museen zu Berlin), 2nd ed., 1909, p. 91; a 3rd German edition is in preparation. May not the so-called Typhonic couch from the tomb of Tutenkhamon be supported rather by modified figures of Teweret? In this connection the Amarna tablet No. 14 is of high interest; according to Knudtzon's critical edition, it contains an inventory of presents sent by the Egyptian king to the Babylonian king, including (Col. II, 19) "a bedstead, overlaid with gold, of which the supports are protective divinities." On this goddess see also: Thomas George Allen, *A Handbook of the Egyptian Collection* (Art Institute), Chicago, 1923, p. 57, where the goddess' name is rendered Toëris. Cf. now Carter and Mace, *The Tomb of Tut-Ankh-Amen,* Vol. I, London, 1923, Pl. XXVIII.

[79] Möller, *Ä.Z.,* Vol. 54 (1918), pp. 138-9.

[80] Davis' Excavations, *Siphtah,* p. 38, No. 10, plate "Amulets and Rings of Queen Tauosrît."

down to give a smooth finish, but its short upper edges were left ragged. The hollow of the head was given the support of a sandy(?) filling, held in place by a rectangular covering of sheet gold, to which the eyelet, now torn away, thus revealing the dark filling, was once attached. This closing piece was neatly soldered on. The gold is of the color of fine gold.

The most important dated parallel for this and the succeeding number is a large gold pendant in the Louvre, bearing the names of a king and queen of the Twenty-second Dynasty.[81] Other pieces have been found under conditions which enabled the excavators to assign them to the period of the Twenty-second to Twenty-third Dynasties.[82]

Although during the later dynasties, the lioness head when surmounted by the sun's disk (as in No. 9) seems properly to belong to Sekhmet,[83] it is doubtful if the Egyptians themselves, at this time, always distinguished consistently their two chief goddesses of feline form,[84] for Sekhmet of Memphis and Bast of Bubastis, and Mut of Thebes, were more or less assimilated to one another.[85] Professor Petrie has published a similar pendant with the human head and double crown of Mut.[86] Perhaps the prominence of the local goddess of Bubastis under the Bubastite dynasty[87] brought this design into special regard. Its significance is obscure,[88] but let us note that it was regularly placed as an attribute in the hands of Bast in a well-known type of figure in which she appears cat-headed and clad in a patterned and fringed gown. Here, according to considerations advanced by one authority,[89] the goddess is carrying an image of herself.

The combination, in the design of this pendant, of a head and broad collar is peculiarly Egyptian and is seen constantly from the mid-Eighteenth Dynasty[90] on. It is not an unpleasing solution of the artist's problem how to finish a head below, when it is undesirable to represent the related body. The

[81] Perrot and Chipiez, *Histoire de l'art,* Vol. I, p. 834, Fig. 569 = Vernier, *Bijouterie,* Pl. XIX, No. 1.

[82] So Petrie, *Hyksos and Israelite Cities* (XIIth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XIIth Year), London, 1906, Pls. XIX E, XXXII. Cf. Petrie, *Amulets,* p. 42, giving the limits XXIInd-XXVIth Dyn. for this type of amulet, and No. 195 g, Illahun, XXIInd Dyn.

[83] As in the well-known statues from Karnak; see Lythgoe, "Statues of the Goddess Sekhmet" (Pt. II, *Bull. M.M.A.* for Oct. 1919).

[84] Even in the Vth Dyn., Bast was lioness-headed, though without the disk, but with the epithet "sekhmet" ("the mighty") suggesting an early association with Sekhmet; see Borchardt, *Ne-user-re,* p. 94, Fig. 72. The Abbott collection includes a late inscribed statue of a priest of Bast (No. 150, *Catal.* 1915) holding a shrine containing an image of his deity in relief; also here Bast is lioness-headed without the disk.

[85] See, for instance, Erman, *Religion,* Engl. ed., p. 56; 2nd Germ. ed., p. 71. Again, just these three goddesses are associated on the stela of a high-priest of Memphis of the XXIInd Dyn.; *The Bulletin of the Cleveland Museum of Art,* Vol. V (1918), p. 68.

[86] *Amulets,* Pl. XXXV, 195 g.

[87] The XXIInd.

[88] According to Schäfer, *Ä.Z.,* Vol. 43 (1906), pp. 68-9, when a funerary amulet, it replaced an actual broad bead collar.

[89] Hermann Kees, *Der Opfertanz des aegyptischen Königs,* Leipsic, 1912, p. 21. Such a bronze figure of Bast was published in the Society's *Quarterly Bulletin,* Vol. II (1918-19), p. 47, Fig. 4; another, Schäfer, *Goldschmiedearbeiten,* p. 55, Fig. 39; see also Wilkinson, *Manners and Customs,* ed. Birch, vol. III, p. 35.

[90] So, to mention two examples: in the adornment of chairs, Davis' Excavations, *The Tomb of Iouiya and Touiyou,* London, 1907, Pl. XXXIII, and in the prow and stern ornaments of vessels, Naville, *Deir el Bahari,* Pt. V, (XXVIIth Memoir. Eg. Expl. Fund), London, 1906, Pls. CXXII, CXXVI.

mind reverts to the herm and bust, the solutions offered later by the Greeks and Romans.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1030; edition 1915, No. 1026.

No. 9 (Plates V, a, b, XXXV, c). Pendant representing the lioness head of a goddess, Sekhmet or Bast.

Gold. Twenty-second to Twenty-third Dynasty, 945-718 B.C. (?). Weight, 9.29 grains (0.602 grams).

The eyelet for threading, with a portion of the back plate to which it was attached, is torn off.

The pendant was made in two parts, a front impressed in a die, filled with a sandy(?) composition, and chased on the obverse to bring out sharply the details of the collar, and a flat back soldered to the front. The soldering was not accomplished with entire success, as about one-third of the joint along the lower curved edge of the collar is open and in the view of the reverse a minute lump of once-fused solder may be seen, below, on the right, where it collected, instead of performing the office of closing the joint! Tiny particles of white metal are observable on the sun's disk and the back of the amulet. The color is that of fine gold.

On the identity of the goddess represented and the dating of the piece, see under No. 8.[91]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 996; edition 1915, No. 992.

No. 10 (Plate V, a-c). Pendant in the form of the minor god Bes.

Pale gold. Latter part of the Eighteenth Dynasty, 1500-1350 B.C. (?). From Thebes. Weight, 60.34 grains (3.910 grams).

Its main part is made hollow in two halves, impressed in dies, and soldered together down the sides. The side joints have been worked over, but not rendered invisible; they even gap in some places. The loop for threading is compound, having four soldered seams. Presumably the procedure was first to cut a strip of thin sheet gold about 0.039 inches (1 mm.) wide, rub it with a burnisher lengthwise, converting it from flat stock into a half-round in section; then it was wound about a mandrel as in making links for a chain, cut, and the parts were soldered together, and the whole loop finally was soldered to the top of the figure. The tail, beaten out separately, is soldered near the tip to the figure's left heel and again to the body where the end is trimmed

[91] Other similar amulets of precious metals but undated: Schäfer, *Goldschmiedearbeiten,* No. 42; C. L. R[ansom], *Bull. M.M.A.,* Vol. X (1915), pp. 117-20; Petrie, *Amulets,* Pls. XXXV, 195 f, XLV, 195 e.

and flattened out; an unmelted panel of solder remains at one side. Minute particles of white metal, visible with a magnifying glass, are especially abundant on the figure's back.

The figure of the god Bes, a ludicrous being, partly leonine, partly human, whose attitude toward men was kindly and whose protection from evil beasts was eagerly sought, came into great vogue after 1580 B.C. as a motif in the minor arts, and this Bes-pendant is of a well-known, Eighteenth Dynasty type[92] in which the god is represented without headdress or other accessories and with his hands resting on his hips.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, under No. 46. Abbott catalogue, editions 1853 ff., No. 1044; edition 1915, No. 1040.

No. 11 (Plate V, a-c). Pendant in the form of the minor god Bes.

Electrum. Latter part of the Eighteenth Dynasty, 1500-1350 B.C.(?). From Sakkara. Weight, 34.09 grains (2.209 grams).

Made as No. 10 except that the loop is of a single strip of metal with rills chased in and the tail where it joins the body is not flattened out, nor is it soldered a second time near the tip. The side seams are better finished than in No. 10. A coppery tinge is noticeable in the solder on the top of the head.

On design and date, compare No. 10.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, under No. 46. Abbott catalogue, editions 1853 ff., No. 1043, edition 1915, No. 1039.

No. 12 (Plates V, a, XI, b, c). Bead.

Pale gold. Eighteenth Dynasty, about 1500 B.C., or later (?). From Sakkara. Diameter, 0.236 inches (6 mm.). Weight, 2.00 grains (0.130 grams).

The bead is hollow, having been made in two halves, which were then soldered together. Sheet gold was beaten into a die to form each of the halves. The soldered joint was well finished, but not quite to invisibility. The threading hole was pierced by an instrument of round section which was drawn back and forth and twirled about to work a good edge; inside, the jagged edges of the torn sheet may be seen.

The only clue to its date which occurs to us is a resemblance in shape to certain blue faience beads, usually larger and coarser, which are common in the Eighteenth Dynasty.[93]

[92] Examples: Petrie, *Tell el Amarna,* London, 1894, Pl. XVII, 290; Davis' Excavations, *Iouiya and Touiyou,* Pl. XXXV and plate opp. p. 37, at bottom.

[93] See MacIver and Mace, *El Amrah and Abydos,* Pl. XLVI, D 102. Cf. the smaller gold beads of a mid-XVIIIth Dynasty necklace, R. Engelbach, *Riqqeh and Memphis VI,* (XXVIth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XIXth Year, 1913), London, 1915, p. 15, Pls. I, 10, XI, 4; also Marshall, *Jewellery,* No. 787, Pl. VIII.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1011; edition 1915, No. 1007.

No. 13 (Plate V). Bead.

Gold. From Sakkara. Twelfth to Eighteenth Dynasty, 2000-1350 B.C. (?). Length, 0.433 inches (11 mm.). Weight, 2.50 grains (0.162 grams).

One side is somewhat crushed, the other uninjured.

The bead was made hollow in two halves and soldered together; compare the technique of No. 12. The seams run lengthwise and the solder appears to be of the same color as the gold, which has the hue of fine gold.

Such isolated small pieces of geometrical form as this and the preceding number are especially difficult to place chronologically. Hollow gold beads were pressed out in two parts and united by solder from very early times.[94] Beads of the shape of this one are frequent in stone and metal in the period to which we have assigned the piece.[95]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., under No. 1021; edition 1915, under No. 1017.

No. 14 (Plate V). Pendant representing a seated figure in a frame of the sky supported by *was*-pillars.

Gold. From Sakkara. About Twenty-fifth Dynasty, 712-663 B.C. (?). Weight, 18.63 grains (1.207 grams).

The piece has been misused and is worn and scratched.

Probably it was made of several parts beaten out separately and then united by solder. Stars were roughly suggested by three grains flattened by hammer blows and then soldered to the top piece. The loop for threading was made of a separate strip of metal soldered on the reverse to the head of the figure. The gold contains many minute particles of white metal.

In size, general composition, the *à jour* technique, and the summary rendering of the figure, our pendant resembles certain gold and silver amulets which are especially numerous from the period around 2000 B. C.,[96] but occur also later,[97] and we believe that its design is a derivative from the same category of ideas as the designs of those pieces. In the usual amulet, a standing or seated figure bears in each hand a stripped, notched palm-rib. It was in this form that

[94] See Vernier, *Bijoux*, I, p. 13, Fig. 15.

[95] De Morgan, *Dahchour*, II, Pl. VIII and Carnarvon and Carter, *Five Years' Explorations*, Pl. XLV, 2 H.

[96] For instance: Ayrton, C. T. Currelly and Weigall, *Abydos. Part III. 1904* (Special extra publ. Eg. Expl. Fund), London, 1904, Pl. XII, 1, 2; MacIver and Mace, *El Amrah and Abydos*, Pl. XLIII, tomb 81.

[97] Davis' Excavations, *Siphtah*, p. 39, No. 12, plate "Amulets and Rings of Queen Tauosrît." Petrie, *Amulets*, p. 19 under 59; also example mentioned below in note 103, made of glazed pottery.

the concept "infinity" was sometimes expressed.[98] Further these amulets came into funerary use just at the time when the ordinary mortal, in death, was first being identified with the king of the dead, Osiris, and was acquiring the appurtenances and prerogatives of the kings of earth. Possibly therefore we may venture to suggest that the amulets assured to the deceased the gift of an infinity of years, the years being symbolized by the hieroglyph for *year,* the notched palm-rib, on which in a primitive age the record of passing years had been cut.[99] The amulets would thus have denoted much the same thought as the large temple reliefs representing the enthroned kings of earth, to whom the gift of years is handed, symbolized by a cluster of notched palm-ribs[100] or by a figure of the god Infinity with a lofty palm-rib as headdress.[101] In the same reliefs the limits of the scene are defined by the hieroglyph for sky in large size, supported by pillars similar in form to the hieroglyph *was,* of which a frequent meaning is *good fortune,* or the like. Again in this and other scenes the gift of "good fortune," together with "life" and other blessings, symbolized by the objects represented in the hieroglyphs with which the respective words were written, are continually being bestowed on the mortal king by the gods; in this way these objects came to be the recognized attributes of divinities, and a *was*-staff was regularly carried in one hand and a life-sign in the other, in most representations of Egyptian gods.[102] The early amulets to which we have alluded we suppose to have had their origin in a conscious purpose to secure for the dead what had once been granted only to the king, but, as time went on, their meaning became obscured and the gold pendant under consideration, we believe, shows only a confused reminiscence of several elements in the artists' representation of the ideas spoken of above. The sky supported by *was*-pillars was suggested by the frequency of this motif as the frame for scenes in wall-decorations. But

[98] Cf. *J. E. A.,* Vol. III (1916), p. 280. Professor Erman in *Die Hieroglyphen* (Sammlung Göschen), 2nd ed., Berlin and Leipsic, 1917, p. 15, interpreted the usual ideogram expressing "vast number" as a scribe throwing up his arms in expressive oriental gesture over a huge sum. But the concept "infinity" must have been personified as a minor god very early, for many of the oldest examples of this hieroglyph have the long curved beard of divine beings. In the XVIIIth Dyn. it acquired, further, the palm-rib as headdress and in reliefs a minor god of like form is depicted (Griffith, *A Collection of Hieroglyphs,* VIth Memoir. Arch. Survey of Eg., London, 1898, p. 13). The guardian of the sea of fire in the Book of the Dead, Ch. 17, § 26, however, is another being, the "Swallower of Years." There is an occasional variant of the hieroglyph for "infinity," a figure holding a palm-rib in each hand as in the above-mentioned amulets (see Griffith, *loc. cit.* and Möller, *Hieratische Paläographie. Die aegyptische Buchschrift in ihrer Entwicklung von der fünften Dynastie bis zur römischen Kaiserzeit,* Vol. III, Leipsic, 1912, No. 37 bis). This, we believe, was an excerpt from the ideas expressed more fully in the temple scenes, in which a god, Horus or Set, extends the gift of years (see above, main text), and only secondarily came, as a whole, to mean "infinity." Quite often the figure wears the sun's disk (Möller, *loc. cit.* and in an unpublished amulet of the Abbott collection) when we may question whether it was regarded as the god Infinity.

[99] *Ä.Z.,* Vol. 45 (1908), pp. 45-6.

[100] So in an unpublished relief from the pyramid-temple of Amenemhet I, now in the Cairo Museum. A photograph of this scene from the "Sed" festival is now in our hands, through the courtesy of the discoverer, Mr. Lythgoe.

[101] *J.E.A.,* Vol. IV (1917), Pl. IV, a scene from the temple of Amenhotep I, discussed by Mr. Winlock.

[102] Cf. *N.-Y. Hist. Soc. Quarterly Bull.,* Vol. III (1919-20), p. 76.

the holding of these same *was*-staves by the seated figure was reminiscent of the god bearing his gift of "good fortune", the whole being brought into the scheme of the early amulets, which had become traditional in the equipment of the dead. Support for this view and for a late dating of our piece is to be found in a pendant of glazed pottery from the Twenty-fifth Dynasty, of which an illustration has been published by Professor Reisner.[103] In this, too, a figure holds a *was*-symbol in each hand and these *was*-staves form the frame at the sides of the pendant, though the piece is terminated above by a sun's disk flanked with uraei, constituting the god's headdress, instead of by the sky.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1008; edition 1915, No. 1004.

[103] Boston *Bulletin,* Vol. XIX (1921), p. 32, 2nd row from bottom, 3rd piece from left.

B.—Scarabs

One of the most characteristic sights among the humbler creatures of Egypt in ancient days as later was the *Scarabaeus sacer,* or other native dung-beetle, rolling the ball of excrement which, in some underground nest, was to serve as food.[1] It caught the imagination of the observant Egyptians, who in one myth conceived the Sun-god to be a gigantic beetle rolling the ball of the sun across the sky. Amulets and seals in beetle form, the "scarabs" of present-day parlance, were carved by the ancient Egyptians in stone, moulded in pottery, and, very rarely, fashioned of gold, silver, bronze, or ivory. The large majority of the scarabs in the New York Historical Society's collection will be published in a subsequent part of the catalogue, but a few, by virtue of their material or setting, fall within the scope of the present part. See also the rings, Nos. 18, 20, and 23, having a scarab, or several scarabs, as bezel, and the late amulet, No. 100.

No. 15 (Plate VI, a-e). Scarab-seal (?).

Pale gold. Early Nineteenth Dynasty, about 1325 B. C. Weight, 63.64 grains (4.124 grams).

POINTS OF INTEREST: It is one of the few Egyptian scarabs known which are made entirely of gold[2] and it bears the name of Mutnezmet, queen-consort of Harmhab.

The condition is perfect, except for a slight dent in the prothorax.

The piece is exquisite technically, as artistically. It is made of the following parts: (1) an oval bottom plate on the under face of which the queen's name is chased; (2) the upper half of the body worked in repoussé, with details subsequently engraved; (3) the lower half of the body in repoussé, sold-

[1] The habits of the *Scarabaeus sacer* were studied on the sunny hillslopes near Avignon, nearly the northern limit of its native haunts, by the French naturalist J. Henri Fabre and described by him with dramatic vividness in *The Sacred Beetle and Others* (translator, Alexander Teixeira de Mattos); cf. H. R. Hall, *Catal. of Egyptian Scarabs, etc.* (British Museum), London, Vol. I (1913), p. XVII, notes 1, 2. On scarabs see: Newberry, *Scarabs;* Hall, *op. cit.;* Petrie, *Scarabs and Cylinders with Names, Illustrated by the Egyptian Collection in University College, London* (XXIXth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XXIst Year, 1915), London, 1917, and the bibliography given in the last-mentioned work.

[2] We have noted only four other specimens: (a) one unpublished, in the Cleveland Museum of Art, No. 258.14, undated, but not later than the XVIIIth Dyn., mentioned *J.E.A.,* Vol. V (1918), p. 171; (b) one found with the mummy of Maket, dating probably from about 1500 B.C.; Petrie, *Illahun, Kahun and Gurob,* London, 1891, p. 22, Pl. XXVI, 9; (c, d) and one each in the Cairo collection and the British Museum which are set as the bezels of rings; Vernier, *Bijoux,* II, Pl. XXIV, undated, and Hall, *Catal.,* No. 2822, XVIIth Dyn. On the rarity of gold scarabs see: Newberry, *Scarabs,* p. 83; Hall, *Catal.,* p. XXVII; and Petrie, *Scarabs and Cylinders,* p. 8. Cf. the Greek gold scarabs, Marshall, *Finger Rings,* Nos. 1634-5 and the Meroitic gold scarabs, Schäfer, *Goldschmiedearbeiten,* Nos. 258-60, Pl. 31.

ered along the sides at intervals to the preceding piece; (4-9) the six legs, each solid, beaten out of a separate piece of gold, carved as to details, and soldered to the base and the lower half of the body; (10) a canal for threading made of a piece of sheet gold rolled over and soldered longitudinally; it is soldered to the base and to the fore and hind legs of the beetle, but not to its body, and it has a greater diameter at the ends than in the middle. One would naturally suppose the base to have been chased before the parts of the scarab were soldered together, but it is interesting to observe a bit of solder sunk in the line bounding the field of the inscription, definitely proving this to be so. Probably only one grade of solder was used; with care, the parts could have been united in several operations without undoing previous work. Probably the order of procedure was to unite the threading channel to the base, then to add the legs, then to grind the tops of the legs very even and solder to them the body, of which the two halves had first been joined.

The piece has the form and size of a scarab-seal but its delicacy suggests that it may not have been actually used for sealing, but instead have been worn on the person as an ornament, threaded with beads or singly.[3] The vertical markings on the wing-cases, as also in the two following numbers, are derived from the *Scarabaeus venerabilis;*[4] less usual than the plain wing-cases of *Scarabaeus sacer,* the striated wing-cases are found represented from time to time, beginning as early as the reign of Sesostris I[5] (1980-1935 B. C.).

Was Mutnezmet, whose name completely fills the base of the scarab and fixes its date, a member of the old royal line whom Harmhab, the founder of the Nineteenth Dynasty, married in order to legitimize his claim to the throne? This scarab is the most valuable of the small objects known bearing her name.[6]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1055; edition 1915, No. 1051.

No. 16 (Plate VI, a, b). Scarab-amulet.

Lapis lazuli, set in gold. Later than 1000 B. C.(?). From Sakkara. Weight, 17.64 grains (1.143 grams).

[3] In the 17th and 16th centuries B.C., small scarab-seals were commonly tied to the third finger of the left hand. See *Bull. M.M.A.,* Vol. XII (1917), Supplement for May, p. 20; Carnarvon and Carter, *Five Years' Explorations,* pp. 70, 71, No. 15, 74, Nos. 23-4, 80, No. 52, 82, No. 62, 83, No. 64, 85, No. 76; Petrie, *Qurneh* (XVIth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XVth Year), London, 1909, p. 9; cf. Schäfer, *Goldschmiedearbeiten,* No. 26.

[4] Petrie, *Scarabs and Cylinders,* p. 5.

[5] So in the monumental beetle-hieroglyph in the king's name as repeated in the decoration of the inclosure wall of his pyramid at Lisht. See *A Handbook of the Egyptian Rooms* (M.M.A.), New York, 1911, p. 77, Fig. 38.

[6] Other objects: (a) a green-glazed pottery ring, Petrie, *Scarabs and Cylinders,* Pl. XXXVIII, 14, 28; (b) green-glazed pottery ring, Petrie, *loc. cit.,* 29 = Newberry, *Scarabs,* Pl. XXXIV, 7; (c) seal in the form of a frog, Newberry, *loc. cit.,* 8 = Auguste Mariette, *Catalogue général des monuments d'Abydos découverts pendant les fouilles de cette ville,* Paris, 1880, p. 547, No. 1412; (d) a scarab, Berlin No. 1971.

The stone has rotted somewhat and is full of tiny holes; there are a few small rents in the upper edge of the setting.

The setting is of a simple, close form still used by craftsmen.[7] First a band of thin sheet gold was fitted about the scarab and its ends soldered together; this oval frame was next soldered to a piece of sheet gold of a little larger area; the superfluous metal around the outside was then cut away, leaving a shallow box just accommodating the scarab. The vertical seam is on the right side and two partially melted panels of solder remain near it, as the finish is less thorough than would be exacted in modern work.

The piece belongs to the class of funerary amulets which in later Egyptian times were placed in great numbers within the mummy wrappings; it has no provision for threading, but the overlying bandages held it in place. Evidence is lacking for dating it precisely. The scarab itself has a base like that of the scarab-seal and heart scarab, but is uninscribed.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 988; edition 1915, No. 984.

No. 17 (Plates IV, d, VI, a-c, XI, e). Heart scarab.

Steatite and gold. Twenty-sixth to Thirtieth Dynasty, 663-332 B.C. (?). From Sakkara. Thickness of sheet gold, 0.0043 inches (0.109 mm.).[8] Weight of gold, 60.62 grains (3.928 grams).

POINTS OF INTEREST: This heart scarab is one of distinction because of its handsome gray-green stone, like jade in appearance, the fineness of its carving, and the preservation of the gold plate covering its base.

The stone was easy to carve as it is soft enough to scratch readily. The inscription was executed with chasing tools, working from the obverse with the sheet gold resting on a slightly yielding bed; the entire design may be seen in relief on the reverse. Only straight-edged tools were used as is evident in the photomicrograph (Plate IV, 17 d) of signs near the beginning of line 4; the repeated impressions of the "liner" show in the handle of the basket, which is the letter *k,* and in the upper curve of the letter *t,* immediately above the basket. All over the inscription, in sharp curves, the channel is broader than elsewhere because of this use of the straight liner. The gold plate had been cut a little larger in area than the bottom of the scarab and after the text was inscribed the excess material was folded about the edges of the scarab-base to hold the plate in position.

Heart scarabs are larger than scarab-seals, but generally have the same form, that of the dung-beetle with wings closed and legs drawn in near the body, resting on a thin oval base. They were placed on the breast or stomach of

[7] The modern procedure is described in Wilson, *Silverwork and Jewelry,* pp. 98-100.

[8] Micrometer measurement with help of a tiny steel ball placed between hieroglyphs on the reverse; the diameter of the ball deducted from the reading gave the thickness of sheet gold used.

the mummy. The text occurring on them is included, as Chapter 30 B of the modern numbering, in the Book of the Dead. Although containing difficult passages, as yet inadequately understood, the text gives a hint of the purpose of these scarabs;[9] in it, the heart of the deceased is addressed and conjured not to testify against him in the presence of the Keeper of the Balance, a plea which one associates with the familiar vignette from the Book of the Dead where the heart is shown being weighed before the god Osiris, while various divinities assist and the deceased looks on, awaiting the verdict.

Chapter 30 B in the papyri is often accompanied by a vignette of a heart scarab with cord or metal hoop for suspension;[10] again, scarabs suspended on strings of beads are shown being carried to the tomb in at least one Theban wall-painting.[11] The directions accompanying the incantation 30 B prescribe that it be said over a scarab of green stone embellished with gold, and, as a matter of fact, the majority of extant heart scarabs are actually of green stone and some imposing examples from the Eighteenth Dynasty have a harness of gold with loops for suspension;[12] in these the text is cut in the stone base and the gold is in the nature of a setting, not covering the bottom of the scarab. After the Eighteenth Dynasty there was often no provision for suspension; it was not practically necessary to hang the scarab about the mummy's neck as the bandages and preservatives held it in position;[13] the arrangements for suspension, which, in the early history of heart scarabs, had been taken over from the adornment of the living,[14] were therefore frequently abandoned as superfluous.

A suggestion of the commercial way in which even so good a heart scarab as this one, in common with other funerary equipment, was handled is to be found in the absence from the inscription of the name of the deceased. Often funerary objects are discovered with the space for the name through indiffererence or carelessness left blank.

Although a number of examples of gold plates covering scarab-seals have

[9] See Breasted, *History,* p. 249. Cf. the translation by Dr. Gardiner in Davies-Gardiner, *Amenemhēt,* pp. 112-13, who gathers from the text that the heart scarab was "originally designed to replace or to stimulate the functions of the dead man's heart." See also Allen, *Handbook,* p. 149.

[10] So in Naville, *The Funeral Papyrus of Iouiya* (Davis' Excavations), London, 1908, Pl. XVI and Louis Speleers, *Le papyrus de Nefer Renpet,* Brussels, 1917, Pl. XI, Fig. 22, both of the XVIIIth Dyn.

[11] In tomb 78 (Gardiner-Weigall numbering) of the mid-XVIIIth Dyn. See Wilkinson, *Manners and Customs,* ed. Birch, Vol. III, Pl. LXVI.

[12] *Bull. M.M.A.,* Vol. XII, Suppl. May 1917, p. 18, Fig. 21; Schäfer, *Goldschmiedearbeiten,* No. 35, Pl. 8; the string of beads of gold and semi-precious stones on which the scarab was hung is also preserved and Möller cited the similar scarab in the Leyden Museum, which was suspended by a gold chain; Dr. C. Leemans, *Monumens égyptiens du Musée d'Antiquités des Pays-Bas à Leide,* Part II, *Monumens civils,* Leyden, 1846, Pl. 35, No. 94, also Wilkinson, *op. cit.,* Vol. II, p. 344, M. Two specimens in the Cleveland Museum of Art, Nos. 21.1030-31 = *Catalogue of the Amherst Coll. of Egypt. and Oriental Antiquities,* London, 1921, lots 597, 607, the former, attributed to Dyn. XXII, with loops, but without chain, the latter, of Dyn. XVIII, complete, with hoop of gilded bronze to go about neck.

[13] See *Annales du Service,* Vol. VII (1906), p. 175, under LIX and LX.

[14] In life, amulets and decorations (or ornaments regarded as mere payment?) given for military and civil services were worn suspended from the neck. See, for instance, Victor Loret, *Le tombeau de l'am-xent Amen-hotep* (*Mémoires. Mission,* Vol. I, 1884), Pl. III, and Sethe, *Ä.Z.,* Vol. 48 (1910), pp. 144-5.

come to light,[15] we are able to cite only one other heart scarab having its base thus enriched, namely the unpublished one said to have been found years ago by natives in King Ikhnaton's tomb at Tell el-Amarna.[16] The stone base of our specimen is not itself inscribed and probably some of the large stone scarabs with bases blank, which crowd museum collections, were originally provided with the heart-scarab charm chased in gold. Others, however, were once inscribed in ink [17] or were set in pectorals.

The chronological limits of inscribed heart scarabs were stated in 1914 and again in 1917 to be from the Eighteenth to Twenty-third Dynasties,[18] but both earlier [19] and later specimens are known. A heart scarab of Queen Amenardis of the Twenty-fifth Dynasty was published a few years ago [20] and more recently those of Shabaka and Tanutamon of the same dynasty have been found.[21] The custom of placing heart scarabs with the dead was continued in Nubia in the fifth and fourth centuries B. C.; [22] there is also evidence that it lasted into the period of the Twenty-sixth to Thirtieth Dynasties (663-332 B. C.) in Egypt.[23] The present piece is proved to be subsequent to the New Kingdom by the text, a corrupt, although complete, copy of the heart-scarab charm, containing late peculiarities in the writing, such as the last sign of the fourth line, a gecko issuing from another sign,[24] instead of the older hieroglyph for the verb *pry*. But especially on grounds of style we should place it after the accession of the Saites. Its elegant and precisely carved form, high on the legs, and its nicety of detail are suggestive of the quality of work in the Twenty-sixth and later dynasties; in particular the beading outlining the prothorax and outer edges of the wing-cases is like that on certain scarab-amulets of another class, made of light-blue, hard faience, characteristic of the late dynastic period. With regard to striated wing-cases, see under No. 15.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 35, No. 52. Abbott catalogue, editions 1853 ff., No. 1042; edition 1915, No. 1038.

[15] *Bull. M.M.A.*, Vol. IX (1914), p. 220, Fig. 13, and instances cited by Petrie, *Naqada and Ballas*, p. 66. Also scarabs in the Dashur gold treasures: Vernier, *Bijoux*, II, No. 52241; De Morgan, *Dahchour*, I, Pl. XIX, Nos. 35, 37.

[16] Petrie, *loc. cit.* and *History*, Vol. II (1896), pp. 206, 220. But cf. *Ä.Z.*, Vol. 55 (1918), p. 42.

[17] *Annales*, Vol. IV (1903), p. 151.

[18] Petrie, *Amulets*, p. 24, and *Scarabs and Cylinders*, pp. 28-9, § 60.

[19] For a heart scarab antedating the XVIIIth Dyn., of tentative form, with early version of the text, see Hall, *Catal.*, Vol. I, No. 211.

[20] *Bull. M.M.A.*, Vol. X (1915), pp. 116-17.

[21] Boston *Bulletin*, Vol. XIX (1921), pp. 37-8, in Prof. Reisner's article "The Royal Family of Ethiopia."

[22] Reisner, *Harvard African Studies*, II, pp. 9, 10, 63.

[23] The large scarab of green stone, uninscribed, found at Sakkara on a mummy of the late 6th or early 5th cent. B.C. may be a heart scarab; *Annales*, Vol. I (1900), pp. 234, 261 (on date of tomb). Cf. *Annales*, III, p. 248, "heart scarab of dull green jasper, uninscribed, but finely carved in great detail," found with a tomb equipment which would seem to belong in the 6th to 4th cent. B.C., or even later. Another of the same late time is said to be "d'un beau travail"; *Annales*, IV, p. 82. Finally in *Annales*, XII, p. 84, a Saite, or even Ptolemaic, example with very corrupt version of the text is mentioned.

[24] Möller, *Paläographie*, Vol. III, No. 263 bis, an example of Dyn. XXII. Dr. Grapow has informed us that this sign occurs first as a rarity in the XXIInd and later dynasties and does not become common until the Ptolemaic period; it is frequent in temple inscriptions of the Ptolemaic and Roman periods.

C.—Finger Rings

The Egyptians wore finger rings[1] principally for ornament and for use as seals. Their finger rings, too, probably often served as amulets and sometimes as marks of authority.[2] Classified by form, however, only two general divisions may be distinguished, purely ornamental rings of various designs and signet rings.

Finger rings were possessed by both men and women.[3] The few records of very early rings found in position name the right hand;[4] later finger rings, however, have been discovered most frequently by, or on, the left hand.[5] For the period of the seventeenth and sixteenth centuries B. C., there is clear evidence that the scarab-ring was regularly placed on the third finger of the left hand[6] and this position for the signet ring with immovable bezel has been noted for the sixth century B. C.[7] But rings were sometimes worn also on the right hand and in other positions on the left hand.[8] An overloading of

[1] The principal discussions of Egyptian finger rings are the following: Vernier, *Bijouterie,* pp. 81-4 and *Bull. de l'Inst. Franç.,* Vol. VI (1908), pp. 181-92; Möller in Schäfer, *Goldschmiedearbeiten,* pp. 43-54; Newberry, *Scarabs,* pp. 62, 92-5; Hall, *Catal. of Scarabs,* I, pp. XXXV, 273-83. Many rings from Egypt and introductory matter applicable to Egyptian rings of the Classical types are included in Marshall, *Finger Rings.* Schäfer, *Goldschmiedearbeiten,* pp. 112-50, deals with Meroitic rings of the 1st cent. after Christ. Useful descriptions of rings are contained in the following works: Pierret, *Musée du Louvre. Catalogue de la Salle Historique de la Galerie Egyptienne,* Paris, 1877, pp. 110-17; A. Fabretti, F. Rossi, and R. V. Lanzone, *Regio Museo di Torino. Antichità egizie,* Pt. II, Turin, 1888, pp. 259 ff. In describing the N. Y. Historical Society's rings we have used for the different parts the terms "bezel," "shoulders," "shank," as defined in O. M. Dalton, *Catalogue of the Finger Rings, Early Christian, Byzantine, Teutonic, Mediæval, and Later* (British Museum), London, 1912, p. XVIII; cf. below, note 42.

[2] See the Bible, Gen. XLI, 41-3, a passage which is not necessarily applicable to Egyptian customs of a time earlier than about the 8th cent. B.C. Professor Newberry (*Scarabs,* Pl. II) sees a signet ring in the seal of office represented in an Egyptian tomb as being presented to the "Governor of the Southern Lands, the King's Son of Kush, Huy," about 1350 B.C., but picture and legend seem to us inconclusive. The picture shows, not a shank clasping a bezel as in Newberry's Pl. I, Nos. II, V, but, it appears to us, a high curving handle joined to the top of a rectangular or oval base; cf. Figs. 94-7. Professor Breasted interpreted it as "perhaps an étui containing the seal" (*Records,* II, § 1024).

[3] Dr. Grapow has called attention to the pretty conceit in an Egyptian song of the lover who wished to be the ring on his lady's finger, only to be near her; *Vergleiche,* p. 19.

[4] Möller in Schäfer, *Goldschmiedearbeiten,* pp. 43, 44; also the reference below, note 17.

[5] Peet and Loat, *Cem. of Abydos. III,* p. 25, D 166; Petrie, *Ehnasya,* p. 4, tomb 16; Garstang, *El Arâbah,* p. 27, E 178, E 294; Petrie, *Kahun, Gurob, and Hawara,* London, 1890, p. 39, tombs 23, 24. Cf. the similar results for Nubians of the "C group" (around 2000 B.C.) in: Hermann Junker, *Bericht über die Grabungen der Akademie der Wissenschaften in Wien auf den Friedhöfen von El-Kubanieh—Nord. Winter 1910-1911* (*Denkschriften,* Vol. 64, *Abhandlung* 3), Vienna, 1920, p. 85. The obvious explanation that rings were less in the way and less liable to injury when worn on the left hand has been offered by many writers.

[6] See references in note 3, p. 72.

[7] Petrie, *Kahun,* p. 20.

[8] A mummy of the mid-XVIIIth Dyn. (*ca.* 1500 B.C.), with gold rings in position on the fourth and little fingers of the right hand, was discovered at Abusir el-Meleq; *Ä.Z.,* Vol. 41 (1904), p. 16. The mummy of Makere, consort of Paynozem I (11th cent. B.C.), was found with three plain rings of wire on each thumb,

the hands with rings was not practised until a late period.[9] When deposited with the dead, finger rings were not invariably placed on the mummy. Our No. 25 is said to have been contained in a small box (No. 144) and the scarab-rings of two princesses of the house of Amenemhet III (around 1825 B. C.) were put with other jewels in larger boxes.[10]

Finger rings are rarely represented in Egyptian sculpture and painting and not until the close of the Eighteenth Dynasty, so far as any evidence shows, were they included among the gifts of jewelry with which the kings were wont to reward soldiers and officials.[11] By the time of Ramses III (1198-1167 B. C.), however, rings were presented in great numbers by the king to the god Amon [12] and, therefore, possibly were then used in sealing the god's property. Despite the specific modern translations of Egyptian inscriptions as mentioning signet rings, a reference to the original text very often shows the use of a generic word for seal, not necessarily denoting one in ring form. Both from literary and monumental sources, we conclude that finger rings were less prominent articles of personal adornment in ancient Egypt than broad collars, necklaces, bracelets, and armlets, but that their importance gradually increased in later times after the mid-Eighteenth Dynasty (1500 B. C.).

Egyptian finger rings were made of many different materials and the New York Historical Society's collection includes other rings of bronze, iron, glazed pottery, and carnelian, to be published at a later time. In combining the precious metals with semi-precious stones, or imitations of stone in glass, many charming settings of appliquéd and of inlaid work were used, or the bezel was clasped by gold wrought in the form of lotus flowers, to mention one of the popular designs. The better inlays were usually of gem-stones, valued for their beauty of color and surface when polished; they were never faceted.

the middle one of silver, the other two of gold; Smith, *Royal Mummies,* p. 101, Pl. LXXIII. M. Daressy's list of objects discovered on mummies of about the same time ("second Deir el-Bahri find") includes a scarab tied on the little finger of the left hand (No. 50) and a ring of gold with lapis lazuli fly as bezel on the left thumb (No. 83); *Annales du Service,* Vol. VIII (1907), pp. 26, 29. For numerous rings adorning both hands (6th cent. B.C.), see Petrie, *Kahun,* p. 20.

[9] Many coffins made in the form of a recumbent human figure have the hands represented, but not until late times are they decorated with rings. As one of the earliest examples, see a mask of which the hands are loaded with rings, *British Museum. A Guide to the First and Second Egyptian Rooms,* 2nd ed., London, 1904, Pl. VIII, dated "after Dyn. XXII," (perhaps in the 8th cent. B.C.?). Cf. Wilkinson, *Manners and Customs,* ed. Birch, Vol. II, pp. 340-41 and see last reference in preceding note. Professor Schäfer called attention in *Goldschmiedearbeiten,* pp. 112-13, to the enormous increase in the last millennium B.C. in the size of the bezels of glazed pottery rings; and the late rings, Nos. 34-7, of the present collection have larger bezels than those of earlier date. The taste for numerous rings gained ground slowly, however, for in the series of intact burials of the Persian period, found at Sakkara and described in *Annales du Service,* Vols. I-V, very few finger rings were discovered.

[10] De Morgan, *Dahchour,* I, p. 64; see in detail below n. 45.

[11] Davies, *The Rock Tombs of El Amarna. Part VI. Tombs of Parennefer, Tutu, and Ay* (XVIIIth Memoir. Arch. Survey of Egypt), London, 1908, p. 22, Pls. XXIX, XXX, XLII = Breasted, *History,* Fig. 139 (copy less exact).

[12] Birch, *Papyrus* (Harris), Pl. 13 b reads "108 finger rings for the god" (translation, Breasted, *Records,* IV, § 231); and there are many similar items. The word for ring, used again and again in this document, followed by the phrase "of the finger," is the New Egyptian *gśr.*

(a) Ornamental Finger Rings not in Signet Form.

In Egypt, ornamental finger rings not in signet form long preceded signet rings. Even in the Predynastic period, antedating 3400 B. C., before the precious metals were used freely, finger rings of ivory and shell, which ordinarily were plain hoops, but sometimes were carved with knobs or figures of animals, came into use.[13] Plain hoop rings of copper, [14] of gold,[15] and of silver [16] were of rarer occurrence, but a number of early examples have been discovered ranging down to the Third Dynasty (beginning 2980 B. C., or earlier). Besides the inflexible hoops, there were also in early times occasional bead rings, such as one of small carnelian beads, found in a tomb at Abydos in position on a finger of the right hand.[17] As the period of the Third to the beginning of the Twelfth Dynasty (2000 B. C.) has yielded thus far comparatively little jewelry, it remains at present uncertain whether finger rings went entirely out of use in Egypt for some ten centuries, or not.[18] Two gold finger rings with bezels ornamented in granulated work are known to be of the nineteenth century B. C.; [19] three others of less elegant design, consisting merely of beads of semi-precious stones strung on gold wire, of which the ends were twisted together on the inside of the finger, may be somewhat earlier; [20] but the majority of rings of this class are of a later time, after about 1500 B. C.[21]

[13] Capart, *Primitive Art in Egypt,* Engl. transl. by A. S. Griffith, London, 1905, p. 51, Fig. 24. Ayrton and Loat, *El Mahasna,* Pl. XXI, 4. Also previous note 4. Cf. De Morgan, *Recherches,* II, p. 196, Fig. 743, from Dyn. I. The predynastic and early dynastic culture of Egypt (IVth millennium B.C.) extended also far to the south and Nubian objects contemporary with the early periods of Egypt ("A group") are like those found in Egypt proper. We cite, therefore, as additional examples of the primitive ornamental finger ring of ivory: Junker, *Bericht über die Grabungen der Akademie der Wissenschaften in Wien auf den Friedhöfen von El-Kubanieh—Süd. Winter 1910–1911.* (*Denkschriften,* Vol. 62, *Abhandlung* 3), Vienna, 1919, Pl. XXXV, b, p. 97, and the literature given there. But the Nubian culture did not keep pace with advance in the north and the rings from Nubia referred to above in n. 5 are still of the same early type.

[14] MacIver and Mace, *El Amrah and Abydos,* p. 18, b 28, predynastic.

[15] Petrie and Mace, *Diospolis Parva,* p. 25, predynastic. Reisner, *Naga-ed-Dêr,* I, Pl. 9, b, d, pp. 31, 117, 144, Ist Dyn. Mace, *Naga-ed-Dêr,* II, Pl. 48 b, pp. 26, 48, 57, IIIrd Dyn.

[16] Petrie and Mace, *Diospolis Parva, loc. cit.*

[17] Naville, *Cemeteries of Abydos. I,* p. 17, E 381.

[18] Quite certainly they did not belong to the formal adornment of kings and nobles during the "Pyramid Age" or we should find them represented in temple and tomb reliefs, also among the pictures on wooden coffins (2600-1900 B.C.) depicting the equipment of the deceased for the next life, since this was modeled on the dress of the living king. But one hesitates to argue from the absence of evidence of their existence that finger rings were not worn outside court circles.

[19] De Morgan, *Dahchour,* I, p. 68, Nos. 33-4, Figs. 144-5 = Vernier, *Bijoux,* II, Nos. 52238-9, Pl. XXII, found in association with objects inscribed with the names of Sesostris III and Amenemhet III.

[20] Vernier, *Bijoux,* II, Nos. 52187-9; Edgar in Maspero, *Le Musée Egyptien,* Vol. II, Pt. III, pp. 112, 118.

[21] Plain hoops of faience, 15th cent. B.C.: Carter and Newberry, *The Tomb of Thoutmôsis IV* (Davis' Excavations and Cairo *Catal.*), Westminster, 1904, No. 46017 and Davies, *Five Theban Tombs* (*being those of Mentuherkhepeshef, User, Daga, Nehemawäy and Tati*) (XXIst Memoir. Arch. Survey of Egypt), London, 1913, p. 5. Moulds for plain hoop rings, *ca.* 1350 B.C.: Petrie, *Amarna,* Pl. XVI, Nos. 235-6. Gold ring with uraei in relief, *ca.* 1500 B.C.: *Ä.Z.,* Vol. 41 (1904), p. 16. Elaborate decorative rings of the close of the 13th cent. B.C.: Davis' Excavations, *Siphtah,* plate "Rings and Ornaments of Queen Tauosrît." Still others, undated, of the Cairo collection catalogued by M. Vernier in *Bijoux,* II, as Nos. 52160, 52165-7, 52170, 52198, etc.

They are rarer than signet rings and some collections do not possess a single specimen of precious materials.[22]

No. 18 (Plates VI, a, b, XXXVIII, c, d). Finger ring.

Gold, glass, and a sandy conglomerate containing garnets.[23] Latter part of the Eighteenth Dynasty, 1500-1350 B.C. (?). Found as an intrusive object in the tomb of Semenkhuptah at Sakkara.[24] Weight, 38.50 grains (2.495 grams). Greatest diameter, 0.827 inches (2.1 cm.).

The brass sampler of Plate XXXVIII, 18 c, d, illustrates the method of constructing the shank from sheet gold; the original flat piece was about 5.5 inches (13.97 cm.) long; its ends were perhaps attenuated with the help of a draw-plate, to judge by their surface appearance.[25] The curved edges of the wider part, cut by eye on a radius of about two inches, were hammered over and united along the outside of the shank in an abutting soldered joint, fairly well finished.[26] Each wire-like end passes through the perforations of three of the six gold-mounted pieces forming the top of the ring and is then wound eight or nine times around the shank, but not soldered to it. The five scarabs are castings of opaque green glass; curiously, instead of a sixth scarab, a granular-surfaced, dark-brown stone is used, which is in the general oval form of the accompanying scarabs, but lacks all details of the beetle; it is full of tiny, rough garnets.[23] These six pieces have open settings, made each of a strip of gold burnished around the base of the scarab; the soldered joint uniting the ends of the respective strips is readily visible on the bottom of each setting, and in every instance is at one end. Only the stone with garnets has in addition a stay running lengthwise along its base, with ends soldered to the main part of the setting. Tubular rings,[27] or rings of solid wire, are soldered on the ends of each of the six settings, as a finish and for the purpose of preventing the wires which pass through the perforations from wearing the glass and stone.

This type of shank, in which the greatest diameter comes on the inside of the finger and the wires carrying the scarabs are in one piece with the shank,

[22] Cheaper substitutes in glazed pottery, which reproduce the forms of rings of precious materials, however, are fairly numerous; see Schäfer, *Goldschmiedearbeiten,* p. 112, n. 2, Fig. 113. Petrie, *Amarna,* Pl. XVI, Nos. 222-3 are moulds for such rings.

[23] Kindly examined by Mr. Whitlock.

[24] One relief from this tomb was published in the *Quarterly Bulletin* of the N. Y. Hist. Soc., Vol. II (1918-19), p. 15. The tomb is called in the Abbott catalogue (ed. 1915, Nos. 375-6) "the tomb of Assa" (= Dedkere-Isesi) because of the occurrence in its inscriptions of the cartouche of the Vth Dyn. king of that name.

[25] The longitudinal seam is plainly visible; cf. Introduction, pp. 40-43; in this case if the shoulders formed where the work of the draw-plate ceased were not ground down, they are now covered by the coils; a possible alternative view, since the amount of wire involved is so little, would be that the wires were formed by careful hammering and burnishing.

[26] Cf. M. Vernier's drawings of this style of tapering shank, which, however, show the seam on the inside next the finger, *Bull. de l'Inst. Franç.,* Vol. VI, pp. 183, 184, Figs. 2-4 = *Bijoux,* II, Figs. 38-40; the last two repeated as Fig. 241 in Wilson, *Silverwork and Jewelry.*

[27] Cf. Möller in Schäfer, *Goldschmiedearbeiten,* p. 45, close of section a.

probably was not fully developed until the Eighteenth Dynasty.[28] It is seen oftenest carrying a single scarab-seal. Most of the published Egyptian specimens are no more exactly datable than our own piece, but several were included in the treasure of Queen Tewosret[29] and thus are known to be of the close of the thirteenth century B. C. The type passed from Egypt to other lands, and is seen among Phœnician rings of the seventh to fifth centuries B. C.[30] and among Etruscan rings.[31] The use of tubular or wire ring-guards for the threading holes, instead of the earlier sleeves exemplified in No. 20, is favorable to a date after the first part of the Eighteenth Dynasty.[32] As a parallel to the ornamental use of a number of tiny scarabs certainly not seals, a finger ring in the Cairo Museum may be mentioned[33] in which there are three scarabs, one each of lapis lazuli, turquoise, and carnelian; unluckily the Cairo ring, too, is undated, but judging from its style, it may be as early as the close of the Eighteenth Dynasty. Another finger ring, one found at Abydos and actually dated to the Eighteenth Dynasty, resembles our piece in a number of particulars.[34]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1078; edition 1915, No. 1074.

No. 19 (Plates VIII, a, X, b). Finger ring.

Electrum and glass. Close of the Eighteenth Dynasty, 1400-1350 B. C., or later(?). From Thebes. Diameter of shank, 0.787 inches (2 cm.); width of band forming shank, 0.14 inches (3.56 mm.); dimension across bezel at right angles to shank, 0.512 inches (1.3 cm.). Weight, 30.94 grains (2.005 grams).

The ring shows considerable wear and some ancient repairs. Where the shank had been broken in two, the edges of the break were soldered together and where a section of the braid-like ornament had split open, the loose end was fastened to the under plate by soldering on a rectangular patch. Two short

[28] Possible forerunners, of which the first is inscribed with the name of Amenemhet III (1849-1801 B.C.) and the second may be of the close of the XIIth Dyn. (early 18th cent. B.C.) are the following: MacIver and Woolley, *Buhen,* No. 10758, frontispiece and pp. 192, 201; Carnarvon and Carter, *Five Years' Explorations,* Pl. XLV, 2 A. If indeed the shank and wire carrying the scarab are in one piece (the descriptions are silent on this point), the shank, nevertheless, is thin and wire-like and without the marked swelling opposite the scarab. Far from being the earliest form of Egyptian finger ring as stated in Wilson, *op. cit.,* pp. 403-4, this type of shank was not even the earliest used to carry a scarab-seal; see below, p. 83.

[29] See especially Vernier, *Bijoux,* II, Nos. 52266-7; also Davis' Excavations, *Siphtah,* plate "Rings and Ornaments of Queen Tauosrît," p. 42, Nos. 25-6, where the description is incorrect; cf. the smaller incomplete pieces, plate "Amulets and Rings of Queen Tauosrît," p. 42, No. 27.

[30] Marshall, *Finger Rings,* p. XXXIX, Nos. 290, 292.

[31] Marshall, *op. cit.,* p. XLIV, No. 335.

[32] See on this point reference given above in note 27.

[33] Vernier, *Bijoux,* II, No. 52166, Pl. XXI.

[34] Ayrton, Currelly, and Weigall, *Abydos. Part III.,* Pl. XVII, 3. The shank and the side of the bezel with its protective rings has an appearance similar to that of our No. 18 and the material of the frog's figure, set into the bezel, is blue glass.

sections of ornament are missing from the shank and a few grains are lost from the bezel. There is a hole in the bottom plate of the bezel, possibly burned in, in the making of the ring.

The shank consists of a strip of sheet to which six pairs of wires [35] twisted together are soldered; the twists are grouped in twos forming a braided ornament similar to that on the gold circlet (page 55; Plates III, IV). At the shoulder the shank spreads into three narrower strips, each carrying its ornament of two pairs of twisted wires; between the strips are open spaces. The split shoulders of the shank are soldered to the bezel and the joints are covered by narrow pieces of the electrum sheet bent into cylindrical sleeves. The bezel consists of a bottom plate to which strips of electrum are soldered on edge to form the cells for the inlays; it is further embellished by granulated work, in which the grains are much coarser and less well formed than those of the gold amulet No. 1. The insets were ground out of larger castings and show a number of planes, as the workman failed to secure a perfectly rounded surface. The central inlay is of red glass, imitating red carnelian; the other two are of opaque blue glass, imitating lapis lazuli. The workmanship of the ring is clumsy. It would seem that the craftsman, not being sure of the melting properties of his electrum and solder, applied too much heat, somewhat melting the ring and its decoration and thus smearing both the granulated work and the wire appliqués; he used, too, an excess of solder, and various unmelted, or only partially melted, panels of it are observable here and there; its color is distinctly reddish.

Although the execution of this specimen is indifferent, the design—logical and well balanced, pleasingly ornate and charming as to colors—reveals Egyptian jewelers at their best.

A ring found at Gurob [36] in a group of objects including one piece assigned to the period of Amenhotep III (1411-1375 B.C.) has three oval insets placed in relation to one another and to the ring shank as here; it shows also the same spreading of the shank at the shoulders into three divisions with open spaces between. Rings with three parallel oval stones are represented in the Amarna moulds,[37] dated to the first quarter of the fourteenth century B. C., but their shoulders are different from those of our piece, being wrought in the form of the symbolic plants of the North and South; very likely complete parallels could be found among the unpublished pieces from this site. The closest available parallel to the ring under discussion, however, is an undated specimen in the Cairo Museum,[38] which exhibits the same color scheme and similar granulated decoration on the bezel; in this ring natural stones are used, a

[35] The wires in their present condition—much worn and coated by unskillful soldering—do not show how they were made.

[36] Petrie, *Illahun*, p. 19, Pl. XXII, 11.

[37] Petrie, *Amarna*, Pl. XVI, 222-3.

[38] Vernier, *Bull. de l'Inst. Franç.*, Vol. VI, p. 190, Fig. 31; *Bijoux*, II, Pl. XXIV, No. 52165.

carnelian between two insets of lapis lazuli. According to Mr. Marshall's dating, variants of the design occur as late as Classical times.[39]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 7. Abbott catalogue, editions 1853 ff., No. 1087; edition 1915, No. 1083. Prisse d'Avennes, Monuments égyptiens, Paris, 1847, Plate XLVII, No. 8; Histoire de l'art, Atlas Vol. II, "Art industriel," Plate 20, No. 29.

(b) Rings in Signet Form.

In the early period of the fourth millennium B. C., when finger rings not in signet form were occasional articles of personal adornment (see page 78), the Egyptians were using cylinder seals which were far too large to be worn on the finger and were usually suspended on a cord or a string of beads.[40] It would seem probable that the signet ring came in with the small scarab-seal in the transitional period between the Old and Middle Kingdoms, somewhat before 2000 B. C., but no actual signet rings indubitably older than the nineteenth century B. C. are as yet known.[41]

[39] Marshall, *Finger Rings,* Nos. 762, 967, the latter from Thebes, Egypt, assigned to the period extending from the 2nd or 1st cent. B.C. to the 2nd cent. after Christ. Cf. Myres, *Handbook. Cesnola Coll.,* No. 4072, "probably of 6th cent. B.C."

[40] So in the hieroglyph for cylinder seal, the origin of which was presumably earlier than 3000 B.C. Cf. Newberry, *Scarabs,* pp. 44-5.

[41] Professor A. Wiedemann in *Ägyptische Geschichte* (*Handbücher der alten Geschichte,* I), Pt. I, Gotha, 1884, p. 221, mentions, as contained in the old Bulaq collection, in the "Salle du Centre," a gold ring with inset stone bearing the name of the XIth Dyn. king Senekhkere, who reigned shortly before 2000 B.C. Dependent on Wiedemann are the following references to the ring: Petrie, *A History of Egypt,* Vol. I, *From the Ist to the XVIth Dynasty,* 6th ed., London, 1907, p. 142, where it is mentioned as in the Giza Museum; Henri Gauthier, *Le livre des rois d'Egypte. Recueil de titres et protocoles royaux,* Vol. I, *Des origines à la fin de la XII*e *dynastie* (= Vol. 17 of *Mémoires. Institut*), Cairo, 1908, p. 245, n. 3; here erroneously Wiedemann is said not to have given the whereabouts of the ring. If the original notice was correct, this ring should hold an important place in the history of Egyptian finger rings but at present no illustration or clear description of it is available and Mr. Quibell, kindly replying to our inquiry, tells us that it is not now in the Cairo collection and that he did not, on looking through the appropriate sections of Maspero's *fiches,* succeed in finding a record of it.

Again, of very great consequence in any attempt to trace the history of signet rings is the meaning of the Egyptian word *ḏbC.t* especially in its earliest occurrences. The opinion of the editors of the Berlin Dictionary on such questions has special value, and we quote in English translation their kind replies to our inquiry. First, from Dr. Grapow, under date of June 22, 1922: "*ḏbC.t* never means 'signet ring,' but always 'seal,' really the impression of the finger (from *ḏbC,* 'finger'). So far as the material thus far sorted out enables one to see, the oldest occurrence, aside from that in the tomb of Sirenpowet I (*Ä.Z.,* 45, pp. 126-7; I should doubt whether Gardiner's conjecture 'signet rings' is correct) and that of British Museum 614 (Pier-Breasted stela), is in the Middle Kingdom Book of the Dead (*Religiöse Urkunden,* V, 174). Otherwise it has been noted only for Dyn. XVIII and later times. Especially interesting as to the writing: *Ä.Z.,* 21, 132; *Urk.,* IV, 209; 470; and the picture Mariette, *Abydos,* Pl. 2 ('to break the seal' *śfḫ ḏbCy.t* in the temple ritual). I confess that in the Sirenpowet passage, one could think of 'seal' as that with which one makes a sealing (therefore as signet-stone, or the like), but the meaning 'signet ring' does not appear to me to be inevitable. Still other passages from Dyn. XVIII are: *Urk.,* IV, 68; 1072; Mariette, *Abydos,* II, 33." Professor Erman wrote on June 26: "I have always thought out the matter thus: *ḏbC* means really 'to make an impression in clay with the finger' (from *ḏbC,* 'finger') after the primitive manner of sealing, as it occurs, for example, in Babylonia. Then it was used also for the act of sealing with a stamp and came with this discovery to the Semites. This could not have taken place, however, until, in Egyptian, people were saying, not *ḏbC,* but *dbC,* hence טבעת and not

Egyptian signet rings are of two classes, those with movable bezel, ordinarily made wholly, or exclusive of the setting,[42] of another material than that composing the shank of the ring, and those with immovable bezel, almost always of the same material as the shank.[43] The movable bezels are set chiefly with scarabs (Nos. 20, 23), very rarely with miniature cylinders (No. 24), and occasionally with plaques, figures of animals, or some other fancy form of seal. The methods of mounting the bezel to permit it to turn, of which three are illustrated in our signet rings Nos. 20 to 24 (compare No. 18), are quite varied. It would seem that the earliest was the stringing of the scarab on a metal wire, which was then twisted together on the inside of the finger; that is, by substituting wire for cord, a finger ring, in the ordinary acceptance of the term, was evolved from the practice of tying a scarab-seal on the finger.[44] Such was the form of all the beautiful scarab-rings of the nineteenth century B. C. from the princesses' treasures of Dashur,[45] also of the scarab-rings of the same century which belonged to a princess buried at Lahun.[46] At least as early, it may be, in actual date, although the type probably did not have so early an origin as that previously mentioned, is the scarab-seal of an official, found at Lisht, which has the ends of its gold shank inserted in the threading hole of the scarab.[47] The ring with movable bezel in scarab form was used in Egypt through many centuries and passed to other lands. A late Egyptian example is one found at Daphnae in the Delta, probably of the seventh, or sixth, century B. C.[48] Mr. Marshall states that the swivel ring went out in

צבעת. Also חותם 'seal' and חתם 'to seal' will have been borrowed from the Egyptian *ḥtm* and not the other way around, as *ḥtm* has further the more general meaning 'to close securely'." From all this, it appears that the early occurrences of the word *dbC.t* cannot be employed safely as evidence to push back the probable time of the first employment of signet rings in Egypt, and we are thrown back on the archæological evidence. Professor Erman referred also, in the letter from which we have quoted, to the need of a thorough-going examination on the monuments of the determinative of the Egyptian words for "seal." It appears to him to be often a degenerate sign, the result of the confusion of several signs. In this connection we may add a reference for the British Museum stela 614 of Thethi, chief treasurer under the Intefs I and II, mentioned by Dr. Grapow, namely: Budge, *Egyptian Sculptures in the British Museum* (1914), Pl. VIII (photographic), l. 5.

[42] Also a "bezel" in the restricted sense in which the word is employed as a technical term by metal-workers. We have used it in this book in the more general sense.

[43] But see rings of movable bezel with both parts of gold, Newberry, *Scarabs,* Pl. I, Nos. II, V, of Dyn. XVIII and XIX; Vernier, *Bijoux,* II, No. 52199, undated; also the green-glazed steatite seal set into a bronze ring with immovable bezel which Mr. Hall (*Catal. of Scarabs,* I, No. 2652) ascribes to the XVIIth Dyn., and an undated ring with a bezel of lapis lazuli, which has the appearance of being movable but is actually fixed, described by M. Vernier, *Bijoux,* II, No. 52212.

[44] Cf. Newberry, *Scarabs,* pp. 62, 93 and Möller in Schäfer, *Goldschmiedearbeiten,* p. 44, also our p. 72, note 3, giving evidence for the continuance during the XVIIth and early XVIIIth Dynasties of these ways of fastening scarabs to the finger.

[45] Vernier, *Bijoux,* II, Nos. 52240-1, 52243-6, 52258-60, Pls. XX and XXII = De Morgan, *Dahchour,* I, p. 69, Nos. 35, 37, 40, 41, 43; p. 70, Nos. 52-4 = Newberry, *Scarab-Shaped Seals,* (Cairo *Catal.*), London, 1907, Nos. 37411-15, 37417-20, Pl. XVIII.

[46] *Bull. M. M. A.,* Dec. 1919, Pt. II, Fig. 19; Brunton, *Lahun I,* Pls. II, XI, 3, pp. 35-6, § 48.

[47] *Bull. M. M. A.,* Vol. IX (1914), p. 220, Fig. 13; cf. Newberry, *Scarabs,* p. 93, Fig. 108. The Lisht ring was found in the cemetery surrounding the tomb of Amenemhet I (2000-1970 B.C.), but is not necessarily so early as his reign. It was ascribed by Mr. Mace simply to the "XIIth Dynasty."

[48] Petrie, *Nebesheh (Am) and Defenneh (Tahpanhes)* (with *Tanis II,* the IVth Memoir. Eg. Expl. Fund, 1887-88), London, 1888, pp. 76, 111, Pl. XLI, 37.

Etruria at the close of the fourth century B. C. and that it was out of fashion among the Greeks by the third century B. C.[49] Presumably the time of its extinction in Egypt was about the same as in other countries.

The second class of Egyptian signet rings, those of one material and immovable bezel (Nos. 25-28), began, according to some authorities, early in the Eighteenth Dynasty (1580 B. C.),[50] but very few examples anterior to 1450 B. C. are known.[51] After the mid-Eighteenth Dynasty these rings ran parallel with the rings of movable bezel until signet rings of Egyptian design gave way before Greek and Roman types.

The recognition of small scarabs, both those set in rings and others, as seals rests largely on the finding of clay sealings, ranging in date from about 1900 to 1700 B. C., which in size and design bear evidence that they are impressions from scarabs. But it has been pointed out[52] that many of the extant scarabs are not suitable for use as seals because the design on the base is virtually filled with glaze, rendering the making of a clean impression impossible; further, from the period of the Eighteenth and later dynasties, which saw the production of many scarabs, thus far, very few scarab sealings have been made known.[53] Many scarabs, too, may be judged by the nature of their inscriptions to have been amuletic, and even though their value as amulets does not preclude a use as seals, it accords with the view that numerous scarabs having the form of the scarab-seal were actually only amulets or ornaments. Our own No. 20 has a prominent gold frame about the scarab which renders it unsuitable for use as a seal. The caps at the ends of the cylinder in No. 24 would have interfered with its use in sealing. Turning to the rings with immovable bezel, we have the evidence of many glazed pottery rings, too frail ever to have been used as seals and explainable only as dummies for seals, as amulets, or as personal decoration. It is to be noted also that all writing on our metal rings is in the normal direction, from right to left, (Nos. 25-28, 30, 34), and the figures in the non-symmetrical designs (Nos. 26, 28, 31, 32), face the right. The ring-maker had regard for the aspect of the ring rather than of the impression; yet this fact does not disprove their use as seals, since clay scarab sealings are known in which the reverse direction of

[49] *Finger Rings,* pp. XXIV, XXXI.

[50] Newberry, *Scarabs,* pp. 93-4, Fig. 111 and Möller in Schäfer, *Goldschmiedearbeiten,* p. 44. These authorities do not cite the evidence and we have been unable to locate examples which we regard as indubitable, but see: (a) A ring of gold with name "Ahhotep"; Petrie, *History,* II, *During the XVIIth and XVIIIth Dynasties* (1896), p. 9, Fig. 4; (b) ring of gold with name Amenhotep I; Petrie, *Scarabs and Cylinders,* Pl. XXIV, 1. Of these (a) has no cartouche and might belong to a private person, but if the early XVIIIth Dyn. queen was intended, since she was paid divine honors long after her death (Erman-Ranke, *Aegypten,* p. 87), an object inscribed with her name might be of later date. And it is well established that objects inscribed with the name of Amenhotep I are not all contemporary with his reign.

[51] Possibly, but not certainly, of the mid-XVIIIth Dyn. are the following rings: (a) Gold ring with name of Thutmose III; Petrie, *History,* II, p. 100, Fig. 48 (= ? "Bronze" ring cited in *Scarabs and Cylinders,* Pl. XXVI, 18.6, 13); (b, c) two of gold bearing the name of Nefrure (Hatshepsut's daughter?); Hall, *Catal. of Scarabs,* I, No. 2653 and Schäfer, *op. cit.,* No. 75; (d) silver ring from the tomb of Maket; Newberry, *Scarabs,* Pl. XXIX, 31.

[52] Petrie, *Scarabs and Cylinders,* p. 4.

[53] But see Quibell, *Tomb of Yuaa,* Nos. 51179-83.

writing may be observed.[54] There is none among our rings with fixed bezel which would not admit of being used as a seal,[55] if the owner so desired and were not all too particular about the sharpness of the impression; only No. 34, however, is so cut as to make a really satisfactory impression; No. 25 with its raised edge and its undercutting and the poorly executed design of No. 33 seem especially unsuitable for sealing purposes. At least we may believe that all these pieces were especially valued as ornaments, however much or little they served a utilitarian end.

No. 20 (Plate VI, a-e). Scarab-ring.

Glazed steatite and gold. Eighteenth Dynasty, about 1500 B. C. From Sakkara. Weight, 106.64 grains (6.910 grams).

POINTS OF INTEREST: The good preservation, beauty, and value as an early example of the swivel joint in jewelry, place this ring among the notable pieces in the collection.

The scarab was hand carved in steatite and perforated longitudinally by drilling from each end, then coated with green glaze and fired; the glaze gathered thickly in the depressions of the carving and only thinly over the smooth surfaces of the back. The shank is of solid gold hammered with slightly tapering sides and saucer-like ends,[56] in the concave surfaces of which cylindrical tenons were soldered. Each tenon was formed of a strip of sheet gold, bent over, with ends soldered together. The scarab setting was made of two bands of sheet gold bent each into oval form and slipped one within the other;[57] the ends of each strip were united and the ovals held together by solder. The inner band which is of thinner stock projects about 0.0787 inches (2 mm.) above the other. The upper edge of the outer band forms a shoulder around the sides of the scarab and its lower edge, which before bending into oval form had been worked into a half-round by drawing a burnisher along its surface,[58] clasps the base of the scarab. At each end, surrounding the perforation, was soldered a sleeve composed of two pieces of gold, one a cylinder made as the tenons previously described, the other a flat ring

[54] Ayrton and others, *Abydos. III,* Pl. XXXIX, 3, 15.

[55] We are not aware that any Egyptian sealing made by a signet ring with immovable bezel has been published, but one is contained in the collections of the Oriental Institute of the University of Chicago (Haskell 11,369) with cartouches of Amenhotep IV (*ca.* 1365 B.C.); the impressions are of the shape of our ring bezels Nos. 27 and 28 but of a larger size, more usual in bronze than in gold rings. In this connection, it is interesting to note that many authorities consider the Mycenæan gold rings (*ca.* 1600 B.C. and later) as primarily intended for ornament rather than for signets, even though contemporary sealings have been found which could have been produced by signet rings; Marshall, *Finger Rings,* p. XV, and the references given by him.

[56] An alternative view is that the saucer-like ends of the shank were separately made and soldered on; the finish is too good to permit a decision on this point.

[57] Or the bands may have been soldered together in the flat and then bent.

[58] So it seems to us probable. There is no indication of a soldered seam here as in the Berlin scarab setting described by Möller in Schäfer, *Goldschmiedearbeiten,* under No. 62.

cut out of a circle of sheet gold and soldered to the outer end of the cylinder; in these sleeves, the tenons on the extremities of the shank play, forming a swivel joint. The visible gold parts were polished and burnished with extreme care and it is only by looking inside the sleeves when the shank is detached that one can make out the construction of the scarab setting. The gold is strewn through with small particles of white metal; its color is very close to that of fine gold.

The date could not be earlier than the time of Thutmose III, whose name is inscribed on the scarab; even though the name of this king occurs on some scarabs not contemporary with his reign, this one is unlikely to be later, because the style of the scarab itself and of its gold mount[59] is characteristic of the mid-Eighteenth Dynasty.

The device on the base of the scarab is not as a whole translatable, but is rather an ornamental assemblage of hieroglyphs culled from the king's list of names and titles. Thutmose III's prenomen, *Menkheperre,* in the oval frame called a cartouche, occurs twice, written once vertically, the other time, horizontally. The falcon surmounting the hieroglyph for *gold* is the constant prefix of another of the Pharaoh's five names and the word written over the bird's back means *eternity,* or the like.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 6. Abbott catalogue, editions 1853 ff., No. 1083; edition 1915, No. 1079.

Nos. 21, 22 (Plate VIII). Ring shanks which have lost their bezels.

Silver. Probably Twenty-sixth Dynasty, 663-525 B. C. Found in Lower Egypt. Weight of No. 21, 98.23 grains (6.365 grams); of No. 22, 92.96 grains (6.024 grams).

No. 21 has had one of its bent-over ends broken off and four pieces of its coils are now held in place by cement.

Both ring shanks were cast and then worked over to remove traces of the casting; the ends were cast straight and afterwards bent over, forming loops through which the separate wires, carrying the bezels, passed before being wound around the shoulders of the shanks. The coils were held in place merely by their own elasticity; the wires are solid but it is uncertain whether or not they were produced by means of a draw-plate.[60] The lost bezels may

[59] Notable among many parallels are the following: (a) Hall, *Catal. of Scarabs,* I, p. 32, No. 290, a blue-glazed steatite scarab with name of Hyksos king Khian (XVIIth cent. B.C.), gold mounted; (b) Hall, *op. cit.,* cut on p. XXXV = No. 533, p. 56, scarab of lapis lazuli inscribed with name of Queen Hatshepsut, gold mounted; (c, d) Petrie, *Illahun,* Pl. XXVI, 10, 7 = Newberry, *Scarabs,* Pl. XXIX, 32, 33, blue-glazed scarab, gold mounted, and silver scarab, gold mounted, found with the mummy of Maket. The only pieces in the foregoing enumeration which could be later than the mid-XVIIIth Dyn. are those from the tomb of Maket, which Professor Petrie assigned to the XXth Dyn., but which was later shown to be of the XVIIIth (Von Bissing, *Ä. Z.,* Vol. 35, 1897, pp. 94-7).

[60] One break has a granular appearance unlike the closed end produced by the crushing together of the walls of a tube; very little of the original surface is left.

have been scarabs, plaques, or some fancy form of seal. A microchemical analysis revealed no one of the following metals with the silver: gold, copper, mercury, tin, lead, or zinc. Thus the shank of No. 21, from which the sample for analysis was taken, is in all probability of fine silver. The presence of the coils which cannot be made entirely free from foreign matter renders the piece unsuitable for a specific gravity test.

The noticeable characteristics which may be significant of the age of these pieces are the marked thickening of the shank opposite the position of the bezel, the smallness of the bezel as indicated by the narrow opening left to accommodate it, and the nearly round inner outline of the ring. This combination of characteristics is hardly probable before the Nineteenth Dynasty and may indicate a later date. A decided thickening of the shank, perhaps to give comfort in wearing,[61] has been observed in another type of ring as early as the Thirteenth Dynasty,[62] but among dated rings of the present type it is especially marked in an outstanding piece of the early Nineteenth Dynasty, the gold ring of Harmhab in the Louvre.[63] The gold rings of the close of the Nineteenth Dynasty, those of Tewosret, to which attention has been called above (page 80), have smaller bezels and a nearly round inner outline of the shank, but the closest parallel to the small bezel is found in the previously mentioned (page 83) late ring from Daphnae; the inner outline of the shank of this ring is slightly elliptical with its greatest diameter in a vertical direction. Before the Nineteenth Dynasty the ring shank very often was shaped as that of No. 20, or, like the ring bearing the name of the Hyksos king Apophis,[64] had an elliptical, rather than round, form, with the greatest diameter in a lateral direction. Finally, the statement of the old catalogue that these pieces were found with Nos. 35 to 37 makes it extremely probable that they, too, are of the Twenty-sixth Dynasty. It is of interest to note that rings with the scarab-bezel carried on a separate wire, passed through holes in the ends of the shank and wound about its shoulders, were made in Etruria in the fifth and fourth centuries B. C.[65]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 975-6; edition 1915, Nos. 971-2.

No. 23 (Plate VII, a-e). Funerary finger ring.

Gold and amazon stone. Probably Persian, or early Ptolemaic period, about 525-200 B.C. Weight, 47.50 grains (3.078 grams).

The ring is too flimsy to have been worn in life. In making it, the discarded back of a scarab of amazon stone, which had been broken in the

[61] Suggestion of Möller, *op. cit.*, pp. 44-5.
[62] Newberry, *Scarabs*, p. 93, Fig. 108.
[63] Newberry, *op. cit.*, Pl. I, No. V; Pierret, *Salle Historique*, p. 115, No. 481.
[64] Newberry, *op. cit.*, Pl. I.
[65] Marshall, *Finger Rings*, D, i, pp. XLIII, XLIV.

process of drilling, was utilized. The broken surface was ground fairly smooth, but shows interestingly the marks of drilling from the two ends; instead of a straight threading hole of uniform diameter, such as would be produced by a modern drill, a change of direction is seen in the middle, where the two separately made channels come together, and the channels taper inward. The scarab is surrounded by a band of sheet gold soldered together on the right side; here (c in Plate VII) a mark 0.197 inches (5 mm.) long and just under 0.02 inches (0.5 mm.) wide [66] indicates that binding wire was used to prevent the opening of the joint during the soldering process; the joint has abutting edges. The shank is a pleasing example of beaten work, rectangular in section, and narrower and thicker toward the ends, which are bent over at right angles and project through holes in the gold band about the scarab. A fine wire extends across under the scarab and through the holes in the band and is wound about the shoulders of the shank; it has prominent longitudinal markings. The color of the metal is about as deep a yellow as that of fine gold, but is stained red here and there, perhaps by foreign matter, as the piece has not been cleaned.

The mode of wrapping exemplified in the mummy hand seemed to afford the best clue for dating the ring and we are indebted to Dr. G. Elliot Smith for the following expression of opinion: "I should say that the hand of which you send a photograph was wrapped either in the Persian, or the earlier Ptolemaic period. This is merely a tentative suggestion, but I think it is likely to be a correct appreciation. To the student of embalming processes mummies of the late period present little interest; and I have to confess that I paid inadequate attention to them and to their wrappings. But I feel sure that the bandaging shown in your photograph could not have been done at any other period." [67]

BIBLIOGRAPHY: Abbott catalogue, 1915, p. 97 under Minturn gifts: "Hand of a mummy with a scarabæus ring." [68]

No. 24 (Plates VIII, a, b, XI, c). Finger ring with bezel in the form of a cylinder seal.

Silver, electrum, and cobalt-blue glass. Probably Eighteenth Dynasty, 1580-1350 B.C. From Thebes. Weight, 29.45 grains (1.908 grams).

The wires are broken where they issue from the cylinder and parts b and c (see below) are lost from one of the caps.

[66] Some of the solder flowed along the wire for this distance and some superfluous solder gathered in tiny lumps on the inside of the band at the joint.

[67] The late date to be assigned to the ring renders more plausible its position outside the wrappings of the finger. In earlier times, so far as known, rings were placed next the finger, although other pieces of jewelry were often separated from the body by bandages, as for instance in the burial of Senebtisi; Mace and Winlock, *Senebtisi,* pp. 18, 20.

[68] *Op. cit.,* p. 98 contains a record of a mummy hand with ring presented by Sidney A. Schieffelin. This is excluded from the present catalogue because the ring proves to have been faked, as is evident from the workmanship and material (brass) of the shank, as well as from the appearance of the hand, which had been bored violently through the dry and brittle wrappings to admit the modern ring.

The cylinder of blue glass was cast plain and the inscription was subsequently cut in it—with considerable difficulty to judge by the poorly formed hieroglyphs. The shank of the ring is of silver and hollow; it tapers gradually into fine wires which cross within the threading hole of the cylinder and are wound ten times about the shoulders; compare No. 18 for the way the shank was made, except that in this instance the seam follows the inner curve. Each end of the cylinder was protected and ornamented by an electrum cap of the following construction: (a) a sleeve, formed of a strip of sheet soldered end to end, has its inner edge bent at an angle and soldered down on (b), a circular piece of a diameter slightly in excess of that of the end of the cylinder and perforated with a hole corresponding to the threading hole of the cylinder; (c) a narrow strip of sheet bordering the inscribed surface of the cylinder at each end has its ends soldered together and the edges of (b) soldered down on it. The seams are well finished.

Only two similar rings have been published: one in the British Museum, with cylinder of blue glass imitating, as here, lapis lazuli;[69] the other in the Cairo Museum with cylinder of the mineral lapis lazuli.[70] Both have gold shanks; in the first-mentioned ring the cylinder is blank, in the second the surface has so deteriorated that the inscription is illegible. For dating these rings, there is only internal evidence, chiefly the form of the shank. We should judge the New York Historical Society's example to be a little earlier than the other two, of which the piece in the British Museum has a shank resembling that of Harmhab's gold ring (see above, page 87) and the one in Cairo an especially developed arrangement for securing the ends of the separate wire carrying the cylinder, after the wire had been coiled about the shank.

The cylinder seal was nearly obsolete at the time when these pieces probably were made. The blankness of one and the caps at the ends, which would have been in the way, are further indications that these cylinders were not intended to be used as seals and Mr. Hall probably is right in regarding them as miniature seals, made expressly as ring bezels, but reminiscent of the larger cylinders once used as seals.

The reading of the inscription, of which some hieroglyphs are in doubt, is uncertain, but it presumably contains a personal name.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 14. Abbott catalogue, editions 1853 ff., No. 964; edition 1915, No. 960. Published in inaccurate colors, Prisse d'Avennes, Monuments égyptiens, Plate XLVII, 14, and Histoire de l'art, Atlas Vol. II, "Art industriel," Plate 20, No. 10.

No. 25 (Plates VIII, a, b, X, c-e). Signet ring bearing the name of Amenhotep II.

Gold. Eighteenth Dynasty, 1448-1420 B.C. From Thebes, said to have been found in the box No. 144. Weight, 124.50 grains (8.068 grams).

[69] Hall, *Catal. of Scarabs,* I, the plate opp. p. XV, No. 3, there labeled "XIIth-XVIIIth Dyn." and p. XXXV, "Middle Kingdom"; but pp. XI and XXIX, the possibility of a date anterior to the XVIIIth Dynasty is abandoned. This is perhaps the ring mentioned in Wilkinson, *Manners and Customs,* ed. Birch, Vol. II, p. 340, n. 6.

[70] Vernier, *Bijoux,* II, p. 77, Pl. XXI, No. 52197.

POINTS OF INTEREST: The ring is beautiful in form and workmanship and bears the name of one of the historic kings of Egypt. The form of the bezel differs from that of any Egyptian ring hitherto published.

The soldered seam at the right has sprung partly open and the shank has been indented in a few places.

Shank and bezel were made separately. The shank is solid and was beaten out and bent into shape from a piece cut from a stock casting; its form, thicker opposite the bezel, tapering a little on the sides, then thicker just at the ends, to give strength to the soldered seams, is pleasingly modulated. The bezel, too, was beaten out from stock material and has the inscription executed entirely with punches; the slight burr raised was hammered down as may be seen in the somewhat overhanging upper edges of the signs. Traces remain of scraping and burnishing on the sides of the raised border and parallel to it. The ring thus made exhibits a charm of craftsmanship and beauty of surface superior to that of any cast ring. A microchemical analysis of the gold proved the presence with it of silver and the absence of copper, mercury, tin, lead, and zinc. The color over the greater part of the surface, a yellow, slightly paler than that of fine gold, accords with this result, but in the depressions of the inscription and elsewhere, here and there, is a reddish luster, with respect to which, see the statement on page 31. The specific gravity of the ring is 17.271, indicating with the analysis a gold of about 20.7 carat. A number of particles of hard white metal are visible on bezel and shank, although unnoticeable without a magnifier.

The inscription reads: *Okheprure, son of Amon-Re.*

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 3. Abbott catalogue, editions 1853 ff., No. 1085; edition 1915, No. 1081. Prisse d'Avennes, Revue archéologique ou recueil de documents et de mémoires relatifs à l'étude des monuments et à la philologie de l'antiquité et du Moyen Age, Paris, Vol. II, 2 (1846), p. 733; Monuments, Plate XLVII, 3. Lepsius, Denkmäler, Text, published by Naville with the collaboration of Borchardt, edited by Sethe, Leipsic, Vol. I (1897), p. 10, No. 17. Gauthier, Livre des rois, Vol. II, De la XIIIe à la fin de la XVIIIe dynastie (= Vol. 18 of Mémoires. Institut), Cairo, Part II (1912), p. 284, No. XXXIV.

No. 26 (Plates VIII, a-c, X, d, e). Signet ring bearing the name of Amenhotep II.

Silver. Eighteenth Dynasty, 1448-1420 B.C. From Sakkara. Weight, 164.39 grains (10.652 grams).

POINTS OF INTEREST: The association with the name of Amenhotep II (compare No. 25) and the human figure in vigorous action, unusual in ring designs from Egypt, give this piece distinction.

The ring has been cast in two pieces and soldered together; the ends of

the shank after being cast were hammered to make them thinner and wider; an abundance of solder shows on the under surface. The ring is well shaped but the execution of the design is crude. Possibly some portions of it were cast in, but we regard it as more probable that the larger surfaces, such as the king's body, were gouged out and that the round signs, head of the king's club, legs of the beetle, arms of the captive (which have no hands!), and some other details were executed with punches. A microchemical analysis revealed the presence of lead with the silver. No gold, copper, mercury, tin, or zinc was detected. The specific gravity of the ring, 10.321, is lower than that of either of the two component metals;[71] perhaps this fact is sufficiently accounted for by the presence of solder used in uniting the two parts of the ring.[72] The ring is harder than the following No. 27, its surface is coarser grained, and it tarnishes more readily.

A gold ring of this shape bearing Amenhotep II's name is in the collection of the British Museum.[73] Possibly the form was in use in the preceding reign[74] and occasional later examples are known,[75] but it was never common.

The scene on the bezel, one known in the major art of Egypt from a remote antiquity, represents the king about to fell an Asiatic captive whom he grasps by the hair. Behind the king's figure is a hieroglyph meaning *life* or some part of the verb *to live,* or perhaps used only as an amuletic stop-gap; the legend before the king's face reads: *The good god, Okheprure.*

The Louvre possesses a splendid gold ring having a movable, solid-gold bezel of rectangular form inscribed with Amenhotep II's name.[76] We have, then, a minimum total of four rings of this king in the precious metals which have survived to modern times. Is it possible that the Louvre ring, which weighs 628.87 grains (40.75 grams), was once the king's personal signet? It would be hazardous to suppose this, the more so as we do not know the carat of the gold, or the modern history of the ring. All four may have been gifts of the king to persons of distinction in his service and may even have been bestowed personally from the palace balcony as in the scene pictured in one of the Amarna tombs.[77]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 12(?). Abbott catalogue, editions 1853 ff., No. 984; edition 1915, No. 980. Lepsius, Denkmäler, Text, Vol. I, p. 10, No. 18(?), stated to be of gold; see also p. 185, under 30, reporting shaft where the ring No. 18 of Lepsius' notes was said in his day to have

[71] The specific gravity of pure silver is 10.50, that of lead, 11.34.

[72] Otherwise, since the ring is heavy, we may have to do with a combination of lead and silver, perhaps corresponding to a compound of a similar nature, of which the specific gravity is lower than would be expected from an ordinary alloy. See Gmelin-Kraut, *Handbuch der anorganischen Chemie,* Heidelberg, Vol. V, Pt. 2 (1914), p. 220.

[73] Hall, *Catal. of Scarabs,* I, No. 2657.

[74] Newberry, *Scarabs,* Pl. XXIX, 31.

[75] Schäfer, *Goldschmiedearbeiten,* No. 84; Hall, *op. cit.,* p. XXXV; Newberry, *op. cit.,* p. 94.

[76] Newberry, *op. cit.,* Pl. I, No. II; Pierret, *Salle Historique,* p. 113, No. 468.

[77] Cf. above, n. 11, and pp. 2-3 of our Introduction.

been found; the editor's note 2, p. 185, by oversight gives reference to the preceding ring, our No. 25.

No. 27 (Plates VIII, a-c, X, d, e). Signet ring.

Silver-tin alloy. Probably latter part of the Eighteenth Dynasty, 1400-1350 B.C. From Sakkara. Weight 185.20 grains (12.001 grams).

POINTS OF INTEREST: The ring is one of the handsomest in the collection, by virtue of its heavy weight, good finish, and elaborate, well executed inscription; the alloy of which it is made has not hitherto been noted from ancient Egypt.

The shank of the ring has a few indentations and there are modern scratches within the sun's disk.

The ring was cast in one piece, whether directly in a three-part mould, as Möller postulated for all Egyptian cast rings of metal, even the earlier ones, citing the evidence of part of a three-piece stone mould bearing a Greek inscription,[78] or, as we think more probable, in a one-piece mould which had to be broken to remove the ring. There are lines of burnishing just over the edge of the bezel (Plate VIII, b) which might be due to the necessity of removing a feather edge left by the seam in a divided mould, but are also explainable as made in bringing the ring to a true edge after the displacement of metal caused by punching in the boundary line of the inscription. It is difficult, too, to determine whether any part of the inscription was cast in, but the occasional finding of rings with blank bezels (Nos. 35-7) suggests that it may have been the ordinary practice to cast rings blank and add the device subsequently. We regard this design as chiefly engraved; but certain round details on the human heads and bird's claws, also the head of the uraeus, indicate the use of punches. The alloy of which the ring is composed has been shown by microchemical analysis to contain silver and tin, and no gold, copper, mercury, or lead. The specific gravity of the ring is 10.096, indicating, on the assumption that the material is a binary alloy, 15.2 per cent. of tin.[79] The alloy was not necessarily put together of metallic silver and metallic tin,[80] for ores

[78] *Op. cit.,* pp. 50, 51 and Berlin *Verzeichnis,* p. 364, No. 11,337. For the XVIIIth Dyn., only open moulds have thus far been made known, although Mrs. Richardson tells us that the Metropolitan Museum's Egyptian Expedition found part of a two-piece limestone mould which they regard as dating from the XVIIIth Dyn. Professor Pernice's investigations (see pp. 204-5) have made it appear that divided moulds to be used again and again were a very late invention, and certainly bronze statuettes at this time were cast in one-piece moulds by the waste wax process (see Petrie, *Tools and Weapons, Illustrated by the Egypt. Coll. in University College, London, and 2000 Outlines from Other Sources,* XXXth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XXIInd Year, London, 1917, § 184; *Arts and Crafts,* pp. 89, 101, 102). See further on the use of divided moulds, p. 195, n. 10.

[79] Calculation by Mr. Nyland making use of the Holzmann table showing contraction in alloying the two metals; Brannt, *Metallic Alloys,* 3rd ed., p. 85.

[80] Metallic tin was, however, known at this time. See Petrie, *Ancient Egypt,* 1915, p. 17, *Illahun,* p. 19; J. H. Gladstone, *Proceedings of the Society of Biblical Archæology,* London, Vol. XIV (1891-92), p. 226.

are found containing sulphide of silver and sulphide of tin,[81] which when smelted yield a mixture of silver and tin, the sulphur having entered into combination with the oxygen of the air. The ring has a silver-white, smooth, close-grained surface; it is harder than pure tin, but not so hard as the other silver rings of this collection, nor does it tarnish so much.

The ring is of a practical and good-looking shape, one which possibly made its appearance about 1580 B.C.,[82] and became common toward the close of the Eighteenth Dynasty, about 1350 B.C. It was so much used in later times, in Egypt and in other countries, that one must look for other criteria than the shape to determine the date of the piece under discussion. The component parts of the prenomen of Amenhotep III (1411-1375 B. C.), "Nibmare," are contained in the inscription, but so scattered that the intention of the designer remains very much in doubt. Even so, the ring may be assigned to the latter part of the Eighteenth Dynasty, in view of the stylistic resemblance of its inscription—in size, form, and grouping of the hieroglyphs—to that of two rings of the same shape bearing the name of Amenhotep IV.[83]

It is difficult to translate satisfactorily the hieroglyphs on this ring, because if an inscription was intended, the limited space and the desire to produce a good decorative effect led to abnormalities in the writing. Professor Erman, in correspondence, suggested the possibility that the ring contains a series of epithets, beginning with *The soul of Re,* but, on the whole, was more inclined to our view, that the hieroglyphs are used for their decorative and amuletic values. Among them, besides the human-headed falcon in which the Egyptians visualized the soul[84] (compare Nos. 98, 99, 104, and 105), are the following: the shepherd's crook (No. 94), which is a triliteral sign meaning *ruler* or *to rule;* another triliteral sign *ḥtp* (second from the bottom) meaning *offering,* also *to be satisfied, benignant,* and the like; the signs *ḏd*(*y*) and *ḥs*(*y*) written twice[85] and meaning respectively *endurance* or *to endure* and *praise* or *to praise.*

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 11(?). Abbott catalogue, editions 1853 ff., No. 1090; edition 1915, No. 1086.

[81] So Mr. Nyland informs us.

[82] Ring bearing name Ahhotep; see above, note 50, and the doubts expressed there.

[83] (a) *J. E. A.,* Vol. IV (1917), p. 46, No. 10, Pl. XIII; (b) Petrie, *Scarabs and Cylinders,* Pl. XXXVI, 18.10.18. Cf. the gold ring of Eye (*ca.* 1350 B.C.) in the Leyden Museum, of which a line cut is given in Newberry, *Scarabs,* Pl. XXXI, 34; also in Leemans, *Monumens égyptiens,* Pt. II, Pl. XL, as No. 202.

[84] The soul occurs on the ring bearing King Eye's name (see preceding note) and above its human head is the sun's disk, but not so close as here, and certainly a separate sign and not a headdress as in late representations of the soul of Osiris (Mariette, *Dendérah,* Paris, Vol. IV, 1873, Pls. 40, 42). Cf. the XVIIIth Dyn. hieroglyph for soul as given in Möller, *Paläographie,* Vol. II (1909), No. 230, which is bearded as here.

[85] For another instance of signs in twos, see Newberry, *Scarab-Shaped Seals,* Pl. IV, No. 36,205, with name of Thutmose IV (1420-1411 B.C.); also the grouping of *ded* and "girdle-tie" signs in the decoration of Tutenkhamon's catafalque.

No. 28 (Plates VIII, a, b, X, c, d). Signet ring.

Pale gold. Nineteenth to Twenty-fifth Dynasty, 1350-663 B.C. (?). From Sakkara. Weight, 177.84 grains (11.524 grams).

The ring was cast in one piece and the design chased in, rather boldly and crudely; one can follow the individual impressions of the punch and fairly count the number of blows the ring received! A microchemical analysis showed the presence of gold and silver in the alloy, the latter more abundant than in No. 25, and the absence of copper, tin, mercury, lead, and zinc. The color is markedly paler than that of fine gold and has a slightly green cast. These data, taken with the specific gravity, 13.830, indicate a gold of about 12.6 carat. Some inconspicuous particles of hard white metal are discernible.

The device consists of a seated figure of the goddess Isis, identified by her name written in front of her face. She holds the usual attributes of divinities, the *was*-scepter in her left hand, and the sign for *life* in her right, once significant of the god's good gifts, but now probably only traditional attributes.

The ring is obviously a comparatively late piece, but there are no definite clues for dating it. Figures of Isis with the disk and horns as headdress and the name written in the same fashion as here are found as early as the beginning of the Nineteenth Dynasty.[86]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 4. Abbott catalogue, editions 1853 ff., No. 1089; edition 1915, No. 1085.

No. 29 (Plates VIII, a, b, X, c, d). Signet ring.

Gold. Latter part of Eighteenth Dynasty, about 1500-1350 B.C. (?). Weight, 107.39 grains (6.959 grams).

POINTS OF INTEREST: Attention may be called to the design on the bezel, as especially pleasing and affording an example of Egyptian success in formal ornament.

The shank of the ring has been bent a little out of shape.

Probably the ring was cast in one piece and the design was chased in. One may observe on the bodies of the uraei the continued use of the same punch, even when, in the narrow parts, the cross lines produced by it extended beyond the outlines of the uraei. The color of the ring is that of fine gold, but a microchemical analysis proved the presence of silver and tin, the latter apparently in very small quantity, with the gold, although no trace of copper, mercury, lead, or zinc was found. The specific gravity, 17.010, too, indicates, not fine gold, although a gold of high carat, close to 20.1. If any piece in the collection has been artificially colored,[87] we should pick out this ring as a pos-

[86] Capart, *Abydos. Le temple de Séti I^er^. Etude générale,* Brussels, 1912, Pls. XXXVII, XLVI.
[87] See pp. 37-8.

sible instance. But one must then suppose that the ring had little subsequent handling, or the film of fine gold would be worn through in spots. Particles of a hard white metal are abundant on the shank of the ring.

The design on the bezel is a conventionalized rendering of a sistrum flanked by two uraei, crowned each with a sun's disk. This particular form of sistrum had above the handle, terminating in a head of the goddess Hathor, an open box in the form of a shrine, with uraeus within; the noise was produced by two strips or wires of metal, fastened at the bottom of the box but coiled loose above, which knocked against the sides of the box when the sistrum was shaken. It is seen pictured in reliefs of the early Nineteenth Dynasty.[88]

The shape is paralleled by that of a gold ring in the Berlin Museum bearing the name of Nefrure;[89] if Queen Hatshepsut's daughter of that name was intended, the Berlin ring is dated to the mid-Eighteenth Dynasty, about 1500 B.C. Another ring with double bezel of about this shape and having a sistrum as one element in its design is probably of the time of Thutmose III.[90] This is meager evidence for dating our ring, but the conviction that the design is of a good period is in part back of our suggestion.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1084; edition 1915, No. 1080.

No. 30 (Plates IX, a, b, X, c, d). Signet ring.

Silver. Mid-Eighteenth to Twenty-fifth Dynasty, 1500-663 B.C. From Sakkara. Weight, 52.55 grains (3.405 grams).

The surface has somewhat deteriorated, but the ring is intact.

Probably the bezel and shank were separately hammered out, the inscription was executed with chasing tools, and the two parts were soldered together, but in the present condition of the surface, this cannot be determined with certainty. In a microchemical analysis, lead was found present with the silver, but not gold, copper, mercury, tin, or zinc.

On the shape of the ring, see the preceding number.

The inscription reads: *Ptah, great in power;* the epithet "great in power" was often borne by this leading divinity of ancient Memphis, in the necropolis of which the ring was found. There are no clues to determine the ring's date.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 18(?). Abbott catalogue, editions 1853 ff., No. 965; edition 1915, No. 961 (said to be of bronze, but the number 961, found by us on the ring, is nevertheless probably correct, since all other bronze rings listed have been located).

[88] Winlock, *Bas-Reliefs from the Temple of Rameses I at Abydos* (M. M. A. *Papers*, Vol. I, Pt. I), New York, 1921, Pl. VI, p. 30.
[89] Schäfer, *Goldschmiedearbeiten*, No. 75.
[90] *Ä. Z.*, Vol. 41 (1904), p. 16.

No. 31 (Plates IX, a, b, X, c, d). Signet ring.

Gold. Second part of the Eighteenth Dynasty, 1500-1350 B.C. (?). From Sakkara. Weight, 75.03 grains (4.862 grams).

The bezel is bent slightly out of position and there are some dents in the shank.

The ring was cast in one piece. The design on the bezel was partly engraved, partly chased. The papyrus stalks and umbels and parts, at least, of the boat are clearly done with punches; the body of the animal may have been gouged out; the line following the curve of the bezel above is scooped up to the surface at its two ends after the manner of engraved lines. A microchemical analysis proved the presence of silver with the gold and the absence of copper, mercury, tin, lead, and zinc. The ring's specific gravity, 12.896, indicates about 9.6 carat for gold alloyed only with silver. For the slight suggestion of red in the discoloration of the gold, see the explanation offered on page 31. Specks of a hard white metal may be seen on the shank and in the under surface of the bezel.

On the shape of the ring compare the preceding Nos. 29 and 30. The somewhat pointed oval of the bezel is paralleled often in seals of the Eighteenth Dynasty.[91]

The design represents the goddess Hathor in the form of a cow, who wears the sun's disk between her horns, and here is traversing the papyrus marshes of the West by boat. In this aspect she was the beneficent goddess who welcomed the dead. The conception is prominent in the art of Egypt from the Eighteenth Dynasty onward, as in the statues of the goddess-cow in the Cairo Museum and in scenes on coffins. Two Eighteenth Dynasty examples among designs on seals may be cited: one in the British Museum, bearing the name of Thutmose I, and one in Berlin with the accompanying legend *Mistress of Dendera*.[92] Gold of low carat has been noted in rings of the Eighteenth Dynasty.[93]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1088; edition 1915, No. 1084.

No. 32 (Plates IX, a, b, X, c, d). Signet ring.

Silver. Latter part of the Eighteenth Dynasty, 1500-1350 B.C. (?). From Thebes. Weight, 42.15 grains (2.731 grams).

The surface of the silver has somewhat deteriorated.

The ring probably was beaten out in two parts and soldered together; the design seems to have been executed by a combination of chasing and engrav-

[91] Newberry, *Scarabs*, Pl. XXIX, Nos. 23, 27, 40; Schäfer, *op. cit.*, Pl. 12, No. 66.
[92] Hall, *Catal. of Scarabs*, I, No. 478 and Schäfer, *op. cit.*, No. 65, Fig. 30, p. 47.
[93] Petrie, *Scarabs and Cylinders*, Pl. XXXVI, Nos. 12, 18.

ing. As indicated by a microchemical analysis, the silver contains some lead, but no gold, copper, mercury, tin, or zinc.

Two rings of the same shape in Berlin bear respectively the names of Amenhotep III and his consort Tiy,[94] therefore were made around 1400 B.C. But the form had a long history, for Mr. Newberry has published[95] a similar-shaped ring inscribed with the name of the king Psamtik II (593-588 B.C.) of the Twenty-sixth Dynasty.

For a discussion of the design on the bezel, see the preceding number.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 968; edition 1915, No. 964.

No. 33 (Plates IX, a, b, X, c-e). Signet ring.

Gold. Probably Twenty-sixth Dynasty, 663-525 B.C. From Sakkara. Weight, 133.29 grains (8.637 grams).

The shank of the ring has several indentations.

The ring was cast in one piece. There is a blistered look on the inside of the shank and the design was crudely chased in; altogether the ring is an inferior piece technically. By microchemical analysis, silver was found in the alloy, but no copper, mercury, tin, lead, or zinc. The specific gravity of the ring is 13.627, and the carat of the gold, then, is about 12.0. On the color of the gold, deep yellow, with a film of red to black discoloration, see page 31.

The finger ring with bezel in the form of two cartouches, each surmounted by a pair of ostrich plumes with drooping tips, may be traced from about 1300 B. C.; a specimen of red jasper is in the collection of University College, London, containing in one cartouche the name of Seti I, in the other that of Ramses II.[96] About a century later, two similar rings of gold were made for the Tewosret treasure by soldering together separately cast rings, having the bezel in the form of a single cartouche;[97] in these the shank, consequently, is double, too; one of these rings has the name of Tewosret in both cartouches, but the other has a uraeus, hieroglyph for the word *goddess,* in the cartouches. Two gold rings of later date were found, a few years ago, at Memphis, in the excavations of the University of Pennsylvania; and we are permitted[98] to mention that one of them, M 4293, came from a level above that of the Nineteenth Dynasty but well below that of Greek times, and that the other, M 7052, was found in the stratum of Ahmose II (569-525 B. C.). The first-men-

[94] Schäfer, *op. cit.,* Pl. 13, Nos. 76, 77, both of electrum.

[95] *Scarabs,* Pl. I, No. III.

[96] Petrie, *Scarabs and Cylinders,* Pl. XL, 45.

[97] Davis' Excavations, *Siphtah,* p. 42, Nos. 23, 24, colored plate "Rings and Ornaments" = Vernier, *Bijoux,* II, Nos. 52264-5, Pl. XXVI. Such rings, but without plumes, from Tutenkhamon's tomb are now known.

[98] By the Director of the Expedition, Mr. Clarence T. Fisher, whom we have to thank for showing us these rings and so much of the other jewelry found by him at Memphis as is now in the University Museum, Philadelphia.

tioned ring has the cartouches filled with a group of hieroglyphs, possibly a name; in the second, the cartouches contain figures of a standing goddess, of which at least one seems clearly to represent the lioness-headed Sekhmet, consort of Ptah of Memphis, crowned with sun's disk, as in our piece. Indeed this second ring from the stratum of Ahmose II presents so close a parallel in design and quality to our No. 33, that we have little hesitation in assigning the latter, which was found in the necropolis of Memphis, to the Twenty-sixth Dynasty. Mention may be made of an unpublished and undated ring of this type in the New York Historical Society's collection, made of carnelian, with the triliteral sign *nfr,* often meaning *good, beautiful,* as the sole content of each cartouche.[99]

In the earlier rings, with names of known rulers of Egypt, we see the cartouche fulfilling its normal function of inclosing a royal name; one can imagine, too, a playful substitution of the word for *goddess,* in the place of the royal name. But in the later rings, we may question whether we have to do with the highly abbreviated names (or epithets?) of princelings, as yet unidentified, a Sakhmi and Neferi, or with the atrophy of the usual significance of the cartouche, which, now, perhaps, could inclose ornamental or amuletic devices, such as occur on other forms of seals. In confirmation of this latter view, Dr. Allen reminded us of the wooden toilette dishes in cartouche-form[100] which illustrate the breaking down of the usual significance of the cartouche.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 5. Abbott catalogue, editions 1853 ff., No. 1086; edition 1915, No. 1082.

No. 34 (Plates IX, a-c, X, d, e, XII, f, g, XIII, h, i; see also Plate XI, map). Signet ring of the priest of Isis of Khufu, Neferibre.

Gold. Twenty-sixth Dynasty, first half of the sixth century B. C. From Giza. Weight, 329.70 grains (21.364 grams).

POINTS OF INTEREST: The ring is uncommonly heavy and bears an unusually long and beautifully executed inscription on the bezel; the inscription includes some titles not yet understood. The ring's history is romantic, as the occurrence of the name of Khufu in the inscription resulted in its being considered popularly for many years the signet ring of that monarch, builder of the Great Pyramid of Giza.

The ring is in superb condition, showing only a little wear, which may be in large part modern.

The bezel and shank were separately cast and soldered together; the finish is careful, rendering almost all the solder invisible, even on close inspection.

[99] Bonomi catalogue, 1843, p. 33, No. 26. Abbott catal., editions 1853 ff., No. 967; ed. 1915, No. 963.

[100] One in the New York Historical Society's collections; Bonomi catalogue, 1843, p. 9, No. 24; Abbott catal., editions 1853 ff., No. 458; ed. 1915, No. 464.

The inscription on the bezel, whether originally, or by reason of wear, is slightly chamfered, a characteristic which aids in the making of a good impression. It is uniformly about 0.0197 inches (0.5 mm.) in depth. The most varied opinions have been expressed by practical workers in metal as to how it was produced and the photomicrographs of Plates XII and XIII are offered to enable readers interested in the technique to judge it for themselves. The view to which we incline is that the bezel was cast blank, the inscription then first chased lightly on the surface and afterwards sunk by gouging out the gold with a graver, and that the inner markings of the signs were added chiefly with small chasing tools. Evidence of the carving of the gold is best seen on the side walls of the signs, especially those which are curved, and, unfortunately, does not show in the photographs. The bills of the birds within the cartouche have the appearance of being made by the same punch, of which we see the impression, too, in the right-hand corner of two signs just to the right (the letter *t,* bounded above by a semi-circle, below by a straight line; Plate XIII, i). The two letters *n,* zigzag lines below at the extreme right, gave difficulty to the workman, as his tools must make such short impressions. An interesting question is whether any curved punch was used, for some curved markings within the sign picturing the sky (Plate XII, f, at top), if not engraved, suggest the use of such a tool, because they seem to have been made with one blow. On the contrary, markings in the lower part of the *nfr*-sign and heart-sign (Plate XIII, i, at left) indicate the repeated use of a straight liner to round the curves, in the manner we have already noted above (page 73) in the heart-scarab inscription chased in gold. A microchemical analysis revealed the presence of silver and the absence of copper, mercury, tin, lead, and zinc in the alloy. The specific gravity of the ring, 17.669, indicates a gold of 21.3 carat when alloyed only with silver,[101] and the color, a yellow slightly paler than that of fine gold, is right for this result. Strewn through the gold and visible on both bezel and shank are larger and smaller particles of a hard white metal. One such particle shows in Plate IX c and Plate XIII i, just before the body of the upper bird (the letter *w*) in the cartouche.

Attention may be called to the smallness of the shank (Plate IX, b). Neferibre could hardly have worn his ring on the third finger of the left hand as did his near contemporary, Uzahor of Hawara.[102] Perhaps it would have fitted the little finger, or, possibly, the practice of wearing rings near the tips of the fingers, noted for a later age,[103] had already begun.

This ring, the best known of the objects published in the present volume, was one of the earlier acquisitions of Dr. Abbott, included in that first catalogue of his collection which was written in 1843 by the sculptor and antiquarian, Joseph Bonomi; a cut of the ring, one perpetuated in the later Abbott catalogue,

[101] The solder in the ring and the particles of white metal would to some extent offset each other in influence on the specific gravity and they form so slight a part of the heavy weight of the ring that the estimate of the carat of the gold cannot be much affected by their presence.

[102] Petrie, *Ten Years' Digging in Egypt, 1881-1891,* New York and Chicago, p. 94; *Kahun,* p. 20.

[103] Marshall, *Finger Rings,* pp. XXV, XXVII.

accompanied Bonomi's description. An impression from the ring was drawn by, or for, Prisse d'Avennes and first published by him in 1846. The ring has been reproduced frequently since,[104] but never photographically nor even in a wholly accurate line cut until the present time.

Lepsius gave 1841 as the year when the ring appeared on the market in Cairo. Prisse stated positively, in more than one place, that it was discovered in 1843. The sources are equally unsatisfactory as to the find-spot. Bonomi, writing in 1843, said that it was found at Giza "in a tomb near that excavation of Colonel Vise (sic) called Campbell's tomb" (see map, Plate XI). Wilkinson's statement, printed first in 1843, reads: "In the high plain between this (namely, 'Campbell's tomb') and the Great Pyramid are several pits, where sarcophagi are found, frequently of black basalt; one of which, with a lid in the form of the dwarf deity of Memphis, Ptah Sokari, is still lying on the ground above. Near this, is the pit where a gold ring, bearing the name of Suphis was found, which is now at Cairo, in the possession of Dr. Abbott." Lepsius' comment, recorded within the years 1843 to 1845 when he examined the ring in Cairo, was as follows: "The ring is said to have been found in the neighborhood of the Great Sphinx, according to others, however, at Sakkara." The exact find-spot will never be known, but some credence may be given to the various contemporary reports which put the tomb from which it came in the area between the Great Sphinx and "Campbell's Tomb" on the south and the Great Pyramid on the north.

Lepsius recounted, further, that the ring was offered first to Wilkinson, then to some Frenchmen, and finally was bought on the recommendation of Prisse d'Avennes by Dr. Abbott, who paid £20, instead of the £50(?) at first demanded. Prisse d'Avennes in 1846 reported [105] a less sober story, current in his day, that the Duc de Luynes, on a visit to Cairo, offered £450 for it! We must distinguish sharply between these early statements from good sources,[106] which are to be weighed for what they are worth, and the picturesque tales which were recounted later about the circumstances attending Dr. Abbott's acquisition of the ring. Two samples of these may interest some readers: The Rev. Buchan W. Wright, "Sometime Acting Chaplain at Cairo," wrote a tiny brochure entitled "The Royal Ring of an Ancient Pharaoh" (another ring) which was published, without date, by William Macintosh, 24 Paternoster Row, and opens thus: "Most antiquarians are conversant with the history of Dr. Abbott's celebrated Egyptian ring, which was a source of competitive demand between the museums of New York and London and ultimately fell to the former for a considerable sum of money. Dr. Abbott, one day, while riding in the outskirts of Cairo, met some Arabs returning from a search in

[104] See Bibliography, p. 105, also for the literature referred to in the following paragraphs.

[105] *Revue archéologique,* Vol. II (1846), p. 733, footnote.

[106] Professor Reisner has informed us that the ring is mentioned in the manuscript diary of a Scotch gentleman, Mr. Ogilvie, who frequented Egypt in the days of Lepsius, Wilkinson, and Prisse d'Avennes and he believes that it was once owned by Ogilvie. We hope that Professor Reisner will one day publish a note about the ring, giving the data from the Ogilvie diary, which he now owns.

the harvest field of tombs to the east of, and around, the Great Pyramid. One of them held up a gold ring of beautiful construction and massive solidity. What would he (the doctor) give for it? Its weight in gold, or more? Yes! Not a moment was lost in securing so valuable a relic. Could he believe his eyes? It had the oval of Cheops on it—the kingly and most scientific constructor of the world's greatest wonder," and so forth. A quite different story has been told in New York. The New York Historical Society possesses a paper dictated and signed by Henry Dexter in 1904 containing reminiscences of his journey in Egypt in 1867. At the time of the journey, so he tells, he talked with missionaries who had lived in Egypt since Dr. Abbott's day there and who described a scene in a public room in Cairo where an agent of Dr. Abbott and two Frenchmen, collectors for a Paris Museum, were present when a native boy brought in this ring. The Frenchmen had the first chance to buy it, but failed to appreciate it and would not pay the £11 asked by the boy, who declared that his father would whip him if he returned with less, and when they were done bargaining, so the account runs, Dr. Abbott's agent took it for the £11 asked. This story was first put in writing in 1904[107] and depends on Mr. Dexter's memory of what was told him thirty-seven years earlier by people who were recounting what had happened about twenty-five years before the time of their narrative; obviously it is to be taken with some grains of salt!

It will be of interest to the members of the New York Historical Society to hear that the ring was exhibited at a stated meeting of the Society held in the chapel of the New York University in Washington Square on Tuesday evening, November 2, 1852. The entry in the minutes of the Society reads: "Frederic de Peyster, Esq., the Second Vice President, announced the presence of Dr. Abbott of Cairo and exhibited a curious and valuable relic belonging to that gentleman, viz., a ring of gold, weighing about three English sovereigns. It was found on the south side of the Great Pyramid of Cheops in the tomb of a high-priest," and so forth. This was soon after Dr. Abbott's arrival in America, before his collection was put on public exhibition in the old Stuyvesant Institute, and about eight years before the acquisition of his collection, including the ring, by the New York Historical Society.

One reason, although not the chief one, for the great reputation of the ring is its weight, much above that of most Egyptian rings. In this connection a passage written by Mr. Griffith in 1892[108] may be quoted: "Mr. Petrie points out that gold seal rings in Egypt are of fairly uniform weight, about 140 grains (9.072 grams), and may have been adjusted to a standard equal to the value of an ox; some heavy ones probably reach 210 grains. Accurate weighings might give interesting results." Thirty years later there are still few records available of the weights of Egyptian gold rings, but it will be seen that the rings of the present collection have a considerable range in weight, render-

[107] A highly colored version of it appeared in the *New York Daily Tribune* for November 20, 1904, based on an interview with Mr. Dexter, who was then in his 92nd year.

[108] *P. S. B. A.*, Vol. XV (1892-93), p. 308.

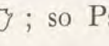
ing an attempt to connect them with any specific standard full of uncertainty and that the ring under consideration is a giant among them. Indeed its weight is exceeded, so far as we can learn, by only a few Egyptian gold rings,[109] chief among them the earlier specimen having a movable bezel inscribed with the name of Harmhab, to which reference has been made before (pages 87, 89); this altogether exceptional piece is possibly the heaviest gold ring which has come down from antiquity,[110] weighing, as it does, 1936.77 grains (125.50 grams).

According to Lepsius, Prisse d'Avennes was the first to read in the inscription the cartouche of Khufu (Cheops). Prisse always believed the ring to be the seal of some high official of Khufu and to date from his reign; the name Neferibre, following the cartouche, he took for some title or variant name of the king. But at once, popularly, the ring became Khufu's personal signet; for instance, we find Harriet Martineau, in 1847, after mentioning her wanderings after luncheon, to the east of the Great Pyramid, saying: "It was hereabouts that that precious ring was found which ought to be in the British Museum, but which remains in the hands of Dr. Abbott of Cairo—the gold ring of Cheops with his cartouche cut upon it." Only Lepsius, at the time, failed to believe the ring contemporary with Khufu, but its exceptional character led him astray and he doubted its genuineness, suggesting, however, its true date in the Twenty-sixth Dynasty, were it genuine! This early comment of Lepsius was not published until after Professor Petrie, in 1883, in a book on the Pyramids of Giza, had mentioned the ring as belonging to a late priest of Khufu; among scholars the ring has since been generally regarded as belonging to a priest of the Twenty-sixth Dynasty who served in the revived cult of the ancient Pharaoh Khufu. We shall now see whether this view is accurate.

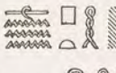
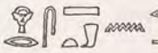
We have referred to the ring as one of unusual character. The shape, to be sure, is now well known as peculiar to the Twenty-sixth Dynasty, but the inscription on the bezel contains obscure passages. The inscription is written in vertical columns, beginning on the right, and consists of a series of titles preceding the name of the owner. A few of these are common titles, readily recognized; the others, however, are so difficult that we sent a photograph of the inscription to Professor Erman to inquire what light the Berlin Dictionary of the Egyptian language, which is not yet published, could throw on the text; and the New York Historical Society and the author of this catalogue are greatly indebted to Professor Erman for the data furnished. His comments are

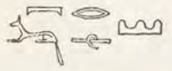
[109] Fabretti, Rossi, and Lanzone, *Antichità egizie*, Nos. 6525, wt., 845.70 grains (54.8 grams); 6526, wt., 368.83 grains (23.9 grams); 6527, wt., 464.52 grains (30.1 grams); 6528, wt., 452.17 grains (29.3 grams). Also above, p. 91, with n. 76. Winlock, *Bull. M. M. A.*, Vol. XVII (1922), p. 172, wt., 1129.65 grains (73.2 grams). In none of these records is the quality of the gold stated. There is no reason to suppose that the Egyptians, like the contemporary Ægean people who were farther away from the sources of gold, made a practice of covering bronze rings with gold (Seager, *Mochlos*, p. 91), but they were well aware of differences in the quality of gold alloys, as one of the Amarna letters (ed. Knudtzon, No. 3, ll. 11-16) gives evidence. In it the Babylonian king complains of the quality of the gold sent to him by his "brother" of Egypt as like silver, and speaks of having had it tested in the presence of the Egyptian king's messenger.

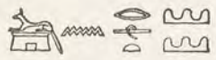
[110] Cf. Marshall, *Finger Rings*, p. XXVI.

so illuminating that we give them in full. First, we quote from a letter of August 8, 1920: "The ring is, of course, genuine and is a splendid piece; it has given us pleasure to become acquainted with it through the photograph. Eighty years ago when Lepsius passed judgment on it, people knew all too little about the minor arts of Egypt and the name of Cheops suggested an Old Kingdom piece, to which the style of the ring hardly seemed suitable. It is, rather, Saite, and belonged, as you also will probably have recognized, to a 'priest of Isis of Cheops,' that is, the Isis whose little temple abuts on the southern-most of the small pyramids next to Cheops' pyramid, a temple which, according to the stela of Mariette, Monuments divers, Plate 53,[111] was thought to go back to the time of Cheops.[112] Following your old catalogue the ring was found in a tomb near 'Campbell's tomb;' the priests of this small temple, then, were buried close to their sanctuary. The approximate period is given by the name  ; so Psammetich II (594-589 B. C.) was called and to a date in this time the orthography of the word Isis () is favorable. You will see on the inclosed sheets what we have been able to find out about the titles. These are titles of the late Memphite priests which are frequent on the stelæ from the Serapeum. It has given us pleasure to help you and we have also at the same time gained something for the Dictionary, for we had not yet recognized the title  as such and the  of your ring had been wrongly read, following the text of Lepsius' Denkmäler." Professor Erman's notes on the titles follow, taking them in the order of their occurrence on the ring:

 *yt nṯr, God's father,* the well-known priestly title with which the late Memphite priests commonly begin their titularies.[113]

 We are acquainted with this incomprehensible title only on the Memphite tombstone, Florence 1640 (Schiaparelli's catalogue),[114] from the time of Necho. It occurs there as  , as  (*śṯ nn of Ptah?*), and as  . The man who bears it is also a  .

 *ḥry śšt3 n R3-śṯ3, Initiate (?) of Giza.* Very frequent with these priests, for example:

 Louvre, Apis stela 333 (Twenty-sixth Dynasty).

 British Museum 134; Turin 2201.

[111] *Monuments divers recueillis en Egypte et en Nubie,* Paris, 1872-1889. For a transl. and discussion of this stela and further bibliography, see Breasted, *Records,* I, §§ 177-80.

[112] See our map, Pl. XI.

[113] On this title see, now, Blackman, article "Priest, Priesthood (Egyptian)," VII, 1, in Hastings, *Encycl. of Rel. and Ethics,* Vol. X.

[114] Ernesto Schiaparelli, *Museo Archeologico di Firenze. Antichità egizie,* Rome, 1887.

 Louvre, Apis stela 250.

 Louvre, Apis stela 247 (Twenty-sixth Dynasty); similar, *ib.* 344, etc. Vienna 157, (Wreszinski, Aegyptische Inschriften aus dem K. K. Hofmuseum in Wien, Leipsic, 1906, page 94, Pl. II) a tombstone, perhaps Ptolemaic, of a  is interesting; his ancestor, five generations back, had the same title and likewise was named  . This ancestor could, perhaps, be the of your ring.

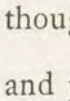
 [115] This unreadable title, also, is frequent with the late Memphite priests:

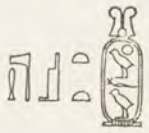
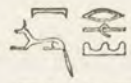
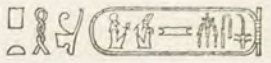
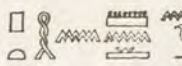
 Louvre, Apis stela 367.

 Musee Guimet (without number).

 Louvre, Apis stela 295 (belonging here?).

 Louvre, Apis stelae, 380, 323 (Darius).

Also Louvre, Apis stela 327, where we have  ; we therefore thought that this *ḳCḥ* could be the reading, yet  often occurs alone and presumably  and  are two different titles.

 surely to be read *ḥm-nṯr sś.t* [*nt*] *Ḫwfw, Priest of Isis of Cheops;* the is unwritten, just as it is unwritten in  and as often in titles and fixed formulæ. Compare also the  and  , *Ptah of Ramses* and *Ptah of Menes(?)*, Ä.Z., Vol. 30 (1892), page 44.

[115] It is tempting to regard the title as having reference to that moment in the cultus ceremonies when the priest, standing before the god's statue, elevated an offering in his hands. The object between the arms on our ring appears to be a *menat.* Among Professor Erman's parallels we recognize the wine jar (Apis stela 295) and the bowl of burning incense (Apis stela 327). Most frequent of all objects depicted between the arms as a late title is the Horus eye, a combination which Alexandre Moret, *Sarcophages de l'époque bubastite à l'époque saïte* (Cairo *Catal.*), Cairo, 1913, Index, renders "porteur de l'ouza (offrandes)." We should like to believe that these late titles are all connected, or are variant writings of one title, in which the arms form the phonetic sign and the offering is pictorial, varying within the range of objects customarily presented to a god. It has been impossible for us to pursue the question further, because we have not had unlimited access to late inscriptions, in the original or in squeezes, necessary to such an investigation. Of course no certainty can be reached unless variant writings are one day found giving the phonetic values of the several groups.

 is found frequently alone as a personal name. Compare the passages cited in Lieblein, Dictionnaire de noms hiéroglyphiques, II, Leipsic, 1892, page 1087 and the two instances of  mentioned above.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 31, No. 2. Abbott catalogue, edition 1853, printed by Varey, No. 1051; edition 1853, printed by Watson, and thereafter, No. 1050; edition 1915, No. 1046. Prisse d'Avennes, Revue archéologique, Vol. II, 2 (1846), pp. 732-3; Monuments égyptiens, Plate XLVII, 4. Lepsius, Denkmäler, Text, Vol. I, pp. 9-10, No. 16. C. W. King, The Handbook of Engraved Gems, London, 1866, pp. 374, 387, plate opposite p. 7, at bottom. Newberry, Scarabs, p. 95, Fig. 114. Mentioned: Wilkinson, Modern Egypt and Thebes, London, 1843, Vol. I, p. 357; Handbook for Travellers in Egypt, London, 1858, p. 181. C. C. Felton in Proceedings of the American Academy of Arts and Sciences, Boston, Vol. III, p. 372, in an account of a paper "Menander in New York," read March 10, 1857. Petrie, The Pyramids and Temples of Ghizeh, London, 1883, p. 139; History, I, 6th edition, p. 42. Wiedemann, Ägyptische Geschichte, I, p. 185. Gauthier, Livre des rois, I, p. 356. The ring has found a place in books on finger rings: Charles Edwards, The History and Poetry of Finger-Rings, New York, 1855, pp. 149-151. William Jones, Finger-Ring Lore, Historical, Legendary, Anecdotal,[116] London, 1877, pp. 11-12. George F. Kunz, Rings for the Finger, Philadelphia and London, 1917, p. 118. Its fame is also reflected in non-technical literature and the following references are selected from many: Harriet Martineau, Eastern Life, Present and Past,[117] Philadelphia, 1848, p. 226, under February 9, 1847. Godey's Lady's Book and Magazine, Philadelphia, Vol. LII (January to June, 1856), p. 108.[118]

Nos. 35-37 (Plate IX). Unfinished signet rings.

Silver. Probably Twenty-sixth Dynasty, 663-525 B. C. Found in Lower Egypt. Weight of each, when finished, would have been around 138 grains (8.942 grams).[119]

No. 35 was found by us with shank and bezel united by modern soft solder, which has since been removed to render evident the construction of the ring; the shank of the ring parted, probably because of an ancient flaw, and a joint under the modern mount is now held by a pin of argentine embedded in soft solder. The solder uniting the two parts of No. 36 had given way and the ring has been resoldered with soft solder. No. 37 has its shank

[116] Our attention was kindly called to this reference by Mr. W. Gedney Beatty.
[117] This passage was brought to our notice through the kindness of Mrs. Schuyler Van Rensselaer.
[118] We owe this reference to the courtesy of Dr. T. George Allen.
[119] No. 36 with its modern solder now weighs 139 grains.

and bezel still crudely soldered together, as we found it. We conjecture that in the late forties or early fifties of the last century a native discovered the rings in parts and took them to the nearest village tinker who soldered this one with spelter and afterwards tried to cut out some of the superfluous spelter, leaving the crosswise marks of his knife on the silver; the job turned out so badly that the other rings were reserved for a treatment somewhat less crude.

The two parts of each ring were separately cast and intended to be united by solder (compare the technique of No. 34). The most plausible theory regarding these rings is that they belonged to a jeweler's stores and had never been finished.[120] It seems improbable that rings with large blank bezels would be worn [121] and the fact that there are three of them just alike is favorable to a provenience from a jeweler's workshop. The silver of No. 35 is proved by an analysis, which we owe to the kindness of Dr. Whitfield, to be high in gold, containing 10 per cent. of the precious metal to 90 per cent. of silver; the material analyzed was the drill chips, obtained from the interior of the shank in boring holes for the argentine pin mentioned above.

Rings of this shape have been associated with the Twenty-sixth Dynasty by the occurrence on them of names—Psamtik,[122] Neferibre [123]—borne also by kings of that dynasty. One was found on the island of Rhodes together with a scarab of Psamtik I.[124] No example is known of earlier date and although the shape, once introduced, may well have lasted into the Persian, or even Ptolemaic, period, we do not know that this was so.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 972, 974, and 973; edition 1915, Nos. 968, 970, 969.

No. 38 (Plates IX, a, X, b). Funerary ring.

Fine gold and copper or bronze. Twenty-sixth Dynasty, 663-525 B.C.(?). From Sakkara. Present weight, 22.10 grains (1.432 grams).

The outer gold surface of the shank has been broken open on one shoulder. The bezel was cut from sheet gold of the thickness 0.01 inches (0.254 mm.)

[120] Cf. Mr. Edgar's similar explanation (in Maspero, *Le Musée Egyptien,* II, p. 104) for a mass of silver bracelets, rings, an ingot of silver, etc. found at Tell Basta. Among those objects was one ring of signet form with blank bezel.

[121] For blankness and flatness of bezel, cf. the ring "of the late Greek or Roman period" composed of "a hard white metal" found by Mr. Petrie, and, following a suggestion of King, interpreted by him as a mirror-ring for the use of a dandy; Petrie, *Naukratis, Part I (1884-5),* (IIIrd Memoir. Eg. Expl. Fund), 2nd ed., London, 1888, p. 43, Pl. XX, 34.

[122] Hall, *Catal. of Scarabs,* I, No. 2736; Schäfer, *Goldschmiedearbeiten,* No. 86, Pl. 13. Cf. the silver ring with cartouche of Wahibre given in Petrie, *Scarabs and Cylinders,* Pl. LVIII, AB (shape of inscribed surface of bezel as here, but side view of ring not given).

[123] Besides our No. 34, see Schäfer, *op. cit.,* No. 85, Pl. 13.

[124] Marshall, *Jewellery,* p. 86.

by eye and is not a true square. It is soldered to the shank, which is of two materials, copper or bronze for the core and sheet gold for the thinner covering. There are longitudinal marks of burnishing on the shank, but no sure indication of a seam on its exterior. Because of the injury mentioned above, however, we were able to determine that the inner copper or bronze wire is solid and that the gold meets in an overlapping seam along the inside of the curve, a seam plainly visible within the gold tube. As determined by a practical experiment,[125] the shank could have been produced by drawing gold tubing, and after soldering or fusing together its seam, inserting into it a close-fitting copper wire and reducing the two wires together in the draw-plate, enough to unite the two metals, after which the compound wire would have been bent over a rod into ring form. Judged by its color, surface, and a microchemical analysis, which revealed no silver, copper, tin, or lead, the gold is of twenty-four carat quality, and its fineness no doubt facilitated the disappearance of the seam on the outside. The Leyden papyrus X gives as prescription 38 directions for gilding objects of copper, in particular, rings, by the use of lead. The intention was fraudulent and the prescription assures the reader that even a touchstone will not reveal the fraud! M. Berthelot, commenting[126] on the passage, referred to Pliny's statement[127] that under the Roman Empire the very slaves incased their iron rings with gold. The present ring was not gilded by the use of lead and its undecorated bezel of light weight marks it as unsuitable for wear in life but quite possibly it was passed off by the maker as having a shank of solid gold.

The ring is an imitation of rings of the type of Nos. 34 to 37, of a variety in which the bezel is square cornered instead of rounded.[128] That it does not reproduce the earlier type of ring exemplified in No. 26 is clear from the fact that the bezel is soldered down over the ends of the shank, which thus do not meet its edges.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 9. Abbott catalogue, editions 1853 ff., No. 1080; edition 1915, No. 1076.

(c) Finger Rings of the Roman Period

In this section are gathered the remaining finger rings of the Abbott collection, representing two late Classical types.

The motif in jewelry of a serpent encircling the finger or arm, once or several times, is known in Mediterranean lands from at least the seventh century B. C.[129] Sometimes the serpent is reproduced more or less literally, again it

[125] Made by Mr. Heins.

[126] *Coll. des anc. alchimistes grecs,* Vol. I, pp. 54, 58.

[127] *N. H.,* XXXIII, 6.

[128] As in the Berlin rings mentioned above in notes 122-3.

[129] For instance: Marshall, *Jewellery,* Nos. 1321, 1360-1, 1364-5, early Italian examples; Nos. 1601-2, archaic Greek. Myres, *Handbook. Cesnola Coll.,* p. 393, Nos. 3572-82, late 5th cent. B.C.

is conventionalized into a symmetrical design, in which a second head is substituted for the tail. Probably the motif did not originate in Egypt, since it has never been observed in jewelry of the earlier Pharaonic times, but its later popularity in the land may have been furthered by the tradition of the uraeus, or cobra, as an element of design in Egyptian art; when sufficiently detailed to render a judgment possible, the serpent bracelets and rings seem to represent the cobra. The earliest example from Egypt which we have noted is the splendid gold armlet in the form of a coiled serpent, from the temple treasure buried in the third century B. C. at Toukh el-Qarmous in the northeastern Delta.[130] A goodly number of pieces of later date have been found at Alexandria[131] and other Delta sites[132] and even as far south as Thebes;[133] four of the Abbott rings are said in the old records of the collection to come from Sakkara. The vogue of such jewelry in Egypt is shown further by representations of it on masks of the second century after Christ.[134] The rings Nos. 39 to 42 are all of one design in which the serpent is fairly literally rendered and encircles the finger but once.

The second late type of ring will be discussed under its one representative, No. 43.

No. 39 (Plate XIV). One-time finger ring.

Gold. First century after Christ(?). From Sakkara. Total length projected, 4.646 inches (11.8 cm.). Weight, 56.68 grains (3.673 grams).

Under a magnifying glass many fissures show, due to the strain on the gold when the former ring was forced into its present shape.

This figure of a serpent is of solid gold. The jeweler may have started his work with a stock cylindrical piece of less diameter than the width of the head, which he lengthened and tapered for the body by beating and which he flattened at the head end and supplemented by pieces soldered on above and below. The details are partly chased in, partly engraved. Behind the right eye is a speck of hard white metal. The color is only slightly less rich than that of fine gold.

On the design and date, see under No. 40.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1045; edition 1915, No. 1041.

[130] Vernier, *Bijoux,* I, Pl. XII, No. 52094; *Bijouterie,* Pl. IV, 5. C. C. Edgar in Maspero, *Le Musée Egyptien,* II, 2 (1906), p. 59, Pl. XXIII.

[131] Marshall, *Finger Rings,* Nos. 243, 246, 949, 950, 955.

[132] Petrie, *Ten Years' Digging,* p. 33, Fig. 19, from Tanis = Marshall, *Finger Rings,* No. 956(?); Vernier, *Bijoux,* I, No. 52114, from Sais; No. 52123, from the eastern Delta.

[133] Schäfer, *Goldschmiedearbeiten,* No. 154.

[134] Petrie, *Hawara,* Pl. IX, 3; Metropolitan Museum of Art, Access. No. 19.2.6, unpublished, and another, No. 11.155.5, *Handbook. Egyptian Rooms,* Fig. 61.

No. 40 (Plate XIV, a, b). Finger ring.

Fine gold. First century after Christ(?). From Sakkara. Total length projected, 3.5 inches (8.89 cm.). Present weight, 46.41 grains (3.007 grams).

The ring is in fair condition; it shows a few bruises and scratches and may have been forced into a somewhat larger oval than its original form, as in such rings the tail and head usually overlap slightly and the present piece is somewhat twisted.

The ring is hollow rather than of solid gold; the light weight and the flattening where the tail is bent would suggest this, but we were able to prove its hollowness by inserting some fine hairs with a total length of 33.25 inches (84.46 cm.) through a minute opening in the jaw. The only visible seams are on, or near, the head; the body is now to all appearances seamless tubing. Probably the serpent was formed of a strip of gold narrowing toward the tip of the tail, diamond-shaped at the head, and of uniform width for the greater part of its length; the body would have been converted into tubular form by inserting the small end of the strip into a draw-plate, and drawing it to leave only a flat projection at the opposite end, later to be supplemented by one or more pieces soldered on to make the head; the tail may have been closed by pressing the end of the strip over a tapering wire inserted through the body and afterwards removed. As an alternative possibility we may suggest that the entire piece except the head was worked into a groove. The longitudinal seam was fused or soldered. The color and surface feeling of the ring are those of fine gold and a microchemical analysis proved the absence of silver, copper, lead, and tin from the metal; to the high carat of its gold, then, may be attributed the fact that the seam could be burnished to invisibility in the plain part of the body. One of the seams at the neck parts slightly and shows under magnification a wall of gold at a slightly lower level; this is possibly due to a horizontal splitting of the gold, such as occasionally happens in beating out sheet gold, or more probably the seam was slightly burned just here and a piece of smaller tubing was inserted as a repair. The details on the top of the head and on the tail are chased in; some of the scales near, and on, the head are engraved. The final form was given by bending the piece around a rod.

Characteristic of rings and bracelets of this design is the waviness of the serpent tail and the omission of details of the scales from the greater part of the hoop; at the two extremities, in the better pieces, the scales are chased or engraved with considerable nicety. For two pairs of gold bracelets in the British Museum, which resemble this piece stylistically, a date in the first century after Christ has been suggested.[135] We do not know of any precisely dated parallel.

[135] Walter Dennison, *A Gold Treasure of the Late Roman Period* (University of Michigan Studies. Humanistic Series, Vol. XII; Studies in East Christian and Roman Art, Pt. II), New York, 1918, Nos. 24, 25, Plate XLVII; Marshall, *Jewellery*, Nos. 2780-1.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 28(?). Abbott catalogue, editions 1853 ff., No. 1049; edition 1915, No. 1045.

No. 41 (Plate XIV). Finger ring.

Gold. First century after Christ(?). Weight, 12.79 grains (0.829 grams).

This ring was made much as No. 40, but the lengthwise seam may be detected here and there, being less well finished. The color is about that of fine gold.

On the design and date, compare No. 40.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 39(?). Abbott catalogue, editions 1853 ff., No. 1068; edition 1915, No. 1064.

No. 42 (Plate XIV). Finger ring.

Gold. First century after Christ(?). From Sakkara. Present weight, 18.07 grains (1.171 grams).

The piece has been broken in two near the head and is now joined by a modern argentine pin and wax cement. The head and tail are both somewhat crushed.

The piece is fashioned of thin gold sheet, rolled over and soldered in an overlapping seam; the serpent jaw was soldered on of a separate piece. The work is crude and the scales are not indicated. The color is very close to that of fine gold.

Since the ring has the same general form as the preceding Nos. 39 to 41, it may well be contemporary with them.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1026; edition 1915, No. 1022.

No. 43 (Plate IX, a, b). Finger ring.

Gold, formerly with gem-stone or inset of glass. From Sakkara. Probably third century after Christ, or later. Weight without inset, 60.37 grains (3.912 grams).

The shank has been broken in two and then soldered together on one shoulder, probably in ancient times. The green glass inset shown in the plate at *a* is modern, probably not later than 1843, when the ring was included in the first catalogue of the collection;[136] the mottled look of the visible surface

[136] Unlike his contemporary, Clot Bey (Maspero, *Catal. du Musée Egyptien de Marseille,* Paris, 1889, preface), Dr. Abbott was not in the habit of repairing and restoring his antiquities. The presumption is strong that we found the ring in just the condition in which it came into his hands.

is due to impurities which sank to the bottom when the glass was cast. The form imitates a primitive way of faceting gem-stones [137] and was intended to be set with the pyramid downward, for the five other faces are well polished and clear from impurities; curiously, as placed in this Roman ring, it illustrated roughly that rare type of faceting found in ancient rings—one in which natural octahedral crystals [138] were set with a pyramid showing above the setting; these were imitated in antiquity in glass.[139]

The box-setting is made of a strip of sheet gold for the perimeter, soldered to a base; the upper edge is ragged as left by the chisel strokes; the solder, slightly paler than the gold, shows somewhat on the interior of the setting. The ripples in the shank appear to have been made in a die; the color is only very slightly paler than that of fine gold and the specific gravity is 13.332. The shank can hardly have a core of baser metal or the density would be lower; it cannot be of nearly fine gold throughout or the density would be higher and the gold softer. Possibly the core may be a gold tube or we may suppose the ring throughout to be composed of a gold alloy which has been given a surface of finer gold by being passed repeatedly through fire and pickled after each heating (see page 38), or by being submitted to some other kind of acid treatment.

The rough indication of date which we have given is based on parallels among the late Roman rings in the British Museum; some of these show the rippled shank,[140] others the rectangular box-setting [141] with ragged upper edge. The possibilities for the lost inset include: an engraved gem-stone, a plain stone of cabochon cut, or glass imitation of such a stone, and—though we believe it to be a more remote possibility—a glass imitation [142] of a faceted stone.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 32, No. 8. Abbott catalogue, editions 1853 ff., No. 1079; edition 1915, No. 1075.

[137] See Whitlock, "The Evolution of the Brilliant Cut Diamond" in *The Jewelers' Circular Weekly*, New York, Vol. LXXIV (1917), p. 115.

[138] Marshall, *Finger Rings*, Nos. 785, "pointed diamond in raised oblong setting"; 790, "two double pyramid-shaped (octahedral) diamonds set in the bezel." Cf. *Jewellery*, p. LIX, under "Diamond."

[139] Marshall, *Finger Rings*, No. 799, "an oblong gold setting containing a paste imitating sapphire, in the form of a double pyramid (octahedral)."

[140] Marshall, *op. cit.*, Nos. 863, 1652 among others; these rings have retained their ancient insets, a convex white glass paste and a nicolo intaglio.

[141] Marshall, *op. cit.*, Nos. 781, "an oblong garnet in a box-setting," and 794, with a "rectangular bezel containing a convex plasma."

[142] The setting is so large that we must assume a glass inset, if a faceted one.

D.—Earrings

Earrings[1] were not an early form of jewelry in Egypt. For more than sixteen centuries the people of the Nile Valley had been adorning their persons with bracelets, elaborate collars and necklaces, circlets for the head, and even rings for the fingers, before it occurred to them to pierce the ears and hang ornaments in them. Möller, in 1910, found no evidence for the wearing of earrings by Egyptians before the reign of Thutmose IV (1420-1411 B. C.), but excavations of the last years[2] have pushed back their earliest appearance in Egypt to the period of the Seventeenth and early Eighteenth Dynasties, about 1700 to 1500 B. C.; we have yet to learn whether they were confined to the latter part of this period or distributed through it.[3] At least by the beginning of the Eighteenth Dynasty (1580 B. C.) earrings had been introduced in court circles, for the *King's daughter* and *King's sister,* Meritamon, had her ears pierced.[4]

The comparatively late appearance of earrings in Egypt renders it probable that they were of foreign origin and many indications point to Asia as their home. Möller cited documentary evidence for their use in Babylonia about 2100 B. C. Earrings have been found at Tello[5] and at Bismya,[6] the ancient city of Adab; the last-mentioned site seems not to have been occupied after about 2600 B. C.[7] Professor Rostovtzeff refers to earrings, both plain hoops

[1] The most important discussions are the following: Möller in Schäfer, *Goldschmiedearbeiten,* pp. 54-65; Vernier, *Bull. de l'Inst. Franç.,* Vol. VIII (1911), pp. 15-41; earrings in Cairo: Vernier, *Bijoux,* II, Nos. 52323 ff. A number of types occurring also in Egypt are treated in: Karl Hadaczek, *Der Ohrschmuck der Griechen und Etrusker* (Abhandlung des Archäologisch-epigraphischen Seminars der Universität Wien, No. 14 = New Series, No. 1), Vienna, 1903. See, further, for late earrings: Marshall, *Jewellery,* and the authorities cited by him; Petrie, *Hawara,* pp. 19, 43-5, Pl. XI, including comments by Sir Cecil Smith; Ludwig Pollak, *Klassisch-antike Goldschmiedearbeiten im Besitze sr. Excellenz A. J. von Nelidow,* Leipsic, 1903.

[2] Ambrose Lansing, *Bull. M. M. A.,* Vol. XII (1917), Supplement for May, pp. 18, 20; for date, p. 10. A few earrings were found earlier by Lord Carnarvon in contemporary burials on the north side of the same great court of tomb 37 of his excavations at Thebes; *Five Years' Explorations,* pp. 80, 86, Pl. LXIX, 83. Earrings of our type (a) and others of coiled wire occurred in graves in Nubia, attributed by the excavator to the time of the Egyptian XVIIth Dyn.; C. M. Firth, *The Archæological Survey of Nubia. Report for 1908-1909,* Cairo, 1912, Vol. I, pp. 27, 61; Vol. II, Pl. 37, d.

[3] See also the earrings of the same type as those discovered by Lord Carnarvon (preceding note) from an intact burial which Petrie, perhaps rightly, attributed to the XVIIth Dyn., but Möller, in an addendum to his discussion of earrings, was inclined to place later, in the first half of the XVIIIth Dyn.; Petrie, *Qurneh,* pp. 9, 10, Pl. XXIX; Schäfer, *op. cit.,* p. 239.

[4] Smith, *Royal Mummies,* No. 61052. Dr. Smith quotes Maspero's opinion that the mummy is still older, one substituted for Meritamon's; he himself regards it as probably of Meritamon's time, if not her own mummy.

[5] *Nouvelles fouilles de Tello,* by the Commandant Gaston Cros, published with the collaboration of Léon Heuzey and F. Thureau-Dangin, Paris, 1910, p. 128 and F on p. 127.

[6] Edgar James Banks, *Bismya or the Lost City of Adab,* New York, 1912, pp. 312-14; in the accompanying half-tone, all details are blurred, but we have examined the originals, attributed by their excavator to the time of Sargon (about 2750 B.C.), which are now the property of the Oriental Institute of the University of Chicago and are numbered Haskell, A 330-31.

[7] So George A. Barton, *Archæology and the Bible,* Philadelphia, 1916, p. 47.

and other types, as occurring in southern Russia in graves of the Copper Age;[8] if he is right in placing his Copper Age in the third millennium B. C., these south Russian earrings are among the earliest extant specimens from the ancient world. But the best known and probably the most elaborate examples of early earrings from Asia are those of the Second city, Troy, dating, according to Dörpfeld's tentative estimate, from 2500 to 2000 B. C.,[9] although some later opinions[10] would equate the period of the Second city with the time of the Egyptian Twelfth Dynasty, 2000 B. C. and after, or would even place it later. In Cyprus, spiral ornaments, earrings or hair-rings, occur in the middle period (2000-1500 B. C.) of the Bronze Age, probably toward the end of it,[11] and the Cretan Cup Bearer of the Knossos fresco with his silver earring is of the period beginning about 1500, and ending about 1350, B. C. Resemblances have been traced between some of the earrings found at Troy and several types which eventually became prevalent in Egypt after earrings were introduced there.[12] But an even closer resemblance may be seen between one of the types from Troy[13] and specimens discovered at the Babylonian sites Tello and Bismya. Such all too meager data as are available seem to suggest the diffusion of earrings from some country in western Asia, possibly Babylonia, to Russia and the Hellespont on the north and northwest, to Egypt on the southwest, and into Ægean lands. Möller, however, and Professor Ranke following him,[14] thought the plain hoop to have been derived from the regions to the south of Egypt, and only the disk and pendant earrings to have come into Egypt from Asia; they did not mention the spirals of wire which together with plain[15] and elaborated[16] hoops are the earliest earrings occurring in the lower Nile Valley, that is, if we may safely claim the spirals as earrings.[17] Möller observed that the earliest known representations of hoop earrings are in the reliefs depicting Queen Hatshepsut's expedition to Punt, dating from about 1500 B. C. In these reliefs both the Hamitic inhabitants and the negroes of Punt are shown wearing large hoops in their ears,[18] and we have no proof of the wearing of earrings by these southern races earlier than the time of the Punt expedition, although, a priori, one would think it might have been even then a very ancient custom in their land. Möller was reluctant to believe that the Egyptians would adopt from uncivilized peoples the custom of wearing earrings and therefore assumed that they came to respect, and then

[8] *Iranians and Greeks,* p. 31; cf. pp. 19, 21, 30.

[9] *Troja and Ilion,* Vol. I, p. 31.

[10] Petrie, *Ancient Egypt,* 1915, p. 18; Curtis, *Memoirs. Am. Acad. in Rome,* I, p. 68.

[11] Myres, *Handbook. Cesnola Coll.,* p. 374.

[12] Hadaczek, *Ohrschmuck,* pp. 4-5; Möller in Schäfer, *op. cit.,* p. 59.

[13] Dörpfeld, *Troja und Ilion,* I, Pl. 43, V. Of the earrings from Bismya, Haskell, A 331; cf. above, n. 6.

[14] In Erman-Ranke, *Aegypten,* p. 254, n. 5.

[15] Such as our No. 44.

[16] Such as the earrings cited above in n. 3; represented also among the earrings from the court of Carnarvon's tomb 37 at Thebes.

[17] Some of them, at least, we believe were earrings, but a discussion of the question lies outside the scope of this catalogue. Cf., however, below, close of n. 20, and Hadaczek, *op. cit.,* p. 5.

[18] Naville, *Deir el Bahari,* III, Pl. LXXVI.

take over, this kind of ornament only after they saw it in use among people of a higher culture. But the disks and pendant earrings, so far as is now apparent, came into use in Egypt later than the early types mentioned above, and following Möller's hypothesis we should be forced to believe that the Egyptians were led to adopt earrings by seeing disks and pendants worn by their cultivated Asiatic neighbors, but that they turned to the southern barbarians for some or all of the models which they first imitated! Now that Professor Junker has shown [19] that, until the mid-Eighteenth Dynasty, the Egyptians had no contact with the negroes, who dwelt far away to the south, beyond the Fourth Cataract of the Nile, it is the more difficult to be certain that the peoples to the south of Egypt were the givers, rather than the recipients of the hoop earrings. We must await the results of excavations in the Near East to learn whether, or not, in early times the hoops were prevalent there also, as the Russian examples suggest, and whether the earlier pendant earrings of Asia were ever hung from hoops or were always provided with a hook to pass through the ear (compare Nos. 56, 57), as were those found at Troy. Thus far, the only one of the three earliest Egyptian types mentioned above of which actual examples have been found outside of Egypt and Nubia is the type composed of coiled wire, and these examples are generally of later date than the ones from the Nile Valley.[20]

In Egypt earrings were worn by both men and women, although somewhat more commonly by women. Even famous kings of the Eighteenth to Twentieth Dynasties had their ears pierced, as their mummies show.[21] Their formal portraits wearing archaic dress do not exhibit earrings, but statues showing them in the dress of their own day sometimes indicate pierced ears,[22] and probably many of them one time were provided with metal earrings,[23] as is known to have been the custom later in Greece with respect to statues of divinities. In Egypt, before a late period, representations of gods were only rarely given earrings,[24] but the gods were almost invariably conceived clad in a style of costume which long antedated the custom of wearing jewelry in the

[19] *J. E. A.*, Vol. VII (1921), pp. 121 ff., "The First Appearance of the Negroes in History," translated by Battiscombe Gunn, from *Das erste Auftreten der Neger in der Geschichte,* Vienna, 1920.

[20] We know too little of the form of the Russian hoops to claim them as of the type of the Egyptian earrings such as our No. 44; it would seem that related pieces are to be expected, if at all, nearer by than Russia. For examples of the spirals later than those from Cyprus mentioned above, p. 113, see Marshall, *Jewellery,* especially No. 1583 and the terra cotta figure (Fig. 46) from Cyprus showing a spiral earring in position in the ear.

[21] Möller, *loc. cit.,* Smith, *Royal Mummies,* Nos. 61,073 (cf. p. 27), Thutmose IV; 61,078, Ramses II; 61,079, Merneptah; 61081, Seti II; 61083, Ramses III.

[22] See: instances given by Möller, *loc. cit.;* the Turin statue of Ramses II, Von Bissing, *Denkmäler ägyptischer Sculptur,* Munich, 1911, text of Pls. 48-9, col. 2; the statue of Ramses IV, Georges Legrain, *Statues et statuettes de rois et de particuliers* (Cairo *Catal.*), Pt. 2, Cairo, 1909, No. 42151; also the unique manikin from the tomb of Tutenkhamon, and the well-known statue of the god Khons with the features of Tutenkhamon; Maspero, *Le Musée Egyptien,* Vol. II, Pt. I, Pls. I, II.

[23] The wooden head of Queen Tiy of the Berlin collection has preserved an earring of gold and lapis lazuli; Schäfer, *Goldschmiedearbeiten,* Fig. 49; Davis' Excavations, *The Tomb of Queen Tiyi,* London, 1910, Pl. XXXV.

[24] See Möller, *loc. cit.*

ears. The prince Pediese in the eighth century B. C. surrendered to the Ethiopian Piankhi, among other treasure: *Golden bracelets, necklaces, collars wrought with costly stones, amulets for every limb, chaplets for the head, rings for the ears, all the adornments of a king.*[25] Some persons wore two pairs of earrings at once; thus the mummy of the mother of Queen Tiy (about 1400 B. C.) has two holes in the lobe of each ear;[26] certain coffins in human semblance show two pairs of earrings in position[27] and Mr. Wainwright found two in place in the ear of a mummy.[28] A charming theme has been preserved in sculpture of the time of Amenhotep IV (about 1365 B. C.) in which the king is shown in the intimacy of the family circle bestowing earrings on one of his little daughters.[29]

In general, as time went on, in the period from 1500 to 1000 B.C., earrings became heavier and larger, and the ears were often grievously mistreated. When first discovered, a certain pair of earrings, large in diameter (1.97 inches, 5 cm.) and weighing each 1674.42 grains (108.5 grams), were declared to have been fastened only by thread to the wig or ears and not passed through the ears.[30] Perhaps some persons did tie on their earrings, but the evidence of mummies in which the lobes of the ears are enormously distended obliges us to conclude that there were extremists, devotees of fashion, in the later effete years of the New Kingdom who did not quail before the most barbarous mutilation.[31] We regard the disks of blue-glazed pottery often nearly two inches in diameter, which are contained in many collections, as earrings,[32] substitutes in cheaper material, for gold earrings. There is some reason to think that they are characteristic of the Twenty-second Dynasty (945-745 B. C.), a time when gold earrings had just attained to their largest size; some examples have holes in the edge which would have permitted hanging pendants to them.

The present collection includes only a few earrings (Nos. 44-50) which go back to the days of Egypt's magnificence; the largest number are of the Classical period, when the land was under the rule of Alexander's successors and the Romans. It is as yet uncertain to what extent the native population adopted Greek and Roman styles of jewelry. Funerary masks occasionally

[25] Piankhi stela, l. 112; text: Schäfer, *Urkunden der älteren Äthiopenkönige,* Pt. 1 (= Steindorff, *Urkunden,* Vol. III, Pt. 1), Leipsic, 1905, p. 44; translation: Breasted, *Records,* IV, § 876.

[26] Vernier, *Bull. de l'Inst. Franç.,* Vol. VIII, p. 18, Figs. 1, 2; Quibell, *Tomb of Yuaa,* Pls. LIX, LX; noted by Möller, *loc. cit.*

[27] Vernier, *op. cit.,* Pl. II; Schäfer, *Goldschmiedearbeiten,* Fig. 55. The coffins are several centuries later than the previously mentioned mummy, showing that the fashion was not ephemeral.

[28] G. A. Wainwright, *Balabish* (XXXVIIth Memoir. Eg. Expl. Society), London, 1920, p. 55, Pl. XIX, 2.

[29] Petrie, *Illahun,* Pl. XXIV, 10; Borchardt, *Mitteilungen der D. O. G.,* No. 57 (March, 1917), pp. 4-5.

[30] Vernier, *Bijoux,* II, p. 114; the condition of the burial as found left this point unsettled and the weight and size of the earrings were the basis of the opinion quoted above.

[31] In addition to the evidence given by Vernier, *Bull. de l'Inst. Franç.,* Vol. VIII, pp. 21-3 and *Bijoux,* II, p. 114, see: Smith, *Royal Mummies* Nos. 61,085, 61,088, 61,095; Daressy and Smith, *Annales du Service,* Vol. IV (1903), pp. 155, 160. But it should be made clear that throughout the centuries when earrings were worn, some mummies show no perforations in the ears, others only moderate-sized ones.

[32] This view was suggested to us long ago by Dr. Allen, but at the time we discussed the specimen in the Cleveland Museum, we could not bring ourselves to accept it; *J. E. A.,* Vol. V (1918), p. 170, No. 6. Cf. now: Allen, *Handbook,* pp. 87-8.

show a mixture of styles, as, in one case,[33] a pendant at the throat representing the triad Isis, Horus, and Nephthys, and earrings and bracelets such as one might see elsewhere in the Roman world; the deceased in these instances, to judge by their names, were often foreigners, but sometimes Egyptians. Professor Schäfer has remarked[34] on the scarcity of extant jewelry of Egyptian style from the first century after Christ, a scarcity which may point to the near extinction of the native styles and to an adoption of foreign models for earrings, as for many other kinds of jewelry.

(a) Earrings in the Form of a Heavy Hoop, Broken by a Slit

Earrings of this type, as we have seen, are among the earliest found in Egypt. The latest examples known to us are those of alabaster, carnelian, and glass, found by the Oxford Expedition at Napata in Nubia and dating from the Twenty-fifth Dynasty (712-663 B.C.); a gold earring discovered by Mr. Fisher at Memphis in a position intermediate between the stratum of Merneptah and that of Ahmose II is probably of about the ninth century B.C.[35] and is at present perhaps the latest known example of this class from Egypt.

Earrings of this form with hoop solid, made of red jasper, bone, and other materials, are more numerous than those of metal, and examples, to be catalogued later, are not wanting in the New York Historical Society's collections. The attempts to explain these objects as accessories of garments or as hair-rings have been refuted by Mr. Wainwright's discovery of specimens in position in the ears of a mummy.[36] These were passed through holes in the ear, but Möller demonstrated that some of the rings could be nipped on the lobe of the ear, and it is possible that both ways of wearing them were practised. The various earrings of this type differ greatly as to the ease with which they could be worn in the ear. Some, with a hoop of comparatively small, and approximately round, section and an interior opening of larger diameter, could readily be passed through a small perforation;[37] but such earrings as the two of metal catalogued below, if actually put through the ears,[38] were cruel things, for the hole in the ear must be as large as the section of the hoop and the lower border of the lobe below it no wider than the diameter of the central, circular, opening in the earring, and thin enough to go through the slit in the hoop. Some extant earrings in which the slit will not admit even a sheet of paper must, we believe, have been only funerary pieces, deposited with, but not put on, the mummy.

[33] Petrie, *Hawara,* p. 16, § 25, Pl. IX, 3.

[34] *Goldschmiedearbeiten,* p. 100.

[35] M 5570; see p. 97, n. 98.

[36] First announced, *J. E. A.,* Vol. II (1915), p. 203, (this reference we owe to Dr. Allen); now, see, more in detail, the reference given above, n. 28.

[37] MacIver and Mace, *El Amrah and Abydos,* Pl. XLIX, D 6; G. A. Wainwright, *op. cit.,* Pls. XX, XXI. These, we take it, are about the kind worn by the negroes. Cf. those pictured in the ears of the princes, sons of Thutmose IV; Schäfer, *op. cit.,* Fig. 36, after Lepsius, *Denkmäler,* III, 69 a.

[38] Cf. Vernier, *Bull. de l'Inst. Franç.,* Vol. VIII (1911), p. 24.

No. 44 (Plate XV, a, b). Earring.

Electrum. Eighteenth or Nineteenth Dynasty, 1580-1205 B.C.(?). Weight, 26.88 grains (1.742 grams).

Except for a few dents and scratches, the preservation is perfect.

Probably the earring was made in two halves, each produced by working sheet metal into a die of the required section; the two parts were then soldered together; on the inner ridge an overlapping seam was left with jagged edge, but on the exterior, the seam was very carefully polished and burnished until now it can scarcely be detected.[39] The open ends were closed with pieces of the electrum sheet, in one of which a hole was punched to allow the escape of the gases generated in soldering the joints. The material of this earring contains several particles of hard white metal.

BIBLIOGRAPHY: Abbott catalogue, edition 1915, p. 92, No. 288, from the Edwin Smith collection.

No. 45 (Plate XV, a-d). Earring.

Silver and pale gold. Probably mid-Eighteenth to Nineteenth Dynasty, 1500-1205 B.C. From Sakkara. Height, 0.709 inches (1.8 cm.). Present weight, 52.56 grains (3.406 grams).

POINTS OF INTEREST: This earring affords one of the earliest known examples of silver plated with gold. Considerable interest attaches to the difficult question of how the Egyptians succeeded in uniting the two metals.

When we first saw the piece, it appeared as in Plate XV, a and b; it was heavily incrusted and a part of the metal had been converted into silver chloride. As a result of careful cleaning with mineral oil and pure grain alcohol, it has become possible to judge what its original appearance was, but parts of the metal were too far gone to be saved (c, d, Plate XV). One considerable piece is now held by modern cement.

This earring certainly was made in two halves soldered together, for the outer seam is plainly visible. The gold skin is only 0.0006 inches (0.015 mm.) in thickness, by measurement with a micrometer caliper; none of the silver body metal was in condition to measure, but it is many times thicker. All persons of experience in working metals whom we have consulted have expressed the opinion that the two metals must have been united before the shaping of the earring was begun, but whether this could have been accomplished by

[39] Cf. Vernier, *Bijoux*, II, p. 119, Fig. 52. The late Mr. Richards of the Metropolitan Museum, who examined the piece, being unable to discover a seam on the outer ridge, made the interesting suggestion that the earring was produced from a strip of sheet bent into a ring and soldered together at the ends, then hammered first on one edge, then on the other, into a dapping block, until the edges were brought together, but Mr. Heins who tried out this method found that the material buckled on the inside of the curve and the edges could not be made to meet.

beating two ingots together with a stone, as M. Vernier suggested,[40] seems extremely uncertain. Mr. Heins tried with success fusing thin sheet gold and somewhat thicker sheet silver. The piece shows on the outside lines of burnishing running around, and, on the inner curves, lines running up and down. Through the kindness of Dr. Whitfield, we are able to give the results of an analysis of the two alloys used. The inner silver was found to contain a small amount of gold; the exact proportion, however, was not obtainable because of the presence of much silver chloride in the sample. The composition of the outer layer as determined is that of a gold of 17.0 carat, alloyed only with silver.[41]

We have noted four other instances of pairs of earrings similar in shape to this piece and probably made of plated silver. One pair in the Cairo Museum, which was the subject of M. Vernier's investigations, came from Sakkara and is undated. Two from Goshen are described as "silver-gilt"; again nothing very definite was established as to their date but the objects found with them suggest the late Eighteenth or Nineteenth Dynasty.[42] Still another pair from Riqqeh are of "silver, gold-plated" and are classed by the excavator among "types of Eighteenth Dynasty beads and hair-rings."[43] The shape is represented among the earrings in the Tewosret treasure[44] and is not included among the early specimens antedating 1500 B.C.

BIBLIOGRAPHY: Found by us with No. 2 of the present catalogue, but unnumbered.

(b) Earrings of the "Leech" or "Boat-Shaped" Types and Their Late Derivatives

These earrings resemble the preceding ones in the absence of a hook by which to hang them (compare under c) or of a catch to secure them when once placed in the ear. Again we have essentially a hoop of metal with an opening to permit inserting it in the pierced lobe of the ear. But the smaller size of the hoop in section and the attenuated end for insertion made this type of earring entirely easy to wear and it was, in its simple form, also a modest ornament, attracting little attention to itself.

[40] *Bull. de l'Inst. Franç.*, Vol. VIII, pp. 38-9 and *Bijoux*, II, pp. 130-31, Nos. 52372-3. Mr. Heins has called our attention to an article by Wilhelm Theobald on the art of the gold-beater, contained in *Kunst und Kunsthandwerk*, Vienna, Vol. XIV (1911), pp. 565 ff.; here the ancient scene interpreted by M. Vernier as the beating together of two ingots of metal is shown, on the evidence of the colors, probably to represent the beating of gold leaf.

[41] Weight as received . . . . . 0.00248 grams
" of gold found . . . . . 0.00176 " = 71.0 per cent.
" " silver " . . . . . 0.00072 " = 29.0 " "

[42] Petrie, *Hyksos and Israelite Cities*, pp. 37, 38, graves 1, 172; Pls. XXXVIII, XXXVII A, No. 26.

[43] Engelbach, *Riqqeh and Memphis VI*, p. 15, Pl. XI, above in group 2.

[44] Vernier, *Bijoux*, II, No. 52,331. The shape is represented in an undated earring of heavy sheet gold in the Field Museum, Chicago.

The earliest known examples from Egypt are dated by scarabs of Thutmose I and III and of Hatshepsut, found with them, to the mid-Eighteenth Dynasty, about 1500 B. C.[45] Others have been found in the tombs of the latter part of the Eighteenth Dynasty.[46] But the type lasted a long time; several examples have been found in a context that renders probable for them a date in the Twenty-second Dynasty (945-745 B. C.).[47] Perhaps the latest certainly dated examples from the Nile Valley are those discovered by Mr. Griffith at Napata, which are of the Twenty-fifth Dynasty (712-663 B. C.), but others from the Delta have been ascribed to the seventh century B. C.[48] The "leech" earring was widely disseminated in the ancient world. Specimens shaped as our Egyptian earrings Nos. 48 to 50 and dating from about 750 to 550 B. C. have been discovered on the island of Cyprus;[49] others of the eighth or seventh century B. C. have been found at Ephesus,[50] still others of the seventh or sixth century on Samos,[51] and of the fifth century in Babylonia.[52] Mr. Marshall gives as their lower limit the fourth century B. C.[53]

A variant shape, very frequent outside of Egypt,[54] is represented in No. 51; in this the earring is symmetrical, instead of properly leech-shaped, and the hoop runs out into two equally attenuated ends which cross just opposite its widest part. No. 51 also illustrates the addition of ornament below the widest part of the hoop,[55] converting the simple type into a more ornate jewel. A boat-shaped, symmetrical form which required the addition of wire or thread is illustrated in No. 52. The late earrings Nos. 53 to 55 have in common with the majority of the earlier forms only the overlapping attenuated ends of the hoop, as the latter is of comparatively small diameter and describes a large circle;[56] like No. 51 they are elaborated by ornament added below the hoop.

Nos. 46, 47 (Plates XV, 46 a, b, 47 a, XXXVIII, 47 b). Earrings, possibly a pair.

Gold with sand filling. Probably latter part of the Eighteenth Dynasty, 1500-1350 B. C. From Sakkara. Weight of each originally about 9.00 grains (0.583

[45] MacIver and Mace, *El Amrah and Abydos,* Pl. LIII, tombs D 102, D 116; from the latter tomb, two earrings are in Berlin; Schäfer, *Goldschmiedearbeiten,* No. 90.

[46] Peet, *Cem. of Abydos. II,* p. 83, Pl. XV, No. 14.

[47] Petrie, *Hyksos and Israelite Cities,* Pls. XVIII, XXXII; cf. XIX, labeled "XXII(?) Dyn."

[48] Petrie, *Tanis II, etc.,* Pl. VIII, No. 18 = Marshall, *Jewellery,* No. 1241, Pl. XIV.

[49] Myres, *op. cit.,* p. 383, Nos. 3240-43.

[50] D. G. Hogarth, *Excavations at Ephesus,* London, 1908, pp. 103-4, 149, Pls. VI, 43; XII, 20; XVIII, 9, 15, 16, 28. Cf. Marshall, *Jewellery,* Pls. IX, Nos. 927, 934, 941; X, No. 1051.

[51] J. Boehlau, *Aus ionischen und italischen Nekropolen,* Leipsic, 1898, Pl. XV, No. 13.

[52] *The Museum Journal* (Univ. of Pennsylvania), Vol. XIV (1923), p. 14.

[53] *Jewellery,* p. XXXIII.

[54] For instance, Marshall, *op. cit.,* Pl. III, No. 292.

[55] Cf., for Egypt, Petrie, *Roman Portraits and Memphis (IV)* (XXth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XVIIth Year), London, 1911, Pl. XXXI; for Cyprus, Myres, *op. cit.,* p. 381, Nos. 3171, 3178.

[56] Cf., however, in these particulars, the "Mycenaean" earrings in Marshall, *op. cit.,* Nos. 197, 373.

grams), of No. 46 after the loss of the greater part of its filling, 3.00 grains (0.194 grams).

Both pieces are much dented, and No. 46, when being cleaned, developed breaks in the gold through which much of the filling poured (*b* in Plate XV); the piece is now held together by modern cement.

These two earrings are of the same form curving down to a point at the lower extremity. Both show a seam along the outer ridge.[57] Lengthwise lines of burnishing characterize the exterior, and crosswise marks the inner, curve. The shaped piece of flat stock from which such earrings may be made was worked out experimentally by Mr. Heins and is indicated in our sampler, Plate XXXVIII, at 47 b. The gold used in these pieces is very thin, almost foil. M. Vernier has remarked on the Egyptian practice of increasing the apparent wealth of metal by filling a mere thin shell with "a composition, of which the agglutinative agent is no longer recognizable and only a blackish powder, escaping through the least fissure, remains."[58] Möller, describing[59] two similar earrings in the Berlin Museum, spoke of the filling as a "black, earthy mass." It is, therefore, of interest to determine that the filling of No. 46, which was kindly examined by Mr. Whitlock, is "a common association of sand, containing a variety of minerals, such as magnetite, garnet, crystallite, and quartz." Presumably, it was originally mixed with a binder.

Because of the marked stylistic resemblance of these earrings to the dated pieces in the Berlin Museum, and to others of the Eighteenth Dynasty, we regard them as probably early, of the period 1500 to 1350 B. C.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., under No. 1006; edition 1915, under No. 1002.

Nos. 48, 49 (Plate XV). Earrings, possibly a pair.

Gold, with a sandy filling. Latter part of Eighteenth Dynasty, 1500-1350 B. C., or later(?). From Sakkara. Present weight of No. 48, 10.60 grains (0.687 grams); weight of No. 49, 17.45 (1.131 grams).

No. 48 has lost a triangular piece of its gold shell, and some of its filling; it is considerably indented. No. 49 is in good condition, showing only a few dents.

No. 48 has a seam along the inner curve, also an overlapping seam on the outer curve, which is now open at the larger end and may be followed half way around, when, to all appearance, it stops; perhaps the original piece of thin gold sheet was cut in two only at the large end; this earring shows no marks of burnishing, but has a granular surface under magnification. No.

[57] Cf. in Schäfer, *Goldschmiedearbeiten*, under No. 90.

[58] *Bull. de l'Inst. Franç.*, Vol. VIII, p. 31; cf. p. 34.

[59] In Schäfer, *op. cit.*, under No. 90. Three earrings of this type, unpublished and undated, are in the Gold Room of the Field Museum, Chicago.

49 seems to have been constructed of one spoon-shaped piece of sheet gold, folded and filled with the seam along the outer curve. Burnishing lines are prominent, running parallel with the seam. The gold of No. 49 is strewn through with minute particles of a hard white metal.

As these earrings were listed in the old Abbott catalogue with our Nos. 46 and 47 under the same old number as also from Sakkara, there is some likelihood that they belong to the same find, yet, all the specimens certainly dated to the Eighteenth Dynasty, so far as we know, have the point below, as in Nos. 46 and 47, rather than the rounded outline of these pieces.

BIBLIOGRAPHY: See under Nos. 46, 47.

No. 50 (Plate XV). Earring.

Pale gold. Eighteenth Dynasty, or later, probably after 1400 B. C. Weight, 14.78 grains (0.958 grams).

The tip of the thinner end shows a fracture, but not much is lost. There are rifts in the gold on the inside of the curve due to an effort to straighten it somewhat, after its shape had been given.

This earring is cast solid.

We are without clues for dating it closely.[60]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1058; edition 1915, No. 1054.

No. 51 (Plate XV). Earring.

Gold. Second century B. C. to first century after Christ(?). From Sakkara. Weight, 57.79 grains (3.745 grams).

The hoop is somewhat dented, but otherwise the piece is in good condition.

The hoop is hollow and soldered without much skill along its inner curve. To form it, a tapering piece of sheet gold with its greatest width in the middle was worked into a groove of a semi-circular section diminishing from the middle toward the ends; the tooling caused the sheet metal to curl in two directions, for at the same time that the edges of the long piece approached each other, the tapering ends hooped up, giving it a curve almost of ring form. After the seam had been soldered, the piece was probably lightly hammered around a mandrel to perfect the ring form, by using an implement of wood or of some other material, not metal. The ornament soldered to the bottom of the hoop was made of a triangular plate of heavy sheet gold, to which three other triangular plates were soldered, forming a hollow pyramid; the faces of the pyramid were then covered with granulated work. In all, 203 grains in

[60] An earring of somewhat similar form made of bronze was found at Gurob, therefore is of the period 1400-1200 B.C.; Petrie, *Illahun*, Pl. XXII, 15.

several sizes were used; the largest are the three grains on the apex, which have been flattened by hammer blows; next in size are those which define the three ridges of the pyramid, and the smallest cover each face; the quality of the grains is fair, although some show flattened areas, pits, or minor roughnesses.

Larger or smaller pyramids of granulated work were a frequent motif in Mediterranean jewelry from about the thirteenth century B. C.[61] down to Roman times.[62] At first they were made solid of larger grains piled one upon the other (compare No. 66); later, hollow pyramids of smaller grains resting against plates of gold, as in the present instance, were also produced.[63] Agreeing stylistically with our piece, and probably about contemporary with it, are the following examples.—(1) A gold granulated pyramid, from an earring, found at Daphnae;[64] this was cited by Hadaczek as of the seventh to sixth century B. C.,[65] presumably because of its find-spot, but the jewels from Daphnae were largely picked up by Bedouins, who scoured the vicinity and brought their finds to Professor Petrie's camp; several came from the "northern site" which reached down to the Roman Age; we regard the piece in question, which is figured on a plate labeled "Defenneh, etc. XXVIth to Roman," as probably one of the later jewels. (2) A pair of gold earrings, almost the duplicates of our piece, found by M. Jean Clédat in 1913, at Kasr Gheyt, an outpost of the Delta to the east;[66] the site seemed to the discoverer wholly Roman, perhaps of the first century after Christ, but the material for dating the objects found was unsatisfactory and cannot be regarded as conclusive. (3) Four earrings in the Cairo Museum,[67] unfortunately of unknown provenience and date, which have inverted pyramids of granulated work, in the style of the piece under consideration, although their hoops are larger and provided with a catch; those earrings can hardly be earlier than the latter part of the Ptolemaic period, inasmuch as the hoops of two of them are profusely ornamented with pearls, which were not in common use until about the first century B. C. or first century after Christ. Despite its earlier style of hoop, the present earring is probably not much earlier than the Cairo earrings, if it antedates them. We do not think these various related pieces are late Roman, for the granulated pyramids and the hoop of our earring are in the style of the older traditions in jewelry; we suggest tentatively that they were made within the period of the second century B. C. to the first century after Christ.

[61] Marshall, *Jewellery,* Nos. 470 ff., Pl. IV; Myres, *op. cit.,* Nos. 3136, 3166; Hadaczek, *Ohrschmuck,* pp. 16 ff., 27 ff.

[62] For examples attributed to the Roman period, two of them to the 2nd cent. after Christ, see Marshall, *op. cit.,* Nos. 2596-2601, Pl. LIV.

[63] So probably in some Sardinian and Cypriote earrings of the 7th or 6th cent. B.C.; Marshall, *op. cit.,* No. 1490, Pl. XXIII; Myres, *op. cit.,* p. 381, No. 3178; Hadaczek, *op. cit.,* Fig. 46, pp. 27-31; also as the terminal ornaments of spiral earrings of the 5th to 4th cent. B.C.; see Marshall, *op. cit.,* Nos. 1585-6, 1649-50, Pls. XXVI, XXX, and Hadaczek, *op. cit.,* Fig. 24.

[64] Petrie, *Tanis II, etc.,* pp. 76, 110, Pl. XLI, 13; Petrie, *Ten Years' Digging,* p. 62, Fig. 46.

[65] *Op. cit.,* pp. 17, n. 8; 18, n. 3.

[66] *Annales,* Vol. XII (1913), p. 160, tomb 2, Pl. III.

[67] Vernier, *Bijoux,* II, Nos. 52504-7, Pl. XXXVII.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 25. Abbott catalogue, editions 1853 ff., No. 1077; edition 1915, No. 1073.

No. 52 (Plate XV, a, b). Earring.

Gold, with a filling. Seventh century B. C., or later(?). From Sakkara. Weight, 57.93 grains (3.754 grams).

The piece is in excellent condition, having lost only the thread, or wire, by which it was suspended.

The gold shell is of one piece of thin sheet, cut wide in the middle and tapering toward the ends, which probably was shaped by being worked with a tool into a depression in hard wood or stone. The filling may be of a sandy or a plaster-like consistency, for none of it is visible and both kinds have been found in earrings of this type. The overlapping seam along the inside of the curve is presumably soldered, although no solder shows and the excess metal lies in folds, which have been somewhat ground down; an abutting seam would have required a nicer calculation of the shape of the original piece of flat stock than was usual in a jewel of this character; the two ends are perforated. M. Vernier was of the opinion that such earrings were tied on by threads, as he found no metal wire with any of the specimens in the Cairo Museum,[68] but one earring of the type, described by Theodor Schreiber,[69] had a wire soldered to it. The color is about that of fine gold.

This style of earring has been found chiefly at Memphis, both the simple form and that with a cylindrical ornament terminated by a conical or lenticular knob, added below the hoop.[70] The latter bears so strong a resemblance to earrings depicted on Assyrian monuments of the eighth and seventh centuries B. C.[71] that Assyrian influence and a date as early as the seventh century must be postulated for the earlier earrings of this type. But M. Vernier saw reason to believe that the type lasted into Roman times.[72]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1009; edition 1915, No. 1005.

Nos. 53, 54 (Plate XV). A pair of earrings.

Bronze, once gilded. Third to first century B.C., or later(?). From Sakkara. Present weight of No. 53, 22.33 grains (1.447 grams); of No. 54, 34.52 grains (2.237 grams).

[68] *Bull. de l'Inst. Franç.*, Vol. VIII, pp. 31-2.

[69] *Die alexandrinische Toreutik (Abhandlung der Königl. Sächsischen Gesellschaft der Wissenschaften,* Vol. XIV), Leipsic, 1894, p. 306, Fig. 33.

[70] Petrie, *Roman Portraits and Memphis (IV)*, p. 24, Pl. XXXI; a date about 700 B.C. is suggested by Petrie for this entire group of earrings, including also some of the simple hoops, symmetrical in form, but not so swollen as the present piece. See also Vernier, *Bijoux,* II, Nos. 52441-2, Pl. XXXIII.

[71] So, Perrot and Chipiez, *Histoire de l'art,* Vol. II, *Chaldée et Assyrie,* Paris, 1884, Figs. 308, 432-4.

[72] *Bijoux,* II, No. 52,370, Pl. XXXIII; but cf. Petrie, *Amulets,* Pl. XV, 129 k, where this particular variety is pronounced a bulla.

We found both pieces covered with an injurious green patina, in the midst of which many tiny particles of gold were held. It was necessary to sacrifice the gold in order to free the earrings from the "bronze disease."[73] Both pieces have lost the greater part of one side spiral and have holes in the terminal ball.

The hoops are hollow, made of strips of sheet bronze tapering toward the ends, which probably were coaxed into circular section and ring form after the manner described under No. 51; the lengthwise seams, however, apparently were not soldered. The ornament below the hoops consists, except for the terminal balls, of strips of thick sheet metal, three to an earring, of which the rectangular section renders easy the hammering and bending into curves; the hollow balls were pressed out of sheet metal in two halves in a die. All the parts of the ornament were soldered together and to the hoops; the solder, of a dark gray color, is prominently visible, now that the outer surface of gold has disappeared. We have no means of determining what the process of gilding was; it may, however, have been mechanical, that is, have consisted in applying gold leaf with a binder.

We are unable to find any dated parallel for these earrings.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 979-80; edition 1915, Nos. 975-6.

No. 55 (Plate XV). Earring.

Bronze, once gilded. Third to first century B.C., or later(?). From Sakkara. Present weight, 19.72 grains (1.278 grams).

Found in the same condition as the two preceding numbers; in like manner the remains of gold have almost entirely disappeared. The ornament which once dangled on the end of the chain is missing.

The hoop is like those of Nos. 53 and 54. The ring soldered to the bottom of the hoop and the three links may be of drawn tubing, as the split end of one of the links has this appearance. The links are bent into form, but not soldered. The good-sized lump of soft solder, dark blue-gray of color, at the lower end of the chain, indicates that the missing ornament was fairly large, with a depression into which the solder fitted. By microchemical analysis the solder was found to be pure tin.

Ornaments dangling from the ends of chains are known in Mediterranean jewelry from the Bronze Age down into the Roman period, and we have been unable to find clues for the exact dating of this piece.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 981; edition 1915, No. 977.

[73] Ancient Egyptian bronze objects are very frequently impregnated with salt (sodium chloride), and the progress of chemical action, by which the chlorine unites with the copper of the bronze, results, if not stayed, in the eventual destruction of the objects.

(c) Earrings with Hook for Insertion in the Ear

Among the earrings of the Second city, Troy, were many with a special pin or hook at the back for insertion in the ear.[74] This fashion of hanging the earring was unusual, if it occurred again, before about the fifth century B. C., after which it was common in earrings of the best Greek period and continued into the Roman period.[75] The hook is often masked by the ornamental part of the earring and it hangs free, without catch.

No. 56 (Plate XVI). Earring.

Gold and Oriental pearls.[76] First to third century after Christ(?). Present weight, 26.59 grains (1.723 grams).

One entire pendant and the greater part of the hook at the back are missing.

The main part of the earring was soldered together of numerous pieces of gold. The rosette was cut *à jour* from the obverse with a narrow-ended chisel so held as to produce a beveled edge; over its central opening on the reverse a convex piece of gold was soldered, and to this part, in turn, the hook by which the earring was suspended was soldered. This same piece of gold, concave to the front, formed a resting-place for a pearl held rather crudely on a narrow strip of gold, of which the left end was passed through one opening in the border of the rosette to the reverse and back through an adjacent opening, and the right end was passed through an opening and bent back over the outer edge of the rosette. Before inserting the bead a border was prepared for it consisting of a strip of gold bent into a circle, with ends meeting only on the inner circumference, with a pattern of cross lines punched in the upper surface, and with the lower surface soldered to the rosette. In this earring one coil of each of the two horizontal spirals is filled with solder (compare No. 57). The pendants, which play in rings soldered at the back to the spirals, consist of hammered wire of uneven section twisted at the ends to hold the pearls.

This earring shows a kinship in design to the "bar" earrings represented in portraits from the Fayum, and prevailing there, according to Professor Petrie's estimate,[77] about 200 to 250 after Christ; Mr. Edgar, however, pointed out again,[78] following Schreiber,[79] that "bar" earrings were found at Pompeii, showing that the type was known in the first century after Christ. Our speci-

[74] Götze in Dörpfeld, *Troja und Ilion,* Vol. I, pp. 358-9, Pl. 44, I; Hadaczek, *op. cit.,* Fig. 1.

[75] Myres, *op. cit.,* pp. 395, 399.

[76] Kindly identified by Dr. Kunz.

[77] *Hawara,* p. 19, Pl. XI. Cf. Edgar, *Græco-Egyptian Coffins, Masks and Portraits* (Cairo *Catal.*), Cairo, 1905, No. 33,222, Pl. XXXIV, dated p. XIV, on the basis of the style of hair, to the time of Trajan or Hadrian.

[78] *The Journal of Hellenic Studies,* London, Vol. XXV (1905), p. 230.

[79] *Toreutik,* p. 305, Fig. 31.

men has two horizontal spirals instead of a straight bar, but the three pendants with terminal bead are characteristic of the class. Similar rosettes, with bead carried on a wire, occur in a necklace in the Metropolitan Museum of Art, said to have been found at Nazareth in Palestine in a tomb of the early Imperial period.[80] The same inelegant way of threading the pearl and spirals taking the place of a straight bar are found in Roman jewels in the British Museum, which, however, are without accompanying information to determine their exact date.[81] A piece from Egypt in the Royal Ontario Museum of Archæology, as yet unpublished, although undated, deserves mention as closely related to the earring under discussion; the pattern of the rosette and the manner of fastening the pearl in its center are as in our piece, but it has only a single pendant with pearl, and the pendant is attached directly to the rosette.

BIBLIOGRAPHY: Abbott catalogue, editions 1854 ff., No. 1112; edition 1915, No. 1108.

No. 57 (Plates XVI, a, XIX, b). Fragmentary earring.

Gold and originally one or more other materials. First to third century after Christ(?). Present weight, 27.01 grains (1.750 grams).

A part of the gold of the middle pendant is missing and beads of some readily breakable material (glass? pearls? compare No. 56) are lacking from all the pendants. The wire twisted about the hook and caught in a loop just above the junction of the two main spirals once carried a bead or other ornament.

The earring is intricately soldered together of some seventeen pieces of beaten gold and seven grains, the latter not perfectly spherical. The solder, of which much is visible, especially filling the openings in the main spirals (compare No. 56) and appearing between and under the grains, is golden in color, surely having been submitted to some coloring process, if only the incidental one of repeated heating, in the course of soldering the parts of the earring together. The wire mentioned above is composed of two thick strips of gold twisted together, and hammered or rolled to unite them; it was not drawn, for its diameter is variable. The color is that of fine gold.

This earring and the preceding one have so many points of technique and design in common that they are probably contemporary. Attention may be called to the incurving spirals forming part of the side pendants. This motif is found frequently, although not exclusively, in Roman jewelry; for instance, it occurs in the gold beads of a Roman necklace in the collection of the Rhode Island School of Design.[82]

[80] *Bull. M. M. A.*, Vol. XVI (1921), p. 59, Fig. 1, E.

[81] Marshall, *Jewellery*, Nos. 2665, 2672-3, 2709, Pls. LV, LVI.

[82] See *Bulletin of the Rhode Island School of Design*, Providence, Vol. IX (1921), cut on p. 21, where the necklace is assigned to the 2nd cent. after Christ.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1063; edition 1915, No. 1059.

(d) Miscellaneous Styles of Earrings with Catch

Earrings with some manner of fastening came in very early,[83] but not until the later Ptolemaic period did they predominate. One of the earliest forms was that of the sliding knot[84] obtained by twining the attenuated overlapping ends of hoops of our class (b) about each other (Nos. 58-60, 62, 63). In bracelets the sliding knot was useful in permitting the expansion of the hoop to go over the hand but no advantage is apparent in being able to expand an earring. Again, in early times an attenuated end was sprung into a socket,[85] as in No. 64 below. Later,[86] a small hook to be fastened into an eyelet appeared (Nos. 65-7). Earrings of the point-and-socket form were readily put on and taken off; but the sliding knot could not endure much manipulation, as the wires would soon break in being twisted and untwisted, and even the hook form, if the point, after the earring was put on, were pressed down not to hurt the ear,[87] could not be opened and closed often. The majority of the earrings with catch, then, must have been worn continuously; compare the earrings of class (e) in this regard.

No. 58 (Plate XVI). Earring.

Gold and originally one other material. First to third century after Christ(?). Present weight, 4.82 grains (0.312 grams).

The hoop is somewhat crushed and the spiral of the pendant has been bent from its original form; a bead of some breakable material (glass?) is lost from the pendant (compare No. 57).

The hoop is hollow of the type of that of No. 51, except that its attenuated ends are twisted about each other. The pendant is made of two strips of gold hammered into curves and subsequently soldered together. The color is that of fine gold.

The pendant of the earring is similar in design to those of No. 57. An earring which, so far as one can judge from the only small cut of it avail-

[83] In Egypt, by the latter part of the XVIIIth Dyn.; MacIver and Mace, *El Amrah and Abydos*, p. 90, Pl. L, D 17.

[84] See preceding note and Myres, *op. cit.*, p. 378, a few of 1500-1200 B.C.; p. 380, Nos. 3161, 3164-5 of 1200-750 B.C.

[85] Not found early in Egypt, but included among earrings of the Second city, Troy; Hadaczek, *Ohrschmuck*, pp. 5-6, Figs. 3-4. Also among earrings from Ephesus of about the 8th cent. B.C.; Marshall, *Jewellery*, Nos. 942, 944, 946, Pl. IX, a variety of boat-shaped earring, etc.

[86] The hook-and-eyelet fastening is found in Egyptian jewelry at least as early as about 1600 B.C.; see above, p. 61, n. 60. In earrings, we have noted it first in some of the earlier specimens of our class (e).

[87] Cf. on this matter, Vernier, *Bull. de l'Inst. Franç.*, Vol. VIII, pp. 36-7.

able,[88] is much like our piece, was found by Mr. Edgar at Abu Billou in association with coins buried about A. D. 268.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1069; edition 1915, No. 1065.

Nos. 59, 60 (Plate XVI). Earrings, possibly a pair.

Gold and glass. First to fourth century after Christ(?). Weight of No. 59, 12.84 grains (0.832 grams); of No. 60, 12.41 grains (0.804 grams).

In both earrings the fluted tubing of the pendants is somewhat crushed and the artificial pearls have deteriorated. The loops by which the pendants are suspended are nearly worn through, proving use before they were buried.

On the process of making the artificial pearls, see page 44. The hoops are of the type of that of the preceding number, but better finished; the seam of No. 59 is on one side, that of No. 60 along the inner curve. The loops from which the pendants hang are probably solid, made of narrow strips of thick sheet, giving a square or nearly square section, which have been twisted singly.[89] To the loops are soldered by one end wires hammered from folded-over strips of gold which hold imitation pearls by their lower coiled ends. The junctions of the loops and pendant wire are masked by strips of gold which have been fluted horizontally by pressure in a die,[90] or by the tooling of their surfaces, and are soldered in an overlapping seam. Although the two earrings are so much alike, a difference in the fluted stock from which the tubes on the pendants are made and a difference between the artificial pearls (compare page 44) renders it uncertain whether or not they formed a pair. The color of the metal is that of fine gold.

An earring of this type was found at Shurafa,[91] about eight miles south of Helwan, in the cemetery of a Roman town which was not founded until shortly before the third century after Christ. Others came to light in abundance in Roman tombs, not precisely dated, at Gheyta, excavated in 1906.[92] A pair found by the Oxford Expedition to Nubia is of similar design, except that a kind of eyelet and hook respectively were formed of the attenuated ends of the hoop; these earrings are from Faras and of the Meroitic period, that is, roughly contemporary with the examples from Egypt mentioned above. The closest parallels to our pieces known to us are two earrings in Toronto, in the Royal Ontario Museum of Archæology, which have, however, the addition of one smaller blue glass bead above the pearl and another below it; the provenience and date of these pieces are unknown.

[88] *Annales,* Vol. VII (1906), p. 143.
[89] Cf. Maryon, *Metalwork,* Fig. 238, Nos. 1, 2.
[90] Cf. Vernier, *Bijoux,* II, Fig. 65.
[91] Petrie and Ernest Mackay, *Heliopolis, Kafr Ammar and Shurafa* (XXIVth Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XVIIIth Year, 1912), London, 1915, p. 45, Pl. LII, 6; on date of town, p. 40.
[92] Petrie, *Hyksos and Israelite Cities,* Pl. XL, especially 475.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 36(?), said to be from Sakkara. Abbott catalogue, editions 1853 ff., Nos. 1056-7; edition 1915, Nos. 1052-3.

No. 61 (Plate XVI). Funerary earring.

Gold and glass. First to fourth century after Christ(?). Weight, 7.08 grains (0.459 grams).

A few dents are the only injuries to the piece.

The hoop is hollow and is quite a perfect bit of work, with its well-finished seam barely visible along the inner curve; its section, that of a rectangle of which the corners have been rounded off, may well have been produced in a groove of corresponding half-section (compare way of making hoop of No. 51), as it looks too regular to have been the result of the collapsing of a tube in bending. To the hoop is soldered a strip of gold twisted at the bottom to hold the bead and having a horizontally fluted tube above the bead, like those of Nos. 59 and 60. A boss, masking the union of the hoop and pendant, has the appearance of having been pressed in a die. The entire piece is rigid and the bend was probably in it from the beginning. With no provision for attachment to the ear, it is obviously only a funerary piece, imitating the style of Nos. 59 and 60. For the method of making the artificial pearls, see page 44. The color is about that of fine gold.

On its date, compare Nos. 59 and 60.[93]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1059; edition 1915, No. 1055.

Nos. 62, 63 (Plate XVI, a, b). A pair of earrings.

Silver, quartz, glass, and linen(?) thread. First to second century after Christ(?). From Sakkara. Present weight of No. 62, 42.53 grains (2.756 grams); of No. 63, 38.07 grains (2.467 grams).

Much of the thread on which the pendant beads were suspended is now replaced by modern string, but the knots at the bottom of each pendant are original. Parts of the metal slip knot of No. 63 are broken off.

The hoops are hollow; the seams wander somewhat but keep generally to the inside of the curve; see the suggestion as to the technical method made under No. 51. Both of the smaller beads are of red glass; the larger bead of No. 62 is of agate, that of No. 63 of an unclouded quartz. Mr. Lester H. Dewey, botanist in charge of fiber investigations, of the United States Department of Agriculture, was so kind as to examine the samples of the ancient

[93] Cf. the somewhat similar, but better, piece in Leyden: Leemans, *Monumens égyptiens,* II, Pl. XXXIV, No. 77.

string shown in Plate XVI between the two earrings and wrote as follows with respect to them:[94] "I am unable to identify this fiber with any degree of certainty. One of the most common fibers used by the ancient Egyptians was flax and in some respects this fiber appears to be flax, though it seems somewhat stiffer than fiber of recent origin. Statements have been made that the Egyptians used ramie,[95] but ramie fiber, as nearly as I have been able to determine, was unknown in Egypt, or anywhere outside of eastern China, until within the last three or four centuries."

These earrings perhaps may be considered variants of the "ball" earrings seen in masks and paintings of the first to second centuries after Christ.[96]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 982-3; edition 1915, Nos. 978-9.

No. 64 (Plate XVI). Earring.

Gold. Second to fourth century after Christ(?). Present weight, 16.36 grains (1.060 grams).

A spherical gold bead, to judge by the parallel cited below, is lost from each of the wires depending from the hoop.

The earring is of solid gold. It is not apparent just how the central swelling of the lower part of the hoop to a sharp vertical ridge was produced; possibly by fusing together two pieces of gold, each of which previously had been heated at one end, where consequently a ball of metal gathered and then was hammered down. The socket was separately soldered or fused on. The wires which once held the lost beads were hammered out of folded-over strips of sheet gold and may have been fused to the hoop in the same way suggested for the production of the ridge on the hoop, for they are larger at the top, merging into the curves of the hoop, thus giving an effect of organic growth, instead of looking stuck on! The ringlets on these wires are fused together each of sixteen grains in a double row; the grains vary in size and are not perfectly spherical. A few specks of hard white metal are contained in the gold, which is of the color of fine gold.

The earring is Roman, probably fairly late, inasmuch as this style of point and socket is imitated in certain earrings of the fifth to sixth centuries after Christ,[97] having so wide an opening that the point could not be sprung into the socket, even if the latter were not usually transformed into a solid

[94] With the reservation that he had not given any study to the changes which fibers may undergo in a long time.

[95] So W. W. Midgley in Petrie and Mackay, *Heliopolis, Kafr Ammar and Shurafa,* p. 50, § 90, Pl. LVIII, 1; sample of ramie claimed for the Predynastic period, before 3400 B.C.

[96] See Edgar in reference above, n. 78. Cf. Petrie, *Hawara,* Pl. XI, No. 7; *Antike Denkmaeler herausgegeben vom Kaiserlich Deutschen Archæologischen Institut,* Berlin, II, 2, 1893-94, Pl. 13.

[97] Dennison, *Gold Treasure,* Nos. 16, 17, 20, 21. Vernier, *Bijoux,* II, No. 52,511, Pl. XXXV.

ornamental ball. A close parallel exists in the Cairo collection,[98] differing only in having a slip knot instead of the point and socket; the Cairo earring is complete, having spherical gold beads above the twists and granulated ringlets between the beads and the hoop. Unfortunately nothing is known of its date or provenience.

BIBLIOGRAPHY: Prisse d'Avennes, Monuments égyptiens, Pl. XLVII, No. 7; Histoire de l'art, Atlas Vol. II, "Art industriel," Pl. 20, No. 22; neither illustration accurate. Abbott catalogue, editions 1853 ff., No. 1060; edition 1915, No. 1056.

No. 65 (Plate XVI). Earring.

Gold and glass. Second to fourth century after Christ(?). Greatest width of gold hoop, 0.276 inches (7 mm.). Weight, 43.87 grains (2.843 grams).

The gold hoop was skillfully beaten out from a small stock piece to render it wider and thinner in the center and thicker at the ends, which were then twisted respectively into a hook and an eyelet. Small rings of wire are soldered to the bottom of the hoop and carry two long wires, holding hexagonal emerald-green glass beads. These wires have a lengthwise seam, but too uneven a surface and variable a diameter to be drawn wires; presumably they were beaten out of a folded-over strip of sheet. Near one of the rings a strengthening piece of curvilinear outline is soldered on. The color of the metal is that of fine gold.

Hexagonal beads of stone and of glass occur in jewelry in the British Museum estimated to be of the second to third century after Christ and also in some very late Roman pieces.[99]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1061; edition 1915, No. 1057.

No. 66 (Plate XVI). Earring.

Gold and glass. First to third century after Christ(?). From Sakkara. Present weight, 11.00 grains (0.713 grams).

The surface of the artificial pearl, which may not have belonged originally with this earring, has deteriorated. The gold has been abused, having been ground or hammered, flattening the grains and the hoop itself.

The hoop is of solid gold originally beaten out as a straight piece with tapering ends which were fashioned into a hook and eyelet. After being annealed, it was hammered into ring form over a rod. Four grains were sol-

[98] Vernier, *op. cit.*, No. 52,552, Pl. XXIV.
[99] Marshall, *op. cit.*, Nos. 2705, 2720, 2730. Dennison, *op. cit.*, No. 11.

dered in a pyramid to the bottom of the hoop. On the way of making artificial pearls, see page 44.

As we have noted on page 122, inverted pyramids of grains were an early form of ornament in Mediterranean earrings. The hook and eyelet, however, are suggestive of a comparatively late date.[100]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1007; edition 1915, No. 1003.

No. 67 (Plate XVI). Earring.

Gold and an Oriental pearl. Second century B. C. to fourth century after Christ(?). Weight, 5.58 grains (0.362 grams).

The earring came into our hands with hoop broken in two; it is now cemented together.

The hoop is hollow and the soldered seam may be traced along the inner surface and far out on the attenuated ends which form the hook and eyelet; it was made as the hoop of No. 61. The pearl is carried on the wire-like end which forms the eyelet. The color of the metal is that of fine gold.

An earring very much like this one was found at Shurafa;[101] again a single small pearl occurs on the hoops of earrings found at Kasr Gheyt, which were provided each with a pendant,[102] as, indeed, may have been true of our piece originally.

BIBLIOGRAPHY: This earring was found by us unnumbered, lying with 58 of the present numbering. Is it possibly No. 37 on p. 34 of the Bonomi catalogue, said to be from Upper Egypt?

No. 68 (Plate XVI). Earring (?).

Gold, with a filling. First century B. C. to fourth century after Christ(?). Present weight, 12.27 grains (0.795 grams).

The hoop was made by pressing a strip of thin sheet gold into a groove (compare No. 61); before the seam was soldered the hollow was filled with a substance which is now of a dark to light red-brown color and like ashes in consistency. Despite this filling the hoop is now somewhat dented. On each side of the opening it is ornamented with two bosses of thin gold over a filling.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1067; edition 1915, No. 1063.

[100] Cf. Ernest A. Gardner, *Naukratis. Part II* (VIth Memoir. Eg. Expl. Fund), London, 1888, p. 87, Pl. XIX, 10 = Marshall, *op. cit.*, No. 2501, Pl. LIII.
[101] Petrie and Mackay, *op. cit.*, Pl. LII, 5.
[102] *Annales*, Vol. XII, p. 160, Pl. III, Nos. 3, 4.

No. 69 (Plate XVI, a; compare XXXVIII, b-f). Pendant of an earring.

Gold. Second to third century after Christ(?). From Sakkara. Weight, 38.58 grains (2.500 grams).

The pendant lacks a loop at the top by which to suspend it, probably because it is an unfinished piece. The chains which dangle from it may have lost some small beads of breakable material.

Probably the pendant was made about as follows: a piece of sheet gold was cut of a curvilinear form which when bent and soldered together along its ends made the conical main part of the pendant; this part was well finished at the bottom, but left ragged at the top. Eight holes, which show ragged edges beneath, were punched in from the obverse. As the decoration overlies the soldered seam, it must have been applied to the present curved surface. Lengths of fine wire, some 18 in all, were soldered or fused to the main piece, outlining the holes, the lower and upper edges, and the inner division lines of the pattern, the remainder of which was executed in grains; in all about 577 grains, varying considerably in size, were used. If the ancients possessed some gum comparable to the modern gum tragacanth in burning without leaving a residue, it may have been used to fasten the wires and grains temporarily; or a flux may have served to hold them until they could be permanently attached. The wires are to such an extent coated with a film of foreign matter which we were unable to eliminate that we can only partially determine their technique; some at least are similar to the wire of No. 57, shown at the left in Plate XIX, and in general they do not seem regular enough of diameter and surface to be drawn wires. The chains are of a kind called "loop in loop" by Mr. Petrie,[103] which had been much used in Mediterranean lands from time immemorial.[104] One way of constructing such chains of hollow wire is indicated in Plate XXXVIII, 69, b to f, but the wires of the links of this ancient piece are probably like those appliquéd to the main part; the lowest member of each chain, however, is a narrow strip of sheet, only slightly hammered, which is twisted at the upper end to hold it to the bottom link and also at the lower end to keep the beads from falling off; the gold beads are bent out of short strips of sheet gold along which a burnisher had been drawn to give a convex exterior; the edges are soldered together. The pendant is of good design, but not of the most delicate workmanship.

A pendant of the same conical shape with numerous small chains dangling from its lower edge, which is in the collection of the Rhode Island School of Design, is attached by a loop at its top to a hoop earring.[105] It is from Syria and is said to date from the second or third century after Christ.

[103] *Arts and Crafts*, p. 86.

[104] Petrie, *op. cit.*, Fig. 94 = Garstang, *Mahâsna and Bêt Khallâf* (VIIth Publ. Egypt. Res. Acc. VIIth Year, 1901), London, 1903, Pl. XXXVII; Seager, *Mochlos*, Figs. 20, 25, 43.

[105] *Bulletin* of the School, Vol. VII (1919), p. 9.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 40. Abbott catalogue, editions 1853 ff., No. 1003; edition 1915, No. 999.

(e) Earrings with Animal's Head [106]

This style of earring was widely spread in the Greek world during the fourth to first centuries B. C., and survived into the Roman period.[107] Examples have been found in southern Russia, in Asia Minor, on the islands Melos, Crete, Cyprus, Ithaca (Nos. 86-9), in Greece and Italy, as well as in Egypt. Professor Myres traces the course of its development from Italy in the late sixth century B. C., to Greece in the late fifth, and the island of Cyprus in the early fourth century. Although not of Egyptian origin, doubtless many pieces were made in Egypt and sold both in and out of the country. The type with the head of *Gazella dorcas,* L. (Nos. 70-74), an animal native to the Egyptian deserts and represented in Egyptian reliefs from the earliest times, may possibly have been an Egyptian specialty. The majority, if not all, of the known designs have been found in Egypt [108] on widely divergent sites—Zagazig and Tanis in the Delta, Sakkara and Abusir near modern Cairo, Abydos and Thebes in Upper Egypt—but it is impossible to say how many of these specimens were of home manufacture, how many imported.

Two principal types may be distinguished: (1) the greater part of the hoop is of coiled wires and tapers to a point which is caught either in the open mouth of the animal's head or in an eyelet soldered crosswise under its muzzle; a collar more or less richly decorated with gold grains and appliquéd wires masks the region where the coiled wires of the hoop are fastened and forms an artistic transition between the head and the main part of the hoop; (2) like type (1), except that instead of the ornamented collar, a varying number of beads of gold, stone, or glass, separated from one another by granulated ringlets, intervene between the animal's head and the greater part of the hoop, and frequently instead of ending in a point the hoop has a hook by which it is fastened into an eyelet set lengthwise or crosswise, according to the direction given the hook. The second is the later of the two types and eventually

[106] Hadaczek, *Ohrschmuck,* pp. 46-9, 75, citing all the older literature. Marshall, *Jewellery,* pp. XXXIV, 184, 285; Myres, *Handbook. Cesnola Coll.,* pp. 391-2.

[107] For basis of dating, see Marshall, *op, cit.,* Nos. 1728-9, 1784, found in association with silver drachms of Alexander the Great; Nos. 1838-9, with coins of Antoninus Pius. Further: *Archäologische Zeitung herausgegeben vom Archäologischen Institut des Deutschen Reichs,* Berlin, Vol. XLII for 1884, Pl. 7, Nos. 13 a, b, found in Asia Minor together with objects of obvious Hellenistic style; Petrie, *Tanis. Part I, 1883-4* (IInd Memoir. Eg. Expl. Fund), London, 1885, Pl. XII, 45, p. 34, bronze earring occurring in a house dated by coins to the close of the Ptolemaic period. See also representations on approximately datable objects, such as a bronze mirror cover of the 3rd cent. B.C., Marshall, *op. cit.,* Fig. 60; an Egyptian funerary mask of the 2nd cent. after Christ, Schäfer, *Goldschmiedearbeiten,* Fig. 79; mummy cases from Akhmin of the 1st or 2nd cent. after Christ, Edgar, *Græco-Egyptian Coffins,* pp. XVII-XVIII, Pls. XLIV, XLV.

[108] Vernier, *Bijoux,* II, Pl. XXXV, Nos. 52,512-13 (ram), 52,516-17 (horned lion), 52,519-20, 22-3, 26-7, 30-31 (gazelle), 52,524-5 (dolphin), 52,528-9 (bull). Schäfer, *op. cit.,* Nos. 148 (lion), 149 (dolphin), Pl. 19. Mace, *Murch Coll.,* Fig. 21 (horned lion).

nearly superseded the first. Variants from these principal types occurring in this collection will be sufficiently described below.

When worn, the top of the animal's head and the muzzle from above were presented to the spectator. M. Vernier was surely in error in supposing that the head was dragged down by its weight to a position directly under the lobe of the ear.[109] The smallest part of the hoop would tend to creep into the ear, bringing the animal's head near the lobe or at most half-way down, as numerous representations on Greek coins, sculpture in the round, and the like actually show it.[110] In our plates we have attempted to place the earrings, where practicable, in the position in which they were worn, although the bending of the hoops out of shape has rendered this in some instances difficult. It will be seen that the head is lowest in those designs in which something is placed in front of the animal muzzle (Plate XVIII, Nos. 88, 89).

No. 70 (Plates XVII, a, XXI, b, XXXVIII, c). Earring with gazelle's head.

Gold. Third to first century B. C. From Thebes. Weight, 28.40 grains (1.840 grams).

Except for the loosening of some of the wires toward the point of the hoop, the piece is in good condition.

The earring is of normal type (1) as described above. Its charming gazelle's head is more sculpturesque in character than those of the following numbers, having nuances and delicacies in the modeling which add to its interest. It was probably worked in repoussé from a piece of heavy sheet of about the shape shown in Plate XXXVIII at 70 c.[111] The details were added from the obverse; the eye sockets with round-ended punches, the other details with a graver. The ears were fashioned separately and soldered into holes punched in from the obverse; the eyelet was bent out of a strip of gold which had been tooled to render the surface to the outside convex. The horns appear to have been made of twisted strips (or tapering pieces?) of sheet, having the coils slightly telescoped into one another and soldered together before being bent into their characteristic compound curve; they were soldered into holes worked through from the reverse. The remainder of the ring was formed over an inner elongated cone; at the smaller end where now the coils have parted, seams are visible in the core indicating that it was composed of one or more pieces of twisted sheet gold which here were hammered compactly together; very likely its upper end may be more loosely

[109] *Bull. de l'Inst. Franç.*, Vol. VIII, p. 35, Fig. 55. Cf. Marshall, *op. cit.*, Fig. 61, p. 192.

[110] Marshall, *op. cit.*, Fig. 60, p. 184; Hadaczek, *op. cit.*, Fig. 87, p. 48; Schäfer, *op. cit.*, Fig. 79, p. 79. Cf. Miss Richter, *Bull. M. M. A.*, Vol. XVI (1921), p. 58.

[111] The actual head shows a well defined seam running lengthwise under the muzzle, but none is certain on top of it, and experiments carried out by Mr. Heins demonstrate that there was no need to make the head in two separate pieces and thus introduce the task of soldering in so prominent a situation as along its upper surface. Cf., however, No. 77.

formed like the corresponding parts of Nos. 86 and 87 (Plate XXIII, left). The outer coils, too, helped in producing the taper in the ring, as the single wires, of which the number seems to be five, diminish slightly in size and two drop out toward the point. These wires were made of strips of gold twisted singly; their coiling seams are visible near the head and in the two loose ends, but the majority of the coils have a homogeneous surface (compare page 43). At the upper end of the elongated cone the wires were soldered in place, then, lying side by side, were simultaneously coiled about the cone to cover it and toward the smaller end were soldered to it to prevent their uncoiling; the piece was then further shaped and the wires flattened toward the point by hammering or rolling between two smooth surfaces. The several parts of the earring were next soldered together. A small peculiarity of the present piece is a vertical strip of gold added over the seam between the eyelet and lower edge of the animal neck, perhaps because the edges did not meet properly; this strip, only about 0.059 inches (1.5 mm.) long by 0.02 inches (0.5 mm.) wide, is a typical bit of evidence for the delicacy of manipulation which went into the making of such ancient jewelry. But on this same piece, and also typical, we find evidence of casual work in shaping the collar, for, above, the edges gap slightly and below, they overlap; the workman was capable of the most minute work when he chose, but he did not always think it worth while to be so precise. The collar has a simple decoration of appliquéd wires: a plain area is bordered next the head by two wires, one plain, the other patterned, formed by twisting a strip of gold without inner support, thus securing prominent seams which have a decorative value; below, is the same border, and depending from it is a tongue pattern of the wire with decorative seams. Between the wires is a convexity of surface which gives a pleasing variety of light and shade; it may have been produced by chasing channels for the wires to lie in or by doming up the sheet from the back. Finally the piece, otherwise complete, was bent over a rod into ring form; it was desirable to leave this to the last not only for the greater convenience of working a straight length but that the spring imparted to the metal in bending should not be removed by subsequent heatings in soldering the parts together. The color is close to that of fine gold.

That gazelle's heads of sober style are really of the third to first century B. C., rather than of the late fifth or fourth century, is suggested by the occurrence of two in a tomb in Asia Minor, in association with objects of Hellenistic style.[112]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33 under No. 35(?). Abbott catalogue, editions 1853 ff., No. 1100; edition 1915, No. 1096.

[112] See reference above, n. 107.

No. 71 (Plates XVII, a, XXI, b). Earring with gazelle's head.

Gold. Third to first century B. C.(?). From Thebes. Weight, 30.86 grains (2.000 grams).

The method of making was as that of No. 70 except for minor variations: the horns are perhaps of solid gold as the markings are not spirals but complete circles, having the quality of a nick made by an angle of metal; the details on the head are chased in. It is impossible to see how many fine wires compose the coils of the hoop. The color is close to that of fine gold. Observable on the tongue pattern, on one coil of the left side, and on the right horn are specks of a hard white metal.

The design, too, is the same as that of the preceding number except for the formal element of a star-like rosette, instead of locks of hair, on the forehead.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, under No. 35(?). Abbott catalogue, editions 1853 ff., No. 1101; edition 1915, No. 1097.

Nos. 72, 73 (Plates XVII, a, XX, 72 b). Earrings with gazelle's head, perhaps a pair.

Gold. Third to first century B. C.(?). Weight of No. 72, 25.48 grains (1.651 grams); of No. 73, 28.10 grains (1.821 grams).

The patch of gold sheet which once covered a hole behind the left ear of No. 72 is now gone; No. 73 has a break in the left eye socket and the coils of wire on the ring are in part loosened at the point.

The technique of these pieces is in general similar to that of No. 70, but as the heads show no soldered seams, the shape of the initial pieces of sheet from which they were made is uncertain; their modeling is softer and the details are chased in. In the horns the coils are not telescoped, but just touch one another. We are unable to determine the number of the wires coiled on the hoop, but the spiral seams on the individual wires may be traced readily. In both earrings, toward the point of the hoop, where the coils of wire happen to be pushed apart, the core is seen to be made of folded-over pieces of sheet gold, and through the break in the head of No. 72, it is seen to extend into the animal neck.

The design is like that of No. 71.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, under No. 35(?). Abbott catalogue, editions 1853 ff., Nos. 1103-4; edition 1915, Nos. 1099-1100.

No. 74 (Plates XIV, b, XVII, a). Earring with gazelle's head.

Gold. Third to first century B. C.(?). Weight, 40.93 grains (2.652 grams).

The head has been crushed and broken open on the right side and underneath.

The technical process was about as that of No. 70. A seam shows under the muzzle of the head. The coiled wires, of which the number cannot be determined, diminish noticeably in diameter from the head toward the point and their seams are less prominent than those of Nos. 72 to 73; where the wires are parted, seams may be seen on the core, and this core does not extend into the head. On the collar the contrast in the border wires was obtained partly by varying the width of the twisted strips. With wide strips inconspicuous seams far apart were obtained giving to the unaided eye the effect of plain wires. The color is close to that of fine gold.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, under No. 35(?) (four earrings with gazelle's head were in the collection of 1843, five later; there is no identifying description of the individual pieces). Abbott catalogue, editions 1853 ff., No. 1053; edition 1915, No. 1049.

Nos. 75, 76 (Plates XVII, a, XX, 75 b). Earrings with lion's head, possibly a pair.

Gold. Fourth to third century B. C.(?). From Upper Egypt. Weight of No. 75, 21.02 grains (1.362 grams); of No. 76, 18.63 grains (1.207 grams).

The core within the coils of No. 75 is broken, that of No. 76 flattened in two places; the coiled wires of both pieces are somewhat disturbed.

Compare the description of the technique of No. 70. Here each head was soldered together under the muzzle in an overlapping seam and very few details were added from the obverse; instead, the modeling is quite soft and vague, such as might have been produced by pressing the sheet metal into a stone die, but the fact that the two heads are not precisely alike is in favor of the view that they were done in repoussé. The opening in the muzzle, like an open mouth, which served as a socket for the pointed end of the hoop was pushed in from the obverse with a tool of round section; No. 75 has two such holes, as the first one made was misplaced. The regular turns of the seams in the individual wires show clearly under the microscope. Where the core of No. 75 is broken and the outer coils have pulled apart leaving a gap, it is possible to see under the wires and note that they are approximately round in section and not half round, a fact which is consistent with the method by which we think they were made, that of twisting single strips of sheet gold (compare Plate XXXVII, E-G). No. 76 has the core broken close to the head and between the wires one can see the thin edges of overlapping pieces of sheet gold which constitute the core in this place. The ornament on the collars was executed as in No. 74, but the design differs slightly; two symmetrical spirals fill the space that in Nos. 70 to 74 was left plain, and only one wire borders it above and below.

Although not such good pieces, these earrings so much resemble stylistically the pair cited above, page 134 in note 107, as found with a silver drachm of

Alexander the Great, that they, too, are probably of the late fourth or early third century B. C.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 33(?). Abbott catalogue, edition 1853 ff., Nos. 1097-8; edition 1915, Nos. 1093-4.

No. 77 (Plates XVII, a, XXXVIII, b, c). Earring, with lion's head.

Gold. Late fourth or early third century B. C.(?). Weight, 29.63 grains (1.920 grams).

The sides of the head are somewhat crushed, the right eye socket is broken through, and the head has sprung partly away from the collar on the left side.

This beautiful piece with the intense expression in the lion's head characteristic of many heads of the Hellenistic period—whether of men or animals—differs markedly from the preceding earrings of this section. The head may have been made in two halves and, if so, perhaps in a die instead of by repoussé; its small scale and our inability to see the inner surface render a decision difficult; the seam is indubitable under the muzzle, less clear on top of the head, where, however, the appearance suggests a patch in the long axis which has been burnished down, disguising a seam. The details of the head are partly chased, partly engraved. The hoop has no core, but consists of four elongated cones soldered together at the large end, twisted, and then soldered at the small end. Each cone consists of a tapering piece of heavy sheet which has been pressed around a piece of metal of the desired conical shape and soldered; compare our sampler, Plate XXXVIII, 77 b, c. The seams are extremely well finished but may be detected here and there, especially toward the point. We do not think the slight hollows in the cones necessarily were filled with a composition as in another earring of this type [113] in which the material was doubtless thinner gold and in which the cones may be seen to have partially collapsed in bending. In our piece the cones were not flattened, but they became hard and inflexible under the double strain of being first twisted together and then bent over into a ring; in consequence the point cannot be brought into the socket of the mouth, and this earring would have had a tendency to slip out of the ear. The tongue pattern and its bordering wires on the collar were executed as in No. 70. The color is that of fine gold.

A number of close parallels may be cited but none of them is definitely dated.[114] From the artistic style, we should judge the piece to be early, rather than late, Ptolemaic.

[113] Schäfer, *op. cit.*, under No. 148.

[114] Besides the piece mentioned in the preceding note, see Marshall, *Jewellery*, Nos. 1732-3, Pl. XXXI; Pollak, *Goldschmiedearbeiten*, Pl. IX, Nos. 111-15, 122-3. Cf. also the more ornate, possibly earlier, earring pictured in the Boston *Bulletin*, Vol. XV (1917), p. 35.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1054; edition 1915, No. 1050.

No. 78 (Plates XVII, a, XIX, b). Earring with calf's (?) head.

Gold. Third to first century B. C.(?). Weight, 11.00 grains (0.713 grams).

The earring, which had been broken in two just back of the head, is now cemented together.[115] A hole is torn out of the left side of the neck and a bead is lacking.

The head is rudely executed in repoussé out of more than one piece of gold; a rectangular piece is soldered on top between the ears and the loss of such a piece explains the hole in the neck. The eyelet is a bent-over strip of rectangular section soldered under the muzzle. The two ringlets, which originally, no doubt, had a bead between them, are made each of a narrow strip of sheet gold, rubbed with a burnisher to convert it into a gutter, bent into ring form with the ends soldered together, and ornamented by 25 and 24 grains respectively, soldered into the gutter. A polygonal piece of gold, folded over and soldered together, covers the upper end of the coils, but is unornamented; it may have been partially hidden by the lost bead after the manner of a small earring in the Cesnola collection,[116] which is of similar design to this one. The remainder of the ring consists of two slightly tapering wires united in an open twist; each is cut off with a diagonal chisel stroke at the head end, revealing a solid homogeneous structure. Each wire was produced by twisting together two strips of gold; the cross rills are perhaps due to the subsequent twisting together of the two wires.

We are unacquainted with dated parallels, but the piece is a simple example of type (2) (above, page 134), as yet not fully developed from the earlier type, and therefore unlikely to be of very late date.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1065; edition 1915, No. 1061.

No. 79 (Plate XVII, a, b). Part of an earring with head of a bull.

Gold with a sandy(?) filling. First century B. C.(?). From Sakkara. Weight, 35.00 grains (2.268 grams).

About five grains are lacking from the collar.

The head was worked in repoussé in very thin gold sheet; excess material was cut out resulting in a number of seams on and between the horns and below them; to give strength, a sandy(?) filling was added and some details

[115] So in our plate, but later we put the two parts on exhibition separately because of the missing bead.
[116] I. H. Hall, *Atlas. Cesnola Coll.*, III, Pl. XV, No. 12.

were subsequently chased in. The collar was composed of an apparent globular gold bead, looking as if it were made in two halves by impressing in a die and as if the grains were added to mask the joint; in reality, however, it, too, is of thin sheet with a dark filling; the gold just meets the edges of the adjacent ornament and there is no seam, but only a groove, under the grains. On each side of the bead, the piece is enriched by a tongue pattern and two small wires, inclosing between them a convex, nearly half-round moulding; the latter was made of a strip of gold which was probably rubbed lengthwise on its reverse to produce the convexity; the tongue pattern and small wires were fashioned of narrower strips of gold twisted singly with edges slightly overlapping, giving a telescoped look to the coils when magnified; to the unaided eye, however, the wire has merely a broken surface which is somewhat richer in effect than the smoothness of plain wires. The eyelet of tubing(?), flattened by bending into ring form, is soldered in the place of the lower jaw; it is unusually large and implies by its lengthwise position a hook at the missing small end of the ring.

This earring bears a certain stylistic resemblance to a bronze earring found at Tanis in a house of the late Ptolemaic period.[117] Other closer parallels, not, however, dated, have been found in Egypt and Cyprus.[118]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1096; edition 1915, No. 1092.

No. 80 (Plates XVII, a, XXII, b, XXXVIII, c, d). Parts of a large earring with bull's head.

Gold, and originally, also garnets. Third to first century B. C.(?). From Sakkara. Combined weight of all larger and smaller fragments, 40.50 grains (2.624 grams).

Insets have dropped out from the eyes and from settings on the forehead and muzzle; the one on the forehead, according to the earliest catalogue of the Abbott collection, was a garnet.

In making the head the workman began with a flat piece of thin sheet gold, worked out the form in repoussé, cutting out superfluous material and soldering together the edges of the resultant gaps in abutting joints (compare No. 79). A rectangular patch was soldered on back of the horns to cover a break in the material, but other gaps, visible in the illustration, were never covered. Only a few details were chased in. The eyelet, made of tubing(?), was soldered lengthwise (implying a hook on the small end of the ring) to the under surface of the muzzle; it was provided with a flange, or rectangle of

[117] See above n. 107.

[118] Schreiber, *Toreutik*, p. 305, Fig. 29; I. H. Hall, *op. cit.*, III, Pl. XV, 25; M. M. A., No. L.1474.675 (unpublished; this piece has the gold grains in the same position as on our No. 79). In all these examples, however, the eyelet is set transversely and the hoop, covered with coiled wires, runs out to a point.

gold sheet, which gave firmer hold to the solder. The settings for the inlays were made of pieces of sheet gold for the bottom, to which were soldered, on edge and a little in from the outer limits of the bottom pieces, gold strips, which were subsequently pressed down about the inlays, holding them in place; the outer angle was ornamented with grains soldered both to the bottom plate and the side walls of the settings, and the settings in their turn were soldered to the bull's head; other grains, combined in rhomboids, were soldered directly to the head. This piece is an illustration of what variety of effect may be produced working with grains and flat stock. In our sampler at 80 b is shown, enlarged, the construction of the part which is reproduced actual size in the original in Plate XVII to the right of the bull's head. Eleven strips of sheet gold, variously treated, and all soldered to a broad piece of the same material, compose the original. Four of these strips have been drawn into hollow wires [119] and combined in pairs in one left-handed and one right-handed twist which were then fixed to the ground side by side; an inadvertent difference in the tightness of the two twists, observable on the original, has been imitated in the sampler; this irregularity happened readily in twisting such fine wires and is not disturbing on the original. Six other strips were probably rubbed lengthwise with a burnisher and four of them used as convex mouldings and two as gutters into which grains were soldered; on the original the grains are not so uniform in size as the commercial brass globules of the sampler. The eleventh strip was treated as shown in the sampler at 80 d, that is, twisted, hammered flat, and then untwisted. A bit of the sheet gold from which these ornamental details were constructed has the thickness, measured with a micrometer caliper, of 0.0043 inches (0.109 mm.).

Evidence is lacking for dating this piece exactly. For the one-time appearance of the insets, rounded high above the shallow settings, two earrings in the British Museum, estimated by Mr. Marshall to be of the third century B. C., may be compared.[120]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 44. Abbott catalogue, editions 1853 ff., No. 1093; edition 1915, No. 1089.

No. 81 (Plate XVII, a, b). Part of a large earring (?) with bull's head.

Gold and, originally, at least one other material. Fifth to fourth century B. C.(?). From Thebes. Weight before being repaired, 103.50 grains (6.707 grams).

Six insets were lost from the base of the horns, the forehead, and muzzle before 1843, according to the earliest catalogue of the Abbott collection. In the eyes are the remains of an artificial substance, either a deteriorated material

[119] That they are really hollow, see page 42.
[120] *Jewellery*, Nos. 1803-4, Pl. XXXI.

which itself formed the eyeballs, or a cement which once held something else. A piece of modern, soft brass has recently been inserted in the piece to strengthen it and the loose coils are now held by modern solder.

The head was made much as that of the previous number, but with the addition of many chased details and some supplementary pieces such as those soldered into the ears; the settings differ only in the use of twisted strips for the side walls. The collar, a separate, shaped, piece of sheet gold, was ornamented, while still flat, with grains, lengths of plain wire, of twisted strips of gold and of half-rounds, all soldered or fused on. The ring, which must have ended in a hook, to judge by the position of the eyelet, was formed over an inner cone of thin gold sheet,[121] once, no doubt, supported by a filling, around which eight half-rounds of heavier gold sheet were coiled and soldered at the two extremities, before the whole was bent into ring form. The shape of the inner cone, which tapers more than was usual in the cone of a bracelet, indicates that we probably have part of a large earring rather than of a bracelet. The half-rounds might have been made in a variety of ways: by pressing the strip of gold with the fingers about a wire of suitable size, by pressing it into a groove of semi-circular section with a burnisher or with a suitable-sized rod held in a horizontal position;[122] in a draw-plate, by passing it through a hole of a size to bring the edges just half-way around instead of together, while at the same time on the far side of the draw-plate a tool was held in a position partially to fill the hole and to keep the strip feeding into it evenly; or finally, by laying the strip on a flat surface and rubbing it lengthwise with a burnisher, thus stretching the sheet where rubbed and causing the sides to curl upwards. This last method which we have suggested previously in a few instances of convex mouldings (Nos. 79, 80) seems to us to have been the process used here, for examination reveals a number of places where the section is v-shaped instead of semi-circular, a result which would most readily come through too great pressure with a rather small tool. A sample from the coils was analyzed by Dr. Whitfield, and indicated the material to be essentially a gold-silver alloy of 19.7 carat.[123]

The stylization of the bull's head is suggestive of Persian influence,[124] as may be seen by comparing the piece with the bull capitals of the palaces at Persepolis and Susa, capitals of which the style was dependent on the earlier art of Assyria. The close spiral of several coils with a grain at its center is characteristic of the fifth to third centuries B.C.[125]

[121] The reading obtained from a small sample using a micrometer caliper was 0.0027 inches (0.069 mm.).

[122] Cf. Maryon, *Metalwork,* p. 46.

[123] Weight as received . . . . . 0.01344 grams
" of gold found . . . . . 0.01104 " = 82.14 per cent.
" " silver " . . . . . 0.00240 " = 17.86 " "
" " copper " . . . . . trace

[124] Except for brief intervals, Egypt was a Persian province from 525 to 332 B.C.

[125] Marshall, *op. cit.,* Nos. 1653-4, 1684-5, 1728-9, 1774-5, 2044; Murray, Smith, and Walters, *Cyprus,* Pl. XIII, 25. Cf. Egypt. example of Dyn. XII, Vernier, *Bijoux,* II, Pl. XXII, No. 52239.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 43. Abbott catalogue, editions 1853 ff., No. 1002; edition 1915, No. 998.

No. 82 (Plate XVII, a, b). Part of an earring with sheep's head.

Gold. Third to first century B.C.(?). Weight, 20.00 grains (1.296 grams).

The head is intact except for holes between, and back of, the horns and the possible loss of insets from the eyes. The core of the ring which issues from the neck is incomplete, being broken off at the outer end. The granulated triangles of the collar are injured in a few places.

The head is truthfully and carefully modeled in repoussé, with details subsequently chased and engraved; the only seams visible are on the ears and horns (compare above, Nos. 72, 73). The eyelet is made of a strip of gold of rectangular section, bent into ring form and soldered to the under jaw; the openings for the eyes have been forced through from the obverse with a tool of round section. A band of sheet gold, with 15 larger grains soldered or fused to it, is itself soldered together in ring form, and then soldered to the head at the neck. Another wider band, cut with straight edge above and nine triangles below, has a wire made of a single twisted strip of gold soldered along its upper edge and 36 smaller grains on each triangle and is itself bent into ring form, soldered together, and to the previously mentioned ring with larger grains; on some of the granulated triangles the grains were embedded in an excess of molten metal. The core of the hoop, above, where it is larger, is made of a piece of gold folded over and soldered lengthwise, and compressed by hammering to produce the taper toward the smaller end; it is soldered inside to the back of the head and is the cause of the breaks mentioned above. The color is that of fine gold.

Earrings in the Cairo Museum [126] and the British Museum [127] give a hint as to how this earring looked when uninjured. A bead of gold or stone was fixed between the preserved row of granulated triangles and another row which had its apexes turned toward the bead. The covering of the hoop, in all probability, was quite ornate, being composed of coiled wires, both plain ones and those having decorative seams; it may have ended either in a point or a hook.

The earring with fixed bead at the neck (compare No. 79) is intermediate between the types (1) and (2) defined above (page 134); this fact and the excellent modeling of the head suggest a date in the Ptolemaic, rather than the Roman, period.

BIBLIOGRAGHY: Abbott catalogue, edition 1853 printed by Varey, No. 1052; edition 1853 printed by Watson, and subsequently, No. 1051; edition 1915, No. 1047.

[126] Vernier, *Bijoux*, II, No. 52,512, Pl. XXXV.
[127] Marshall, *op. cit.*, Nos. 1808-9, Pl. XXXI.

No. 83 (Plates XVII, a, b, XX, c). Earring with the head of a lynx.

Gold and garnet. Third to first century B. C.(?). From Thebes. Weight, 24.95 grains (1.617 grams).

Two beads are missing from the hoop.

The modeling of the head is spirited;[128] it was begun in repoussé, and finished by chasing and engraving; seams are visible under the jaw and on, and back of, the ears. Passing through the head and soldered to it at the mouth is a wire composed of a strip of sheet folded on itself and hammered solid; this formed the foundation of the hoop; the end of the original strip which issues from the mouth was left flat and bent into a loop but its extremity remained unattached, instead of being soldered; the other end of the wire was bent into a hook. Four granulated ringlets separated the original three beads from one another, the head, and the spirals. These ringlets consist of flat strips of sheet gold bent probably over a rod and soldered together at the ends; it is evident that each ring was placed edge down while the soldering of the grains went on, for one edge still shows, and the other edge which was uppermost and the broad surface are domed over with grains; one ringlet is soldered to the lynx head at the neck, a second to the spiral wires, and the others now move freely. The spirals were made of three long tapering pieces of sheet which were twisted singly, after which the three resultant slightly tapering wires were soldered together at the top, twisted about the main wire, but held in place at the small end, so far as is now evident, only by their own elasticity; the spiral seams on these individual wires are very clear and regular. The garnet is beautifully formed and polished and is drilled from one end, as the straight bore, larger at one extremity than the other, indicates.

This earring is of type (2) defined above (page 134), which lasted into the Roman period; but on grounds of style, we assign it to the Ptolemaic period.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 34. Abbott catalogue, editions 1853 ff., No. 1102; edition 1915, No. 1098.

No. 84 (Plate XVII). Earring.

Gold and onyx.[129] Second century B. C. to second century after Christ(?). Weight, 39.00 grains (2.527 grams).

One or two beads and probably an animal's head are lost from this earring. One of the remaining beads is chipped. It is possible that parts of more than one earring have been assembled in modern times in the present piece; five ringlets imply four beads, an unusual number, and such parallels as we have

[128] Comparative material: Pollak, *Goldschmiedearbeiten,* pp. 54-5 and references given there; Marshall, *op. cit.,* Nos. 1806-7, 2436, 2438-9, 2440-41, Pls. XXXI, LII.

[129] The smaller bead is a pronounced onyx, as the dark bands are quite black; in the larger bead is present a reddish tinge verging toward the color in sardonyx.

found show only one onyx bead combined with one or two globular beads of different material.

The hoop of solid gold is an excellent piece of beaten work. The granulated ringlets, on the other hand, are casually made; two have 20 grains each, the others respectively 12, 19, and 22; three are made as those of No. 78; in the other two the gutters holding the grains are soldered to disks of sheet. The beads are well polished and have a bore of nearly uniform diameter. The color of the metal is close to that of fine gold.

The earring is catalogued in this section under the assumption that it originally had a stylized dolphin's head as in the earrings cited below.[130] The plainness of the hoop is characteristic of the later earrings of type (2) (page 134). Finally, in the history of these earrings, not merely the coils of wire, but the animal's head, was abandoned and the earrings became plain hoops carrying a few beads, like many of those depicted in the Fayum portraits of the first to second centuries after Christ;[131] another view would be that our piece was of this outgoing style.

BIBLIOGRAPHY: Found by us bearing the number 1088, which duplicates a number certainly right (compare our No. 89).

[130] Petrie and Mackay, *Heliopolis, Kafr Ammar, and Shurafa,* Pl. LII, 2, 3, p. 45, from a Ptolemaic cemetery; Schäfer, *Goldschmiedearbeiten,* No. 149, Pl. 19; Vernier, *Bijoux,* II, No. 52524, Pl. XXXV; Schreiber, *Toreutik,* p. 305, Fig. 30; cf. also Marshall, *op. cit.,* Nos. 2426-32, Pl. LII.

[131] Petrie, *Hawara,* Pl. XI. Cf. the earring found in the ash heap of a Roman town, not founded until shortly before the 3rd cent. after Christ; Petrie and Mackay, *op. cit.,* Pl. LII, 4, pp. 40, 45; also the onyx bead represented in the earring with S-hook on a mask from Meir (1st cent. after Christ, probably Claudian age), Edgar, *Graeco-Roman Coffins,* p. 30, No. 33135, Pl. XVI.

Addendum to C and D

Jewelry Found on the Island of Ithaca in 1812

The year 1811 was one of momentous discoveries in Greece. An international band of friends—travelers, antiquarians, and architects, who had met in Athens—excavated and planned the temples of Ægina and Phigaleia and brought away their wonderful sculptures, which eventually were to form the nucleus of the Glyptothek at Munich and to enrich the British Museum. The marbles from both temples were removed first to Zante, then the trading-center of that part of the world, and an old account by a British traveler, who saw the Phigaleian frieze there in September 1813, tells us that these events on the mainland of Greece had excited a spirit of discovery in the islanders of the western coast.[1] In particular he recounted the recent opening of tombs on near-by Ithaca, an enterprise promoted by a Mr. Fiott Lee: "The grand discovery of these sepulchral treasures was made in the little rocky isle of Ithaca, under Mount Aïto, where ruins exist of a city, with its acropolis, which tradition designated as the residence of Ulysses." A list of silver vessels and gold and silver jewels follows, which the writer expressly stated embraces only very few of the objects discovered; its item No. 9, which we quote below, may well refer to one or the other of our Nos. 86 and 87. At this time the modern recovery of the rich funerary deposits of antiquity was still so much in its beginnings that the author remarked: "Nothing like them was ever extracted from the sepulchres of Attica or any other part of Greece; and their discovery not only raises our ideas of the former wealth, commerce and population of these isles, but affords a cheering prospect of their future prosperity under the advantages of a just and modern government. Surely none but a great commercial and ingenious people, for whom other less favoured or less industrious nations penetrated the bowels of the earth and laboured in the noxious mine, could have dared to waste so great a proportion of the precious metals by inclosing them in the tomb: had the other Hellenic tribes indulged in such a practice, not all the mines which then existed would have sufficed for such extravagance!"

The identification of the five pieces from the Abbott collection, Nos. 85 to 89, as a part of this treasure from Ithaca is dependent on drawings published by Fraenkel in 1891,[2] which were made by the German architect, Baron Haller von Hallerstein, one of the men active at Ægina and Phigaleia; Haller drew the pieces not later than 1817, for that was the year of his death. According to his legends, the majority of the objects drawn by him

[1] The Rev. T. S. Hughes, *Travels in Greece and Albania,* 2nd ed., London, 1830, Vol. I, pp. 159 ff.
[2] *Antike Denkmaeler,* Vol. I, p. 5, Pl. 12.

were found in tombs on the island of Ithaca; one of them, a serpent ring (No. 3 of Fraenkel's plate), was the property of the English Captain Guiterre; by one piece he inscribed the date 1812. A friend of Haller and member of the same coterie in Greece, the Baron Otto Magnus von Stackelberg, also made drawings, which probably copy, albeit inaccurately, one or two of the same pieces.[3] We give in Plate XVIII Haller's drawings—those of the number with which we are concerned—reproduced from Fraenkel's plate for comparison with photographic views of our objects as they appear today. To readers familiar with the methods of ancient artists no further demonstration of the identity of the serpent ring and the four earrings, Nos. 86 to 89, from the Abbott collection with the objects drawn by Haller von Hallerstein will be necessary, despite the injuries which they have undergone since their discovery. Only in ancient art-objects produced in the same mould or die is precise repetition found. Such likeness as in the coils of the head and tail of the serpent, the central ridge on the body, the number, shape, and position of the imitation garnets, is not to be expected between two pieces fashioned free hand. The identification gains force by the number of objects, for, aside from the resemblance between the drawings and the Abbott pieces, the coincidence of such a selection of somewhat unusual designs occurring both in the drawings and in the Abbott collection if supposed to be independent of each other would tax one's credulity. Haller also drew an earring of the type of our Nos. 70 to 74 but the coils about the tapering core were not all of plain wire and the original of the drawing, therefore, is not one of our earrings. We have been unable to trace the history of our five pieces between the time when they were drawn by Haller von Hallerstein and the year 1843, when they were included in the first catalogue of the Abbott collection as from Upper Egypt, but during that period, if our conclusions are correct, they had wandered from Zante to Egypt, perhaps brought hither by the one-time owner of at least one of them, Captain Guiterre, who may well have been captain of a merchant vessel; Dr. Abbott either bought the pieces in Upper Egypt or was led by his agents to believe that they had been found there.

The identification of these antiquities from the Abbott collection as brought to Egypt in modern times is of interest further for the interpretation of the various statements about provenience in the old records of the collection; assuredly the Cretan vase "from Lower Egypt"[4] may, or may not, have been found in Egypt.

No. 85 (Plate XVIII; also A). Finger ring (?) in the form of a coiled serpent.

Gold and glass imitating garnets. Third to first century B. C.(?). Length if projected, about 12.99 inches (33.00 cm.). Thickness of head, 0.045 inches (1.14 mm.). Weight, 95.77 grains (6.206 grams).

[3] *Die Graeber der Hellenen,* Berlin, 1837, Pl. 74.

[4] Abbott catalogue, editions 1853 ff., No. 77; edition 1915, No. 78 = Perrot and Chipiez, *Histoire de l'art,* Vol. VI, *La Grèce primitive. L'art mycénean,* Paris, 1894, Fig. 436.

The edges are torn in a few places and the ring is no longer so closely and evenly coiled as formerly.

The long main piece was cut from fairly thick sheet gold, annealed, and wound about a heavy rod of the diameter desired for the ring. Resiliency was given the coils, and a central ridge and troughs each side were worked in their obverse, by hammering with a small round-ended punch along the course of the coils while the gold was still wound on the mandrel. A suggestion of scales was punched on the two extremities, and the head was formed by skillfully directed hammering on punches; underneath, it, like the coils of the serpent body, is flat and smooth; the curves for the tail, difficult to execute in a flat strip, were probably obtained by hammering and thus stretching the edge which was to form the outside of the curve. Each box-setting was made of a strip of gold, with ends soldered together and lower edges soldered to a bottom piece; the settings in turn were soldered to the coils and the upper edges were pressed down over the insets. The color of the metal is that of fine gold. The insets were examined by Mr. Whitlock, who pronounced one of them certainly glass, the others presumably also glass, but all three to be remarkably free from bubbles.

On this class of jewelry, compare page 108. With its many coils, the present piece is not well adapted to wear on the finger, yet a serpent ring nearly as cumbersome was found at Goshen in Egypt in position on a finger of the right hand.[5] It is difficult to see what else our piece could be, unless a hair-ring. The nearest parallel to it, known to us, is a ring found in the Crimea.[6] The style of the present piece suggests a date earlier than that of our Nos. 39 to 42; especially its numerous elastic coils follow the tradition of serpent rings of early date.[7]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 27. Abbott catalogue, editions 1853 ff., No. 1073; edition 1915, No. 1069. Antike Denkmaeler, I, Pl. 12, 3 = our Plate XVIII, A. Compare Von Stackelberg, Graeber der Hellenen, Plate LXXIV, p. 47.

Nos. 86, 87 (Plates XVIII, a, B, D, E, XXIII, XXXV, 86 b; compare XXXVIII, D-F). A pair of earrings, each with two lion's heads.

Gold. Fourth to third century B. C.(?). Present weight of No. 86, 67.52 grains (4.375 grams); weight of No. 87, 61.00 grains (3.953 grams).

No. 86 has a slight amount of modern filling in the larger lion's head, affecting its weight; the ring is broken where it joins the collar and the lion mane has two small breaks. The right side of the head of No. 87 is some-

[5] Petrie, *Hyksos and Israelite Cities*, p. 42, Pl. XXXVIII, 54.

[6] *Antiquités du Bosphore Cimmérien conservées au Musée Impérial de l'Ermitage*, St. Petersburg, 1854, Vol. III, reissued by S. Reinach, Paris, 1892, p. 61, Pl. XVIII, No. 11.

[7] Marshall, *Jewellery*, Nos. 1320-21, Pl. XVI.

what crushed and the spiral wires of the ring have been disturbed. The smaller heads on both pieces show breaks.

The larger heads resemble stylistically that of No. 77, but not a seam can be detected in them and they were worked probably from a circle of sheet by repoussé, chasing, and engraving. The foundation of each collar is a shaped piece of sheet gold and the braids, tongue pattern, palmettes, spirals, and borders were executed in a combination of plain and of decoratively marked wires, all probably made of single strips of sheet variously twisted. The workman came to grief in soldering or fusing the wires on the right side of the collar of No. 86, for in that region is a somewhat rude ancient repair, two rectangular pieces of sheet gold which in part overlie the appliquéd wires; in the same region the wires were flooded with molten metal, and elsewhere on the two earrings the appliquéing of the wires was not accomplished with entire success. The hoops have a tapering core composed of several pieces of sheet gold, probably scraps, loosely twisted together at the larger end; this is evident in both earrings, above, where the coils of wire are pushed aside and the edges of a number of pieces may be seen (Plate XXIII, left). On each of the wires covering this core it is possible in part to follow the coiling seams. The smaller ends of the hoop are masked by heads executed in two halves, in repoussé or in dies, and soldered lengthwise. Each has at the neck a tongue pattern and bordering wires of the plain and ornate varieties. The color is that of fine gold.

The peculiar feature of the design of these earrings is the smaller lion's head. Presumably it was put through a perforation in the ear somewhat small for it and then prevented the earring from slipping out of position. Thus it was a less comfortable ornament than the more common animal-headed earrings with point-and-socket or hook-and-eyelet fastening. Several earrings in the British Museum[8] show the second lion's head and otherwise a general resemblance to our pieces, and Mr. Marshall has designated them as a Graeco-Italian type of the fourth to third century B. C., because of the florid style of the lion's heads and the find-spots, Ruvo and Capua, of two of the earrings. But there is considerable stylistic difference between the various known earrings of this type, some being less florid than others, and our examples are distinctly at the more restrained end of the scale, suggesting that the type was not confined to southern Italy. Our pieces, if not made on the island, may have been imported to Ithaca from Athens, Alexandria, or some other center.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 32. Abbott catalogue, editions 1853 ff., Nos. 1094-5; edition 1915, Nos. 1090-91. Antike Denkmaeler, I, p. 5, Pl. 12, 6 and 6 a = our Plate XVIII, B, D, E. Compare Von Stackelberg,

[8] Marshall, *op. cit.*, Nos. 1768-71, 1777-8; cf. Nos. 1772-6; Pl. XXXI. Cf. *Monumenti antichi pubblicati per cura della Reale Accademia dei Lincei*, Milan, Vol. XXII (1913-14), Pl. CXIII, 5, from Cumae. A beautiful specimen, with the smaller lion's head in perfect condition, but about which nothing is known, is to be seen in the Gold Room of the Field Museum, Chicago.

Graeber der Hellenen, Pl. LXXIV. Compare also Hughes, op. cit., Vol. I, p. 161, item 9: "A golden ornament like a ring, of fine spiral threads, thick at one end and gradually diminishing: at the thick end is a large lion's head, beautifully executed; at the other, one of smaller dimensions."

Nos. 88, 89 (Plates XVIII, a, b, C, F, XXXV, 89 c, d; compare XXXVIII, 88 c). A pair of earrings, with lynx heads.

Gold and originally some gem-stone, or other material, as insets. Third to first century B. C.(?). Weight of No. 88, including some modern solder and the present inset, 52.50 grains (3.402 grams); of No. 89, with same additions, 53.00 grains (3.434 grams).

The present insets are left in position for illustration, but though ancient, did not belong in these earrings, being ill-fitting, of unlike material and shape, and absent from Haller's early drawing. The earrings have suffered grievously. The views 88a and 89a show their appearance as we found them, disfigured by much modern soft solder and with parts of both settings gone; both hoops had been broken apart and later united with modern soft solder. It has been impossible to effect much improvement except to reduce the amount of modern solder; the hoop of No. 89 is now held together by a wax cement, mixed with gold dust to render it less conspicuous. The present appearance of the pieces is shown in 88b and 89b.

The lynx heads were worked in repoussé in two parts, a larger front part, including the entire muzzle and the front of the ears and ruff, and a smaller part, including the remainder of the head; thus, in contrast to the head of No. 77, these lynx heads are divided crosswise and the soldered seam runs along the upper edges of the ears and ruffs; the details were chased in. The shape of the collars when flat and the design of the ornament are shown enlarged in our sampler, Plate XXXVIII, at 88 c, although the plain wires on the original may not be tubes. No. 89 shows two ancient patches on the collar, namely minute rectangular pieces of sheet gold, one overlying the joint (compare the tiny one on No. 70, described page 136), the other covering parts of the wires on the right side, and both making good accidents which befell the piece probably in the process of manufacture; another rectangular patch is to be seen just under the right ear. We may also remark that one unit in the tongue pattern of No. 89 is of plain wire instead of a patterned wire (Plate XXXV, 89 c); perhaps the supply of the latter gave out at the last! The next part of the ring was made in two parts: there is an inner elongated cone, which projects into the collar and perhaps into the head (compare on this point, Nos. 72 and 74); its visible smaller end under the microscope shows some folds, perhaps indicating that the cone was hammered out of scraps of sheet gold, but so skillfully that evidence of its compound composition was nearly obliterated; the second part of the ring, the outer surface, is a trapeze-

shaped piece of sheet gold which was tooled over a yielding bed to produce ridges and rills running diagonally and then was folded about the inner cone and soldered together. An ornately twisted wire, such as those which adorn the collar, was soldered lengthwise on each side. The settings for the gem-stones were constructed of a number of pieces: a bottom plate for each main setting and its three adjacent cylindrical compartments was cut in one piece of sheet gold, two-lobed at the head end and one-lobed at the eyelet end; the side walls of the several cells were made each of a bent-over strip of gold, first having its ends soldered together and then its lower edges soldered to the bottom plate. As the earrings have come down to us, wires have been passed through a hole punched in the bottom of each small compartment; the lower end of one wire is entwined in the eyelet, the lower ends of the other two are loosely coiled about each other. The wires are surely ancient and one of them under the microscope shows clearly that it is composed of two tiny strips of sheet gold twisted together. The circular, convex upper finish of each wire, somewhat like a pin-head in appearance, may have been made by heating the end until it ran up into a ball and then hammering it down. According to Fraenkel's text, presumably based on Haller's legends, the small compartments were filled with *Perlen;* these *Perlen,* no longer existent, were probably vertically perforated glass or stone beads, convex where they projected above the settings and having the "pin-head" tops of the gold wires in their centers; there was no doubt a pleasing color scheme to which the lost original large insets and the small beads with their gold centers all contributed. The eyelet of each earring was made of a slightly hammered strip of gold, soldered to the lynx neck, passed under the bottom plate of the setting, bent into a ring at the farther end of the setting and with its recurved end secured to the setting by solder. The color of the metal is close to that of fine gold.

The present inset of No. 88 is a banded jasper engraved with a figure of an ibis; that of No. 89 is a carnelian engraved with a hand holding a bunch of grain. The former device is a good old Egyptian motif, although used here, after the manner of Hellenistic Greek art, as a *genre* subject; the latter is distinctly of the Classical period.[9] These two engraved gems may be about contemporary with the gold earrings or somewhat later in date. There is absolutely no means of knowing whether they were added after the earrings reached Egypt, or before.

The introduction of a setting with gem-stone (or other inset) in front of the animal's head is uncommon,[10] and the form of the settings and of the decorative outer parts of the hoops, in particular the use in the hoops of pieces of fluted sheet gold, instead of spirally wound wires, and of two twists and no more running lengthwise on each piece, is unique, so far as we know. The

[9] Cf. the two clasped hands, each holding grain, figured in Adolf Furtwängler, *Die antiken Gemmen,* Leipsic, 1900, Vol. I, Pl. XLVI, No. 44; Vol. II, p. 223.

[10] But cf. Marshall, *op. cit.,* Nos. 1778, 2436-7, Pls. XXXI, LII; these pieces otherwise, however, are of quite different design from those under discussion above.

collars decorated with wire appliqués mark the pieces as not of very late date; they are a variant of type (1) rather than of type (2) (page 134).

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 33, No. 31. Abbott catalogue, editions 1853 ff., Nos. 1091-2; edition 1915, Nos. 1087-8. Antike Denkmaeler, I, p. 5, Pl. 12, No. 14 = our Plate XVIII, C and F.

E.—Late Amulets

In the last seven centuries before Christ the Egyptians multiplied enormously the number of kinds and the total number of small amulets[1] with which they were wont to array their dead. Nine out of ten of the blue-glazed eyes or hearts acquired by the modern traveler in Egypt belong to this late period! Fortunately a series of unplundered coffins of well-to-do persons, an Uzahor of Hawara in the Fayum,[2] a Pedineit,[3] a Harkhebit,[4] and others[5] who lived at Memphis and were buried in its great necropolis, have been carefully opened and the position and number of the amulets recorded with some degree of definiteness. Where, a few centuries earlier, a single *ded*-amulet (No. 106) sufficed, or, at most, two or three were an ample provision, now, a row of ten or eleven smaller ones was placed across the body and a larger *ded* was laid nearer the head. The entire outfit of amulets on a single mummy of a private person often exceeded one hundred. Many of the pieces were provided with loops and were threaded, together with beads, into collars, or fastened on as necklaces and armlets; others were merely embedded at different levels in the mummy bandages and were held by them and the preservatives poured over them; indeed, the modern recovery of the original arrangement has been rendered difficult by the resins and gums in which they are often found caked. The royal tombs of the period have not been discovered, but those of the wealthy priests and officials have yielded many amulets of precious materials and delicate workmanship.

For the study of these extant pieces certain written and pictured lists contemporary with them are of great interest. Every human burial was modeled on that of the god Osiris and one of these lists, inscribed in the temple at Dendera,[6] enumerates, under their various materials, one hundred and four

[1] On the general subject of Egyptian amulets, see: Petrie, *Amulets* and the references given there, p. 8; Allen, *Handbook,* pp. 121-35; Möller, in Schäfer, *Goldschmiedearbeiten,* pp. 70 ff.; Wiedemann, *Die Amulette der alten Aegypter* (*Der alte Orient,* 12th Year, Pt. I), Leipsic, 1910; Erman, *Religion,* 2nd Germ. ed., pp. 147, 163-4, 182, 209; Engl. ed., pp. 131, 144-5, 187; also the references in the footnotes of the present section. This section was written before the following work, to which we have been able to insert only a few references, reached us: Gustave Jéquier, *Les frises d'objets des sarcophages du Moyen Empire* (*Mémoires. Institut,* Vol. XLVII), Cairo, 1921.

[2] Petrie, *Kahun,* pp. 19-20; *Ten Years' Digging,* p. 94; a plan of the position of Uzahor's amulets is given in *Amulets,* Pl. L.

[3] *Annales,* Vol. II (1901), pp. 97-104; Vol. III, pp. 5-6, Pl. IV.

[4] *Annales,* Vol. IV, pp. 76-82.

[5] Thanhebu, see *Annales,* Vol. I, pp. 262-71; Vol. III, pp. 1-5, Pls. I-III; Maspero, *Revue de l'art ancien et moderne,* Vol. VIII, Paris, 1900, p. 353, reprinted in Engl. translation in Maspero, *Egyptian Art. Studies,* pp. 201-7; the imposing subterranean tomb of this "Admiral of the King's Ships" near the pyramid of Unas has been visited by many a tourist, since 1900, the year of its discovery. Uzahor, see *Annales,* III, pp. 210-12, Pls. I, II. Hikemsaf, see *Annales,* V, pp. 69-78.

[6] Mariette, *Dendérah,* Vol. IV, Pl. 87 and *Supplement aux planches,* 1874, Pl. I; text vol., 1884, pp. 289, 292; the list is conveniently available in Petrie, *Amulets,* Pl. XLVIII.

amulets with which the god was once provided; almost without exception they are familiar to us in surviving pieces. Another list, written on a papyrus formerly in the MacGregor collection,[7] is confined to amulets of gold, and names and pictures seventy-five, many, as the list stipulates, to be given the dead in several examples, making a minimum provision of two hundred and ten gold amulets. It may be assumed that this ideal was seldom realized, but Hikemsaf was furnished with seventy-six of gold,[8] besides those of other materials; sometimes greater care was given to the quality of the workmanship, as in Uzahor's[9] eighteen beautiful gold amulets, four of which were inlaid (compare No. 104), than to the number, although he was really well provided for, since he had, besides, one hundred and five of stone! But Thanhebu's[8] gold amulets were exquisite and also numerous, for they were some sixty in number. With the two inscribed lists mentioned may be associated the Kennard tablet,[10] possibly once a manufacturing amulet-dealer's sample board, on which sixty are represented, either appliquéd or inlaid in gold and semi-precious stones, with the materials proper to them inscribed by many of the pieces. Finally, a goldsmith's die of large size, the property of the Museum of Fine Arts, Boston, and still unpublished,[11] is of value, not only with reference to the technique of amulet-production (compare page 207), but for what it teaches of the kinds of gold amulets which were in demand, furnishing, as it does, a selection of sixty-seven different ones. There is no hard and fast agreement between these various lists and the complete sets of actual amulets which have come down to us, yet a few amulets are common to all these sources, many others to several, and probably none is unique. The lists are as nearly canonical as one expects to find from ancient Egypt, where, in this late period, despite past centuries of priestly efforts to standardize beliefs and practices, local and individual conditions led to constant variations within the general scheme characteristic of the time.

The ancient material for studying funerary amulets is much more abundant than that bearing on the amulets worn by the living, but hints may be

[7] Capart, *Ä. Z.*, Vol. 45 (1909), pp. 14-21; convenient in Petrie, *Amulets,* Pl. XLVIII; see also Sale *Catal. MacGregor Coll.*, No. 525, Pl. XIV.

[8] Unpublished, but enumerated in the account of the discovery of the tomb; see above, n. 5.

[9] Of Hawara; the amulets are still unpublished, but were enthusiastically praised by Petrie; see above, n. 2.

[10] Möller, *Amtliche Berichte,* Vol. XXXIV (1912), cols. 24-8. Inscribed on the board is the name of Seti I. Möller left it an open question whether possibly the board goes back to the reign of this king (1313-1292 B.C.), remarking, however, that the amulets represented on it are known otherwise only from a much later period. The large number of ushebtis given to Seti I, when the private person in burial still had only a few, suggests that a king's supply of amulets, too, may have been especially large, befitting his rank. Many of the mummies of the historic kings of the New Kingdom have survived to modern times, but invariably they have been quite, or almost entirely, stripped of their ornaments and amulets, long ago, in antiquity, by the kings' own countrymen. The ancient plunderers overlooked, however, in the instance of Seti II (1209-1205 B.C.), strings of beads, eye amulets, and scarabs, wound spirally about his legs from ankle to knee and small figures of recumbent lions placed at his knees; Smith, *Royal Mummies,* pp. 74, 78, 79, diagrams 17, 18. But these, at least, include none of the innovations in the way of amulets, which, on the basis of available evidence, are now regarded as characteristic of late burials. It is not impossible that the Kennard board is late and was purposely attributed to an earlier time to give it authority.

[11] But a cast of impressions of the two sides and edges of the die may be purchased from the Museum. Our attention was called to this die through the kindness of Mrs. Richardson.

gleaned here and there of the importance of the latter class. Thus *amulets for every limb* were among the personal effects surrendered by the conquered prince Pediese (compare page 115). An account of the investiture of a high-priestess of Amon, early in the sixth century B.C., refers to the putting on of *all the amulets and ornaments* of her office.[12] And Dr. Gardiner has pointed out passages in ancient Egyptian texts indicating the operation of the principle of sympathetic magic among the living,[13] often in association with amulets. Although some funerary amulets obviously would have been superfluous for the ordinary man in life (Nos. 90, 93, 94), our amulets Nos. 96, 123, and 125, like No. 1 of earlier date, as indicated in the wear on the loops by which they were suspended, were only buried with the deceased after long service during his lifetime. Again, ancient pictures occasionally portray the living wearing amulets similar to certain of those given to the dead; an instance is a Theban wall-painting of the fourteenth or thirteenth century B.C., showing the *ded* and girdle-tie (seen pictured as funerary amulets in Plate XXIV at the right) worn suspended from the neck of a Theban dignitary.[14] In earlier times the uses of such amulets for the living and the dead probably often coincided (compare our conjecture, page 53); in later centuries funerary texts indicate that, given to the dead, they frequently had a highly specialized purpose with reference to his welfare in the next life; thus, according to Dr. Gardiner's interpretation,[15] to the *ded* and the girdle-tie, was ascribed special efficacy to stimulate the functions of the dead man's back and blood respectively. The most extended attempt to explain Egyptian amulets is that of Professor Petrie, who has classified them in the divisions Amulets of Similars, of Powers, of Property, Protective amulets, and Figures of Gods; in formulating these classes he took into account the prophylactic and other values associated with amulets outside of Egypt, and to his book we refer readers interested in this point of view.

Amulets had their place also in the temple ceremonies of the Egyptians and among the most beautiful ones ever made were those presented by the king to the gods. That they were actually fastened on the cultus statues is clear from such passages as the following, from the Harris papyrus of the twelfth century B.C., in which the king, always in theory, when not in actual practice, the officiating priest, addresses the god: *I made for thee august amulets of fine(?) gold with inlay of real lapis lazuli and real turquoise. I attached them to thy body in the great house of thy protection and thy magnificence, in thy splendid seat, that they might protect the august limbs as amulets for thy great, grand and lovely form.*[16] In the same document, the

[12] Maspero in *Annales,* Vol. V, p. 85, l. 12; p. 87 (text, translation into French); Blackman in Hastings, *Encycl. Rel. and Ethics,* Vol. X, p. 300, under "Investiture and Installation of Priests;" Breasted, *Records,* Vol. IV, § 988 H (transl.).

[13] In Hastings, *Encycl. Rel. and Ethics,* Vol. VIII, article "Magic (Egyptian)."

[14] Loret, *Le tombeau de l'am-xent Amen-hotep,* Pl. III.

[15] Davies-Gardiner, *Amenemhēt,* p. 112.

[16] Breasted, *Records,* Vol. IV, § 253; cf. § 319; the question mark after the word "fine" is our insertion.

eye amulets (compare No. 95) of various gem-stones given to the gods are listed in lots of 165, 185, 217, and 6583.[17] Coming down to about 300 B.C., two actual collar-amulets (compare No. 91) are in existence, one of them in the Cairo Museum, the other in private ownership,[18] which are part of a temple treasure recovered at Toukh el-Qarmous in the Delta. Both are inlaid with semi-precious stones in the same technique as our No. 104, but are somewhat larger than the ordinary funerary collar-amulet, and with them was found what is described as a "gold and silver headdress of about the same scale."[19] It is possible that we have here a unique instance of the preservation of amulets which once had their part in the temple ceremonies, after the manner indicated by the earlier text quoted above, in this instance, perhaps, amulets for use in the pageant of the death and burial of Osiris.

The large majority, if not all, of the amulets of the present collection were found in cemeteries; they include only a part of the funerary amulets known from ancient lists and surviving examples, but give an instructive glimpse of the variety of form, technique, and quality represented in the actual funerary practice of the Egyptians when employing precious materials.[20] Thus we see that some amulets were chased (Nos. 90-94, 109) or inlaid (Nos. 98, 104), others ornamented with wire appliqués (Nos. 95, 96), and still others, of which Nos. 97 and 100 are examples, were produced in quick fashion in dies; even such short cuts were employed as inscribing the amulets on sheet gold (Nos. 133, 134). It is probable that the MacGregor list, the Kennard board, the Boston die, and other dies of smaller size, were preserved to us in tombs, having been buried as substitutes for the usual equipment, or as additional safeguards, enabling the deceased to secure a further supply of amulets. The families of moderate means, who could not afford to give their dead the amulets prescribed to be of gold, furnished them in gilded stucco, or other make-believes.[21]

The suggestions as to their date made below under the various numbers are quite tentative. The late amulets of good quality whose period is known are of the sixth to fourth centuries B.C. The Ptolemaic amulets published by Mr. Petrie in his book Amulets are of poorer quality and those of the Ptolemaic period to the second century after Christ found at Abusir el-Meleq are poorest of all.[22] If these dated pieces are typical of their respective periods, there was a general falling off in quality from the close of the Thirtieth Dynasty to the time, under the Romans, when such amulets ceased to be made. It is with this in view that we have suggested an earlier range of date for our better pieces and a later for those hastily produced in dies. The information handed

[17] *Op. cit.*, §§ 233, 377.

[18] At present on loan in the Metropolitan Museum of Art.

[19] Edgar in Maspero, *Le Musée Egyptien*, II, Pt. 2, pp. 58-9, Pl. XXII.

[20] The late amulets of stone and faience belonging to the New York Historical Society will appear in another part of the catalogue.

[21] See Möller's list of such pieces contained in the Berlin collection; Schäfer, *Goldschmiedearbeiten*, p. 71.

[22] Schäfer, *op. cit.*, Nos. 108-111, 113-14, 116-18, 122, 124-9.

down from Dr. Abbott's day, however, that our No. 104 was found on a Greek mummy tallies with Mariette's statement that such figures of the soul were common at Memphis under the Ptolemies.[23] Möller made the tempting suggestion[24] that just as the funerary texts and equipment of the kings of about 2500 B.C. some centuries later were adopted by well-to-do private people, so perhaps in the Twenty-sixth Dynasty, sets of beautiful gold amulets first were prerogatives of kings, and only later became available for persons of less than royal rank. But we confess to misgivings about this view, chiefly because of the forerunners of these amulets occurring before the Twenty-sixth Dynasty,[25] and we think it probably a mere chance that no fine set once belonging to some great man of the earlier years of the Twenty-sixth Dynasty has yet been found.

(a) Amulets of Which the Meaning is at Least Partially Understood

Around 2000 B.C., the equipment for the next existence generally was furnished the dead in substantial, actual pieces, many of which could be, or had been, put to use, or in reproductions made of cheaper materials—whether full sized or somewhat smaller than the things of daily use—or again in pictures painted on the walls, now of the coffin, now of the tomb chamber. Even in this earlier period, the funerary equipment was dominated by the belief that the ordinary mortal in death would be in some sort identified with the god Osiris, who was king of the realm beyond the tomb. Osiris was conceived with all the appurtenances of the kings of earth, therefore the Egyptian dead, whether man or woman, since destined to become an Osiris, needed, not only the ordinary necessities—food, clothing, furniture—and some other things which had no parallels in the life on earth, but also crowns, scepters, a full complement of jeweled collars, armlets, bracelets, the uræus erect on the brow, and those emblems of kingly rank which had come down from primitive days, the crook and the "whip." In the late period, with which we are concerned here, in addition to the partial continuation of the older ways,[26] the deceased very often was given some portion of this equipment in miniature,[27] in the form of amulets of a class known from earlier periods only in rare examples[28] (Nos. 90-94; items 4, 7, 10, in Nos. 133, 134).

[23] *Notice des principaux monuments exposés dans les galeries provisoires,* Paris, 3rd ed., 1869, p. 265, No. 843.

[24] In Schäfer, *op. cit.,* pp. 70-71.

[25] See below, notes 28, 35.

[26] Collars, counterweights, bracelets, kilts, etc., pictured in the tomb of Pediamenopet; Johannes Dümichen, *Der Grabpalast des Patuamenap in der thebanischen Nekropolis,* Pt. I, Leipsic, 1884, Pls. XIV, XV. Collars etc. are pictured on the walls of the tomb of Pedinese, *Annales,* I, pp. 232, 251. Wooden models of scepters, staves, mace, bow, etc., given to Thanhebu; *Annales,* I, pp. 263, 264.

[27] First recognized by Professor Schäfer, *Ä.Z.,* Vol. 43 (1906), pp. 66-70.

[28] A sporadic use of such amulets in an early period should not surprise us; the one thing essential was that by some material agent the deceased should be provided with the proper equipment after death. See the gold amulets representing the crowns of Upper and Lower Egypt, the vulture, and uraeus, found at El Mahasna and dating from the XIth Dyn., or an earlier time; Garstang, *Mahâsna and Bêt Khallâf,* pp. 29, 35, Pl. XXXIV; diagram, Pl. XLIII, M. 87. In De Morgan, *Dahchour,* II, Pl. V, another view seems

But even at the time of the greatest emphasis on the material equipment of the dead for a future royal estate, other thoughts were creeping in, and may be traced in the funerary incantations, precursors of the Book of the Dead, which have been termed Coffin Texts,[29] because inscribed on the walls of coffins. The significance of others of the late funerary amulets is grounded in the ideas of these ancient texts, which show that the Egyptian, at least as early as two thousand years before the Christian era, dwelt with anxiety on certain dangers of the life beyond death, such as the one that his heart might be kept from him (see under Nos. 100 to 103, and item 3 of No. 133), and cherished the thought of possessing after death the right spell to enable him to change at will into a falcon (No. 96) or a swallow (No. 97). The Osirianization of funerary thought had gone so far at the time when the Coffin Texts were inscribed as to leave no doubt that Isis, the exemplary wife and mother, Nephthys, the good sister (Nos. 112-15), would grant to the deceased not of royal station the same loving rites, the same mourning, accorded Osiris in the myth, when these two goddesses watched over his body. Anubis, the chief embalmer (Nos. 116, 124?), and the Sons of Horus (Nos. 117, 118), too, would care for the human dead, just as they had once cared for the god.

From about 1500 B.C., or a little earlier, it became customary to inscribe on papyrus the magical texts for the dead, which were then increased by new compositions, elaborated by further titles and glosses, and illustrated by drawings of funerary gods and mystic symbols; thus was created that variable compilation, called the Book of the Dead, which was the key to safety in the next life. At this time, too, the pictures on the coffins changed character, material equipment for the dead almost disappeared, and instead, the decoration consisted principally of figures of funerary divinities, among them, Isis, Nephthys, and Anubis, whose refrain: *I have come. I am thy protection* often was inscribed beside them. According to late thought, it was a further advantage to the deceased to have buried with him in great numbers amulets in the form of these same divine beings and symbols (Nos. 106, 112 to 122; items 5, 6, No. 134). The charms to be spoken over, or written on, certain of the funerary amulets to render them efficacious (Nos. 17, 91, 92, 104, 107), their purpose (Nos. 97, 104, 106, 107), their material (Nos. 17, 91, 92, 104, 107), and proper position on the mummy (Nos. 91, 92, 107) are given in the Book

possible, that the units representing the vulture and uraeus were inscriptional in character; one of them has an additional sign and may be read: "Beloved of Nekhbet." See Mariette, *Le Sérapéum de Memphis,* Paris, 1857, Pt. III, Pl. 11, for gold vulture and uraeus of the XIXth Dyn.

[29] Breasted, *Development of Religion and Thought in Ancient Egypt,* New York, 1912, pp. 272 ff., and the references given in n. 1, p. 273; also, Roeder, "Die ägypt. 'Sargtexte' und das Totenbuch" in *Archiv für Religionswissenschaft,* Leipsic, Vol. XVI (1913), pp. 66 ff.; Grapow, "Über einen ägypt. Totenpapyrus aus dem frühen mittleren Reich" in *Berichte der Preussischen Akademie,* philosophisch-historische Klasse, Vol. XXVII, (1915), pp. 376 ff.; Grapow, *Ä.Z.,* Vol. 47 (1910), pp. 100-111, Vol. 49 (1912), pp. 42-54; Blackman, *Ä.Z.,* Vol. 47, pp. 116-32, Vol. 49, pp. 54-66. These texts are now being edited, as an international undertaking under the auspices of the Oriental Institute of the University of Chicago, by Professor Breasted, Dr. Gardiner, and the pioneer worker in the field, M. Pierre Lacau; see *Oriental Institute Communications,* No. 1, *A Beginning and a Program,* Chicago, 1922, pp. 73-82.

of the Dead.[30] About others (Nos. 124-31) we can only infer that they protected the dead in some way.

The meanings ascribed to amulets in the Book of the Dead frequently were not their original meanings. Much effort is evident even in the older Coffin Texts to adapt to funerary purposes snatches of religious writings containing mythological references, and some of the uses for the dead attributed to them seem forced. The process of editing and adding to them continued from age to age and even in the late period of our amulets the older funerary incantations were reworked and new ones composed. Thus Chapters 157 and 158 of the modern numbering occur only in the late copies and refer to the amulets representing respectively the vulture collar, exclusively royal, and the common broad collar of beads, amulets which essentially were mere substitutes for the real ornaments, as analogous items in the Dendera list of Osiris' equipment indicate clearly enough. The texts of the late rescension are very corrupt and will not be better understood until modern textual criticism, starting with the earliest available rescension of each incantation and based on the comparison of many copies, has progressed further inasmuch as individual copies are hopelessly full of scribal errors and omissions.[31] The priestly elaborators themselves did not understand the older writings which had come down to them and endeavored to conceal their ignorance under changes and glosses. But such as they had become, these holy texts were now, in the late period, given the dead, not only in papyrus rolls, but even more intimately, inscribed on the very bandages which enwrapped him. We reproduce in Plates XXIV and XXV two excerpts from such a bandage in the New York Historical Society's collection.[32] Anyone who has ever marked linen with indelible ink will appreciate the skill shown in the writing and drawing, and sympathize with the ancient scribe's mischance in blotting the upper edge of his bandage (Plate XXV, at left); farther on, in another column, not reproduced here, he had a second upset and obliterated parts of three lines! The Egyptians frugally made use of old linen for mummy bandages and two excellent darns may be

[30] That a connection of thought and purpose between the amulet and a text may often have existed when not definitely alluded to in the text is suggested by the fact that apparently only in the papyrus of Ani does a gloss to Ch. 89 mention the amulet (cf. p. 173); probably a search of published and unpublished copies of the Bk. of the Dead would reveal still other references to amulets not now generally known.

[31] A valuable beginning of a new textual criticism and interpretation of the Book of the Dead has been made by Dr. Grapow in his *Religiöse Urkunden*, Leipsic, 1915 ff., published in the series of *Urkunden* edited by Prof. Steindorff and collaborators. In this work a standard text is gradually being furnished for the different chapters, and in three rescensions, that of about 2000 B.C., for texts occurring so early, that of 1500 to 1000 B.C., and that of the late period, the time of the amulets under discussion above. See also Grapow, *Ä.Z.*, Vol. 49, pp. 42-7, 51-4. More recent contributions are those of Professor Sethe and his pupils in *Ä.Z.*, Vol. 57 (1922), pp. 1-50; Vol. 58, pp. 1-24, of which still other parts are to follow; also Sethe's earlier essays, *Ä.Z.*, Vol. 54 (1918), pp. 1-49. Translations into English are those of Peter le Page Renouf and M. Naville, first published *P. S. B. A.*, Vols. XIV (1891-92) ff., privately printed in London as a single volume by the Society of Biblical Archaeology, and later issued in *The Life-Work of Sir Peter le Page Renouf*, First Series, Vol. IV, *The Book of the Dead. Translation and Commentary, continued and completed by Professor E. Naville*, Paris, 1907.

[32] From Stephen W. Phoenix, either during his lifetime or as a bequest; see Abbott catal., ed. 1915, p. 98. The bandage will be fully catalogued at a later time.

observed in the section shown in Plate XXV; the writing overlies the mended places in part, but one inscribed line was broken to avoid the rougher surface of the darn. As is frequent in the make-up of modern books, the illustrations here are set at desirable intervals and the text falls where it may, often considerably separated from the picture relating to it. Thus in Plate XXIV, at the right, are the vignettes of the *ded* and girdle-tie, belonging to Chapters 155 and 156 of the Book of the Dead. Chapter 155, of which the beginnings of six lines, composing the first column, are lost in this copy, occupies two additional narrow columns and the chapter concerning the girdle-tie starts directly under the vignette of the gold vulture. The chapter of the vulture-amulet, 157, surrounds the vignette of the bead collar (Plate XXV) and the beginning of the latter's text, Chapter 158, may be seen below at the extreme left of Plate XXV! The writing is the cursive called hieratic, used here for religious texts, in accordance with the late Greek derivation of the modern technical term, having in the late period superseded hieroglyphic writing for that purpose. The forms of the signs suggest that the bandage was inscribed toward the close of the fourth century B.C., or shortly afterwards.

No. 90 (Plate XXVI, a, b). Amulet in the form of the uraeus.

Pale gold. Twenty-sixth to Thirtieth Dynasty, 663-332 B.C.(?), or slightly earlier(?). Present weight, 5.90 grains (0.382 grams).

A part of the body and the tail are missing. The piece has been broken in two, just where the body turns, and later hard-soldered together (in antiquity?).

The uræus was cut out of sheet gold with a chisel so held as to give a rudely beveled edge and its details were chased in. Such slight relief as it has is due to the punching down of the obverse. The eyelet is a separate strip of sheet, bent into ring form, and soldered in one operation, together, and to the reverse of the serpent head.

We take up first those amulets of the present collection (Nos. 90-94) which secured for the deceased royal ornaments and insignia befitting an Osiris. His need for such provision, as we have seen (page 159), was not a prominent thought in the New Kingdom,[33] but there are slight indications of its revival in the period just before the rise of the Saite dynasty. Thus a cartonnage, probably pre-Saite, belonging to the Minneapolis Institute of Arts, is decorated with a picture of a mummy laid out on a bed, and under the bed, instead of the usual Canopic jars, are painted various crowns and royal headcloths.[34] On

[33] See, however, the last reference above in n. 28.

[34] Still unpublished, No. 16.414. Compare the Boston *Bulletin,* Vol. XIX (1921), p. 27, half-tone of a painting on the south wall of the tomb of Queen Qalhata (XXVth Dyn.). Here under the couch of the awakening Osiris are depicted crowns, diadems, "whip," crook, mace, bow, staves, kilt, etc.; other examples, the majority, however, later than the beginning of the XXVIth Dyn.: Roeder, *Naos* (Cairo *Catal.*), Leipsic, 1914, Pl. 9, p. 34, § 171, c; Moret, *Sarcophages,* Pl. V, Fig. 15, p. 32; R. V. Lanzone, *Dizionario di mitologia egizia,* Vol. V, Pt. 1, Turin, 1885, Pls. CCLXVIII, CCLXX, etc.

the mummies of the priests and priestesses of the second Deir el-Bahri find, tiny uraei often of gold, or of substitutes for gold, were found fastened to the hair over the forehead.[35] These little amulets occur singly, or in pairs, because placed in position, but on the coffins from Bersheh of about 2000 B.C. a whole kingly allotment of five uraei was pictured,[36] all in one or another of the postures in which they appear on the king's head; their purpose to be worn on the head was indicated in the accompanying legends, and their position in the frieze of objects in the royal equipment was next to the headdresses, that is, on the east inner face of the coffin, close to the forehead of the mummy, as it lay in the accustomed position on its left side. Probably the late lists (compare pages 154-5) which help us to understand the amulets now under consideration drew on early sources, and it is therefore not surprising to find that the Kennard tablet includes a goodly number of uraei, six, and that in the MacGregor list six follow upon the headdresses and bear some of the names by which they were called on the early coffins. These are the supply thought necessary for a king's various wigs and headdresses; they represent the cobra, that *living uraeus upon the head of Re,*[37] which throughout Egyptian history was conceived as present also upon the brow of the king, Re's bodily son, ever erect and angry, with hood expanded, ready to scatter the king's enemies. What the historic kings of Egypt actually wore is now exemplified in a beautiful and massive gold uraeus, inlaid with carnelian and lapis lazuli and having garnets as eyes, which was found in 1920 near the sepulchral chamber in the pyramid at Lahun,[38] the tomb of Sesostris II of the early nineteenth century B.C. This is no tiny amulet, but a piece of suitable size for the front of the living king's crown and there is reason to think that it was worn there in Sesostris II's lifetime. It is one of the very few pieces of jewelry once worn by an Egyptian king which have come down to modern times[39] and it helps us to visualize the splendid adornments and insignia which the less exalted Egyptian believed would be his in the next life, the thought of which was perpetuated, however confusedly, in the late period by such tiny funerary amulets of gold as the present piece.

BIBLIOGRAPHY: Abbott catalogue, editions 1854 ff., No. 1110; edition 1915, No. 1106.

No. 91 (Plate XXVI, a, b; compare Plate XXV). Amulet representing a bead collar.

Pale gold. Twenty-sixth to Thirtieth Dynasty, 663-332 B.C.(?). From Sakkara. Weight, 31.16 grains (2.019 grams).

[35] Smith, *Royal Mummies,* p. 99. Daressy, *Annales,* Vol. VIII (1907), p. 24, No. 33; p. 29, No. 85; p. 30, No. 98; p. 34, No. 127; p. 38, No. 151.

[36] Lacau, *Sarcophages,* Vol. II (1906), Nos. 28087, 28090, 28091 (4, instead of 5), 28092.

[37] Sethe, *Die altægyptischen Pyramidentexte,* Leipsic, 1908 ff., 1108 c (text); Breasted, *Rel. and Thought,* p. 110 (transl.); cf. under item 7 of No. 134.

[38] *Ancient Egypt,* 1920, Part III, frontispiece, p. 67.

[39] The statement above was written before the discovery of Tutenkhamon's tomb and at the time of adding this note it is still uncertain how much jewelry once worn by the king the tomb will yield.

The eyelets for threading the piece have been crushed flat and their solder no longer holds.

The outline of the collar was cut out in one piece from sheet gold, even to the eyelets reserved as narrow strips extending from the top of the falcon heads. The lower edge was turned under and hammered down to give a good finish, but the upper edge was left jagged. The details were chased in and the strips for the eyelets were bent over into ring form and soldered to the reverse of the collar, where the surface now is darkened and reddened.

The form of the collar is only summarily given in this piece, as the rows of beads, but not the individual beads, are indicated. An early source must have been followed, for the terminal falcon heads are wide enough to take in all the threads, whereas, from about 1300 B.C., the threads were caught into bars, ornamented at the top by very tiny falcon heads.[40] Further, the narrowness of the collar is an especially early characteristic;[41] the collar does not, however, decrease in width toward the back, as was usual in the earlier periods (compare page 9).

The execution, in known amulets, all of them of late date, varies from pieces like Uzahor's, with the color scheme and pattern charmingly rendered in gold inlaid with semi-precious stones,[42] to poor specimens of gilded wax.[43] With our piece may be compared the vignette (Plate XXV) of the *Chapter of the Collar of Gold,* which, in fuller copies of the text, is specified also in the title, as here at the end, *to be put on the neck of this glorious one* (the deceased). The central portion of the text is a brief spell to be pronounced (as the last part of the text directs) over the collar and also to be written on it. Such an amulet in Thanhebu's set, now in the Cairo Museum, shows the effort to comply with the last specification,[44] but the amulet-maker was careless, or ignorant, for the wrong Chapter 157 was inscribed on the piece representing the bead collar and on the vulture-amulet was written the charm proper to this one!

On the meaning of this amulet, see above page 158, and compare below, item 4 under No. 133.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1028 (by mistake a "bracelet" in the 1853 editions, afterwards corrected to "gorget"); edition 1915, No. 1024.

No. 92 (Plate XXVI; compare Plate XXIV). Amulet representing a vulture collar.

Pale gold. Ptolemaic period, 332-30 B.C.(?). From Sakkara. Weight, 4.32 grains (0.280 grams).

[40] Caulfeild, *Temple of the Kings at Abydos,* Pls. IV, XVI. Shown on the person of Queen Keromem in the Louvre statuette; Fig. 2, p. 22 of article by Emile Chassinat in *Monuments* Piot, Vol. IV (1897).

[41] Gardiner and Peet, *Inscriptions of Sinai,* I, Pl. II; Petrie, *Sinai,* Fig. 50, showing narrow collar worn by the king Snefru, not later than 2900 B.C. Boston *Bulletin,* Vol. IX (1911), p. 17, for one worn by the king Menkure, not later than about 2850 B.C.

[42] N. 2, above.

[43] Petrie, *Amulets,* Pl. V, 71 c.

[44] Maspero in *Annales,* Vol. III, pp. 2-3.

The condition, even to that of the eyelets, and the technique are the same as in No. 91, except that all the edges are left ragged. The workmanship is indifferent. This amulet, according to the old record, was found on the neck of a mummy together with Nos. 99, 106, 114, 115, 118, 120, and 121.

By the New Kingdom, if not earlier, a queen had the protection of Nekhbet, the vulture goddess of the South, symbolized in a special headdress of vulture form, never given to kings. In the king's regalia, as we know it from the earlier coffin pictures, and from an actual funerary specimen of chased gold found on the supposed mummy of Amenhotep IV,[45] the goddess' protection was symbolized in part by a collar in vulture form. Or again the collar assumed the form of the tutelary goddess of the North, or the double form of the goddesses of the Two Lands. When box-like coffins with pictures of the royal equipment painted on the inner walls went out of style, and those shaped to the form of the mummy largely replaced them, for a time, the vulture collar,[46] or the collar of the two goddesses,[47] was still represented, in a position on the coffin just below the bead collar. Soon, however, these reminiscences of the old royal equipment of the dead were superseded on the coffins by pictures more in keeping with the thought of the day (compare page 159), and the vulture collar, as such, was lost sight of, only to be rather confusedly revived in miniature in the late period; we do not know of any example of this amulet antedating the late period. The amulets and the vignettes of Chapter 157 of the Book of the Dead (Plate XXIV) picture the vulture as it was stylized in the old royal collar of the coffins, except that the wings are no longer upturned nor the threads for tying the collar represented; despite these differences, the occurrence of this amulet in the MacGregor list (item No. 34) in a context of collars, its juxtaposition with the bead collar in the Book of the Dead, and the directions in Chapter 157 that it be placed on the neck of the deceased, all suggest a derivation from the old royal vulture collar; there is no other indication, however, that the *vulture of gold* of Chapter 157 was recognized as a collar, unless possibly in the somewhat effaced legend of the MacGregor list.

Compare below Nos. 128, 130, and 131.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1012; edition 1915, No. 1008.

Nos. 93, 94 (Plate XXVI). Amulets representing the king's insignia, the "whip" and shepherd's crook.

Pale gold. Twenty-sixth to Thirtieth Dynasty, 663-332 B.C.(?). From Sakkara. Weight of No. 93, 6.82 grains (0.442 grams); of No. 94, 4.09 grains (0.265 grams).

[45] Not a queen's headdress, as we conclude from a comparison with the collars pictured on the coffins of 2000 B.C. See further, Weigall in *J.E.A.*, Vol. VIII (1922), p. 199; cf. p. 240 for reference.

[46] Georges Daressy, *Cercueils des cachettes royales* (Cairo *Catal.*), Cairo, 1909, Pls. VII (coffin of Amenhotep I), XIII (coffin of Thutmose II). Davis' Excavations, *Iouiya and Touiyou,* Pls. VIII, IX = Quibell, *Tomb of Yuaa,* Pls. IV, V. Cf. Lacau, *Sarcophages,* I, Pl. LI, No. 436.

[47] Daressy, *op. cit.,* Pl. II (coffin of Sekenenre). Cf. Lacau, *loc. cit.,* No. 435 and the MacGregor list, item 36.

These amulets were beaten out to their present form from thicker stock material, as they have the springiness of hammered metal and the edges are not trimmed. Some details were chased in on both and the relief of the pendants of the "whip" was given by working with punches from the reverse.

We have referred above, page 158, to these insignia of the kings of historical Egypt as survivals from primitive times. The object represented in No. 94 is presumably a shepherd's crook, but no agreement has been reached as to that of No. 93.[48] We are not acquainted with early specimens of these amulets.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 1041 and 1040; edition 1915, Nos. 1037 and 1036.

No. 95 (Plates XXVI, a, b, XXIX, c). Eye amulet.

Gold with a sandy(?) filling. Probably fifth or fourth century B.C. From Sakkara. Weight, 42.59 grains (2.760 grams).

POINTS OF INTEREST: The eye stands out among all others as the Egyptian amulet par excellence. The present example is marked by the richness and the good proportions of its ornament and is instructive as to the technique of wire-making.

The gold sheet of the reverse is split open a little way along its upper edge revealing the dark sandy(?) filling. The obverse has lost an insignificant amount of its appliquéd ornament. In the interstices of the ornament and showing clearly in the photographs is some foreign matter, probably preservatives from the mummy on which it was placed.

The gold shell consists of three main parts, a decorated obverse and plain reverse, overlapping the covering of the edges, which was probably made of two strips of gold joined at the threading holes. The overlapping of the parts[49] indicates that the order of procedure was first to solder the strips for the edge to the obverse; then to solder in position the tube, made of a strip of sheet folded over and soldered lengthwise, by which the amulet was to be threaded, and next to add guards of wire[49] around the threading holes to give a finished appearance and to take the wear. Sand(?) mixed with a binder was then packed into the shell; since the heating of an inclosed shell containing a moist filling would cause expansion endangering the soldered seams, probably the interior mass was well dried before finally the reverse was soldered on.[50] The obverse may have been decorated before or after being

[48] See Mace and Winlock, *Senebtisi*, pp. 94-101, where the possibilities of whip and fly-flap are considered and much pictorial material bearing on the question is gathered; also the discussion in Jéquier, *Frises d'objets*, pp. 187-91.

[49] One of these guards overlaps the folded-over edge of the obverse; the other is itself overlapped by the reverse, showing that the guards were put on after the side walls and obverse were united and before the reverse was added.

[50] Mr. Heins tried out successfully making a gold shell, filling it solidly with sand, and soldering on a closing piece of sheet gold.

united with the other parts of the amulet. The photomicrograph (Plate XXIX, c) reveals the construction of its appliquéd wires to be similar to those which we have considered in section D. Especially interesting to find is the coiling seam of the wire which runs horizontally between a row of grains and a row of tongue pattern, one which to the unaided eye is plain in effect and would readily be taken for an ordinary solid drawn wire of the modern type. The pupil of the eye is a domed disk soldered on. On the method of fastening the numerous short lengths of wire and the grains, which number 133, see our suggestions for the earring, No. 69. The gold contains a few specks of white metal.

The approximate age of this piece is determined by the technique of the wires, the occurrence of the tongue pattern and of the spirals with grain at the center, suggestive of Greek work. Compare No. 81.

Unlike Nos. 90 to 94, all of which were either rare or quite unknown before the late period, this amulet was frequent in earlier times. Specimens even of the Sixth Dynasty have survived,[51] and the eye is pictured as an amulet, threaded with beads, on the polychrome coffins which show us the Osirian equipment.[52] Whatever the secondary superstitions that gathered about it, we may believe that its great vogue was due to an association with the eye of Horus. In the primitive myth the Sky-god had two eyes, the sun and the moon, which the primitive Storm-god Set often blotted out;[53] as the myth took on a human and political aspect, Horus fought with his rival brother Set, and in the fierceness of the struggle his eye was torn out. But the Osirian cycle of tales early was engrafted on the solar,[54] and it was the same eye, returned to him by Thoth, which Horus, the good son, brought to his father Osiris, thereby aiding him to become a soul, and which as a funerary amulet may well have had the same efficacy for the human dead. Growing out of Horus' sacrifice for Osiris, the eye became the symbol of all offerings to the dead, and in the funerary ritual, as recorded in the Pyramid Texts by the third millennium B.C., the priest addressing the dead king recites, as he presents the material offerings: *Take the Horus eye, the bread which thou eatest; said over four portions of bread,*[55] or *Open thy mouth with it* (the Horus eye); *said over two portions of Delta wine,*[56] and so on, through some 178 formulæ.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1048; edition 1915, No. 1044.

[51] Petrie, *Amulets*, p. 32; *Deshasheh* (XVth Memoir. Eg. Expl. Fund), London, 1898, Pl. XXVI.

[52] Schäfer, *Priestergräber und andere Grabfunde vom Ende des alten Reiches bis zur griechischen Zeit vom Totentempel des Ne-user-Re* (8te wissenschaftliche Veröffentlichung der D.O.G.), Leipsic, 1908, p. 58, Fig. 81, Pl. 8. Eye amulets were found on the mummy of Seti II; Smith, *Royal Mummies*, p. 74.

[53] So the eclipses of the sun, the waning of the moon, the occasional violent storms were presumably interpreted; Patrick Boylan, *Thoth, the Hermes of Egypt*, Oxford, New York, etc., 1922, Ch. II, especially pp. 30, 37.

[54] This matter was set forth in detail first by Professor Breasted, *Rel. and Thought;* on the Horus eye, as explained further above, we have followed pp. 31, 59-60, 78-9.

[55] Pyr. Texts, ed. Sethe, 78 a, b.

[56] *Op. cit.*, 92 a, b.

No. 96 (Plate XXVI). Amulet representing a falcon.

Gold. About fifth or fourth century B.C. From Sakkara. Present weight, 18.16 grains (1.177 grams).

This is the wreck of a once beautiful and intricate piece. The top of the head, the eyes, and tip of the left wing are missing. The sides of the bird and walls of the hollow base are somewhat crushed. The eyelet is now cemented together. Interesting are the evidences of ancient wear; the eyelet is worn thin at the top and many of the twisted bands outlining the feathers are smoothed down with wear.

The hollow base is soldered together of several pieces of sheet of the thickness 0.0044 inches (0.112 mm.).[57] The body of the bird is hollow and likewise was soldered together of several pieces domed to the desired shape; the wings, made each of three pieces of sheet, and the hollow tail have the details of the feathers indicated in appliquéd wires, eight lengths on the tail, twelve on each wing, fourteen on the breast; the two outer lengths of the lower group of four on the tail cover seams. The wires are strips of sheet gold twisted singly, about as those of the tongue pattern of No. 95 (Plate XXIX, 95 c). The legs and claws are made of similar heavier wires of two weights.

This amulet, occurring as items 55 and 63 of the MacGregor list of late amulets, is even older in origin than our No. 95, for small figures of falcons have been discovered in predynastic graves.[58] It is a fairly common amulet and presumably owed its efficacy in some way to its association with Horus, who as the Sun-god was visualized as a falcon and again, as the faithful and efficient son of Osiris, was sometimes in falcon form.[59] It is hardly probable that the exact purpose of the amulet remained constant throughout more than three thousand years of use. Possibly by 2000 B. C., it was employed in connection with those formulæ of the Coffin Texts which enabled the deceased to change into a falcon, and it seems almost obvious that Chapter 77 of the Book of the Dead, *a chapter for assuming the form of a falcon of gold* would be rendered more potent if the deceased possessed a gold falcon-amulet! Chapter 77 and the following long Chapter 78 *for assuming the form of a divine falcon* belong to the spells of the "Transformations," which enabled the dead man at will to become also a heron, a lotus, a serpent, or the like. The following amulets Nos. 97 to 99 have reference probably to still others of these "Transformations."

We have no clue to the date of this piece except the technique of the wires composing legs and feathers and the units making up the small feathers, which are like the units used for the tongue pattern on some of the earrings of Section D. We hardly think it is so late, however, as the second or third cen-

[57] Measurement with a micrometer caliper of a piece which broke off.

[58] Petrie, *Amulets,* p. 48; Petrie and Quibell, *Naqada and Ballas,* Pl. LX.

[59] Erman, *Religion,* 2nd Germ. ed., p. 209; Engl. ed., p. 187.

tury after Christ, to which Mr. Marshall assigns a pair of ducks of similar technique in the British Museum.[60]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1027; edition 1915, No. 1023.

No. 97 (Plate XXVI, a, b). Piece of sheet with figure of a swallow in relief.

Fine gold. Ptolemaic period, 332-30 B.C.(?). Weight, 1.30 grains (0.084 grams).

This piece was pressed out in a die (see under section G) and then cut irregularly to leave a slight margin around the bird, except that, carelessly, the tip of the tail was removed. The thickness of the sheet is 0.0026 inches (0.066 mm.). Compare the technique of Nos. 126 and 127 belonging to the same set. By microchemical analysis the metal was found to be fine gold.

The bird is the swallow and we can hardly doubt that it has reference to the incantation No. 86 of the Book of the Dead *for assuming the form of a swallow*. The swallow is included among the amulets of the Boston die and possibly is intended in a bird of similar posture on the Kennard board, although the latter's head seems more like that of a falcon. Unlike the previous number, the amulet of the swallow is rare and is confined to the late period,[61] although the incantation whose potency we suppose it to have enhanced occurs in an early form in the Coffin Texts.[62] Even then, these incantations were far from serving a clear-cut purpose (compare page 160). The early editors were groping to interpret them and a text concerning the falcon (see No. 96) has been noted, now with one, now with another title.[63] So the Chapter 86 not only gratified that natural desire to be able to leave the mummy bandages and the confines of the coffin and take on some living form, but—no doubt on the initiative of some later editor—quieted all anxiety as to how the dead man should again enter the tomb, for its closing words are: *If this incantation be known, he* (the deceased) *will reënter after going forth by day*.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 992; edition 1915, No. 988.

[60] *Jewellery*, Nos. 2446-7, Pl. LII.

[61] See the possible swallow amulet enumerated in *Annales*, XIX, on p. 214; it may be that in records of excavations the late amulet of the swallow has not been differentiated from that of the gold falcon.

[62] Lacau, *Sarcophages*, No. 28034, west side.

[63] Grapow, *Totenpapyrus, m. R.*, p. 384.

No. 98 (Plate XXVI, a, b). Amulet representing the soul [64] as a human-headed falcon.

Gold once inlaid with semi-precious stones. Twenty-sixth to Thirtieth Dynasty, 663-332 B.C.(?). From Sakkara. Present weight, 7.59 grains (0.492 grams).

In *a*, the amulet is shown with a filling, a pasty, gray-blue mass, partially smeared over the edges of the cells. Believing this filling to be modern, we have had it removed and the empty gold shell *b* remains, an instructive exhibit, enabling one to realize the appearance of No. 104 before the inlays were put in. There are some breaks in the gold.

On the technique of such pieces, see under No. 3.

The soul is first unambiguously recognizable in Egyptian art as a human-headed bird about 1500 B. C.[65] in the vignettes of Chapter 85 of the Book of the Dead, *a chapter for assuming the form of a living soul,* one of the "Transformations" alluded to under the preceding Nos. 96 and 97. In these vignettes the soul stands, with wings closed, and is sometimes bearded, sometimes not, probably according to the sex of the person for whom the papyrus was written [66] (compare the amulets 98 and 99 on this point). The soul is always thus represented in Chapter 85, differing from the soul with wings spread (see Nos. 104, 105) of Chapter 89. Amulets of both forms are included in the MacGregor list and both occurred in Thanhebu's fine set of funerary amulets (see above page 155); we do not know of any example which certainly antedates the late period; [67] the amulet survived into Classical times.[68]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 35, No. 54. Abbott catalogue, editions 1853 ff., No. 1108; edition 1915, No. 1104.

No. 99 (Plate XXVI, a, b). Amulet representing the soul as a human-headed bird.

Gold. Twenty-fifth to Twenty-sixth Dynasty, 712-525 B.C.(?). From Sakkara. Weight, 10.14 grains (0.657 grams).

The amulet was worked only from the obverse. First the outline and inner details were chased in the sheet gold, then the figure was cut out, and finally a strip of sheet was hammered over a rod into ring form and soldered, straddling the top of the amulet, to obverse and reverse. The sheet has a thickness of

[64] This translation for the Egyptian "ba" is only a rough rendering. The human being, so the Egyptian thought, consisted of a visible body and an animating intelligence and vital principle, the "ba." Associated with each person was another being of like appearance to himself, a protecting spirit, the "ka." Exalted persons sometimes had more than one "ka," as Queen Hatshepsut, who had twelve! In this statement we have followed Breasted, *Religion and Thought,* pp. 55-6.

[65] There is a rare early amulet in the form of a human-headed bird standing, with wings closed, for instance M.M.A., Nos. 10.130.2157-81 (Murch coll.) in the style of the XIIth Dyn., and despite lack of definite proof, we regard it as probably representing the soul, especially as the Coffin Texts include an "Incantation that a man . . . send forth his soul against his enemy" (Grapow, *op. cit.,* p. 383).

[66] Theoretically at least; no doubt in actual practice there was laxity in the matter.

[67] But cf. No. 99 and n. 65 above.

[68] See Schäfer, *Goldschmiedearbeiten,* No. 41, for a piece of the Ist or IInd cent. after Christ.

0.0155 inches (0.39 mm.) and shows under the microscope numerous specks of white metal.

A general resemblance in style and technique to Nos. 114 and 115 below suggests that this amulet may possibly be pre-Saite or at least that it is not much later than the time to which those numbers have been assigned. On the interpretation, see under No. 98.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1017; edition 1915, No. 1013.

No. 100 (Plate XXVI). Plaque with scarabaeus in relief.

Gold. About 300 B. C. to 100 A. D. From Sakkara. Weight, 3.97 grains (0.257 grams).

Sheet gold of about 0.002 inches[69] (0.051 mm.) in thickness was impressed in a die (see under section G). The front left leg and the middle legs are imperfect and a few holes, as minute as if pierced with a fine needle and only to be noticed by holding the piece to the light, were caused by the strain on the metal when it was worked into the die. Compare Nos. 111 to 113, 117, 119, and 129, which probably belong to the same set. The color is close to that of fine gold.

The scarabaeus, like Nos. 95 and 96, is very old as an amulet and occurred in a variety of forms, of which some are included in our section B. Not only were jars of dried dung-beetles of the species *Scarabaeus sacer* sometimes placed in predynastic graves,[70] but the beetle was carved in stone and worn on the person;[71] a hollow left in the stone beetle was presumably meant to contain a dried beetle. Whether the early beetle amulets had any connection with the scarab as one embodiment of the Sun-god is extremely doubtful; we should more readily believe that they had some such virtue as that ascribed to the scarab in Roman times by Pliny, protection against fever.[72] After 3000 B. C. there are few well authenticated instances[73] of amulets in the form of the simple beetle with wings folded until the late age, for the scarab-seal and the scarab-seal amulet show the beetle resting on a base and their amuletic virtues probably were due in large part, if not entirely, to the names and other inscriptions upon them. But scarabs without base or inscriptions, with the lower surface of the body and the legs carved in detail, were a common late amulet and for such an amulet, the present representation in relief was prob-

[69] Measured with a micrometer caliper; the thickness varies slightly in different places, as is only to be expected.

[70] Petrie, *Amulets,* p. 24, No. 92; *Scarabs and Cylinders,* p. 2.

[71] Petrie, *Amulets,* loc. cit.; *Scarabs and Cylinders,* p. 2, and more fully, Petrie, Wainwright and Gardiner, *Tarkhan I and Memphis V* (XXIIIrd Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. XVIIIth Year, 1912) London, 1913, pp. 9, 22, Pls. III, 4, XIV, 19.

[72] *N. H.* XXX, 30, cited Petrie, *Amulets, loc. cit.*

[73] See, however, Von Bissing, *Ein thebanischer Grabfund,* Pls. VI, 4, VII, 2 a, b.

ably a substitute; it may well be that their meaning was not differentiated from that of the heart scarab (compare page 74), since the vignette of Chapter 30 of the Book of the Dead, in the late rescension, shows the scarabaeus as represented in our amulet. With this likelihood in view we catalogue the present amulet with Nos. 101 to 103, which are best explained as associated with incantations to meet certain dangers of the next life, such as that indicated in the title of Chapter 30, *a chapter of not permitting a man's heart to be turned away from him in the Nether World.* Item 61 of the MacGregor list pictures such an amulet, that is a scarab seen from above with legs spread out, and names it *kheprer,* an ambiguous designation which may be only *dung-beetle* or may be *Sun-god.*[74] In the same form the scarab occurs in the Dendera list, on the Boston die, and on the Kennard tablet.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1032; edition 1915, No. 1028.

Nos. 101-103 (Plate XXVI, 101a, b). Heart amulets.

No. 101, pale gold, Nos. 102, 103, electrum. About 200 B.C. to 100 A.D. Weight of No. 101, 3.87 grains (0.251 grams); of No. 102, 3.70 grains (0.240 grams); of No. 103, 3.97 grains (0.257 grams).

A small piece is broken out from the top of No. 101.

All three pieces were made hollow in two halves, pressed out in a die; the soldered seams are much in evidence, either overlapping or gaping open.

There is no provision for threading these amulets; they may have been tied on with a thread knotted about the middle of each piece, or merely laid between bandages. Although they seem to represent the heart, the form, as the Egyptians stylized it, is not so well rendered as usual; in particular, the lower outline is too rounded, and it is probable that these pieces are quite late, from a time when the old forms were often inaccurately copied.[75] Compare the heart as correctly drawn on No. 133.

Professor Petrie has noted[76] rare examples of the heart amulet from the Sixth Dynasty, not later than 2600 B. C., but these amulets did not become common until after 1580 B. C. Judging by Chapters 26 to 29 of the Book of the Dead, some of which texts are found in shorter form on the earlier coffins (compare page 159), we surmise that the amulets were given as talismans against the dreadful danger that the deceased would be deprived of his heart

[74] Another amulet of the late age, the winged scarab, may receive passing mention here. This representation of the Sun-god is surely a secondary one, for the wings are not the scarab's own, but those of a falcon, and in the amulet we see amalgamated the conceptions of the Sun-god as a falcon darting across the sky and as the beetle rolling its ball, the former more poetic and appealing!

[75] The Berlin collection includes a similar, but somewhat better-shaped, late heart amulet, which was brought from Egypt by Lepsius, a contemporary of Dr. Abbott; Schäfer, *Goldschmiedearbeiten,* No. 123, Pl. 17.

[76] *Amulets,* p. 10.

in the next world. They were intimately related in purpose, however, also to the heart scarab, of which the incantation, Chapter 30 B, was sometimes inscribed on a large stone heart,[77] or on a hybrid form such as a scarab head merging below into a heart.[78] The heart amulet is present in the Dendera and MacGregor lists and on the Boston die, but is omitted from the Kennard tablet.

BIBLIOGRAPHY: No. 103 bore the number 1009 of the 1915 Abbott catalogue, which is obviously wrong, and Nos. 101 and 102 were found numbered 1001 and 1000, for which the entries seem curious but may be the original ones. Corresponding to the two last numbers are Nos. 1005, 1004 of the Abbott catalogue, editions 1853 ff.

No. 104 (Plates XXVII, a, b, XXIX, c). Amulet representing the soul as a human-headed falcon.

Gold, lapis lazuli, turquoise, and steatite. Twenty-sixth Dynasty to Ptolemaic period, 663-30 B. C. From Sakkara. Weight, 106.67 grains (6.912 grams).

POINTS OF INTEREST: For richness of material, admirable design, and skill of workmanship, this is one of the handsomest pieces in the collection; it gives an adequate example of a technique, often likened to modern cloisonné, which was peculiar to Egyptian jewelry and was practised from very early times probably until into the Ptolemaic period[79] (compare page 32).

The jewel has lost only one small steatite inlay; the strip of gold forming one of the eyelets has sprung loose at one end.

The technical process has been described under No. 3. Here the number of cells is larger and the stones have been ground before being inserted into their places until they fit (Plate XXIX) better than do the inlays of our older piece. The light blue stones are turquoise, the dark blue, lapis lazuli, and the few inlays of the color of darkened ivory are "apparently a steatite."[80] The back of the human head is made of a domed disk, soldered in position. The under surface of the bird (with the exception of the wings and the tip of the tail) and the human face (*b,* Plate XXVII) are in relief, probably having been pressed out in a die. The wings are plain below, but the tip of the tail is inlaid, having five cell walls which were soldered to the main piece[81] and five stones which were fitted and cemented into the cells. The eyelets were made each of a strip of sheet gold to which six wires of gold (with longitudinal seams) had been soldered; these strips were then bent

[77] Examples in the Abbott collection, Nos. 619 and 621 of 1915 catalogue.

[78] So in No. 155 of the Edwin Smith collection, Abbott catal., 1915 ed., p. 87. Cf. Petrie, *Scarabs and Cylinders,* Pl. XLVII, 1.

[79] The example No. 39 cited below, n. 88, has the cells filled with enamel, but is not certainly dated.

[80] This was the opinion of Dr. Kunz, who kindly examined the piece.

[81] That is, the bottom plate of the inlaid work is the same for the upper inlays and the few inlays of the reverse.

over and soldered down to the under surface of the wings. In all 241 separate pieces of gold and 231 stones make up this jewel, which is one of the finest specimens of its kind in existence, comparing favorably with the princesses' jewels of the nineteenth century B. C. (see page 238) in the delicacy of the work. The color of the metal is that of fine gold.

Over an amulet of the soul made of *gold inlaid with costly stones,*[82] according to the Eighteenth Dynasty papyrus of Ani (Book of the Dead), was to be recited Chapter 89 of *causing that the soul rejoin its body in the necropolis,*[82] and the accompanying vignette in other copies, as well, usually pictures the soul, hovering in the air, as it is about to settle on the mummy outstretched on its bier. We do not know of any amulet of the form of the present piece which certainly antedates the Twenty-sixth Dynasty,[83] but the conception of the soul with extended wings settled on the breast of the mummy may be traced in other sources from about 1500 B.C.,[84] and it is not improbable that Ani's amulet was of the design with extended wings. The connection of this amulet with Chapter 89 and the closely related Chapter 92 of the Book of the Dead in the late period is rendered clear in a number of stone sarcophagi in mummy form which have the soul with outspread wings and portrait head depicted on the breast,[85] and inscribed below it one or both of the Chapters 89 and 92. The amulet was effective, then, with an incantation which met the dangers of the next life, not by preventing something evil from happening (compare under our Nos. 100 to 103), but by causing the right thing to come to pass. The following Nos. 105 (presumably) and 106 are of the same character, and No. 107 is associated with a spell whose effect is stated in both preventive and active formulæ.

Two slightly varying types of this amulet are known, one with the bird's legs drawn inconspicuously close to the body as in our two pieces, the other with the legs extended and the *shen*-emblem grasped in the claws, just as in the vulture-amulets Nos. 92 and 128; in the examples known to us of the sec-

[82] Trans. Allen, *Handbook,* p. 123. Cf. Grapow, *Ä. Z.,* Vol. 49 (1911), p. 53, n. 4.

[83] The most probable instance is that of Schäfer, *Goldschmiedearbeiten,* No. 37, ascribed to the New Kingdom; this amulet is of the variant type with extended legs and head in profile to the right. We note that the soul represented thus appears above the collar of the Two Goddesses in the Serapeum pectoral bearing Ramses II's name; on the reverse it has a human head, on the obverse a ram's head; Mariette, *Sérapéum,* III, Pl. 9.

[84] So in the model of a mummy on its bier from the tomb of the parents of Queen Tiy: see Davis' Excavations, *Iouiya and Touiyou,* Pl. XXIII = Quibell, *Tomb of Yuaa,* No. 51107, Pl. XXVII, in which the human head of the bird is masculine, as kindly determined for us by Mr. L. F. Hall; also in a goodly number of ushebtis of the New Kingdom; see, for example: Legrain, *Catalogue des antiquités égyptiennes; Collection H. Hoffmann,* Paris, 1894, cut on p. 34, No. 87; *P.S.B.A.,* Vol. 18 (1896), p. 145, Pl. VI.

[85] The following examples are known to us; (a) No. 11.154.1 in the Metropolitan Museum, still unpublished, with both chapters; (b) one in Leyden, with Ch. 89, see P.A.A. Boeser, *De Monumenten van den Saïtischen, Grieksch-Romeinschen, en Koptischen Tijd (Beschrijving van de Egyptische Verzameling in het Rijksmuseum van Oudheden te Leiden),* 'S-Gravenhage, 1915, Pl. IX a; (c) one in Vienna, discovered at Sakkara in 1849; we found among the papers of Gustav Seyffarth bequeathed to the N. Y. Hist. Soc. a number of the *Illustrirte Zeitung* for Jan. 28, 1854, giving views of its decoration including the figure of the soul; (d) No. 29 in Berlin; the figure of the soul on this sarcophagus is given in a line cut in Schäfer, *Von ägyptischer Kunst,* 2nd ed., p. 208, Fig. 177.

ond type the head is turned to the right and the reverse of the amulet is flat and plain. Noticeable is the plainness of the back of the human head in our two specimens, there being no indication of hair, and it is tempting to regard them as derived from burials of priests and, like the figures of the soul in relief on the sarcophagi mentioned above, as conceived with the shaven head of the deceased priest; yet the shape of the head is not quite right for this explanation, and the amulet-maker may merely have spared himself the trouble of indicating hair. Of the fine inlaid examples of this amulet, recorded as found in position in late burials, and therefore of importance for dating our piece, we can cite a number of examples, those of Uzahor of Hawara, and of Harkhebit and Thanhebu of Sakkara.[86] The earliest record states that Dr. Abbott himself removed the present piece from the breast of a Greek mummy. Possibly, then, it is as late as the Ptolemaic period (compare page 158). The total number of such pieces extant is not small,[87] but generally nothing is known of the conditions under which they were found; one example in Berlin, however, is likely to be Ptolemaic, another is without question Roman.[88] There is a curious old account of the opening of a mummy, belonging to the collection of James Douglas, before the Literary and Historical Society of Quebec in November 1864,[89] when such an amulet, weighing "3 dwts, 10 grains" (5.314 grams), was found on the pit of the stomach. The amulet is included in the Kennard tablet, where it is executed in inlays of stone; it occurs as item 48 of the MacGregor list, and is found on the Boston die.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 50; Abbott catalogue, editions 1853 ff., No. 1099; edition 1915, No. 1095.

No. 105 (Plate XXVII, a, b). Amulet representing the soul as a human-headed falcon.

Gold. Twenty-sixth Dynasty to Ptolemaic period, 663-30 B. C. From Sakkara. Weight, 37.89 grains (2.455 grams).

The back of the human head and bird's body and wings are in one piece of sheet gold domed to produce the curvature of the head and chased to render all the fine details of feathers. The under surface has another very skillfully worked piece of gold soldered on in which the legs, body, and charming human face have been modeled in repoussé and chasing, with some supplementary carving about the face. An eyelet, composed of a bent-over strip of

[86] See above, notes 2, 4, 5.

[87] Hilton Price *Catal.* 1897, p. 136, No. 1430 b; p. 428, No. 3566; *Catal. of the Important and Extensive Collection of Egyptian Antiquities, the Property of the late F. G. Hilton-Price, Esq.*, London, 1911, Pl. XXII, Nos. 924, 925; *Bull. M.M.A.*, Vol. XI (1916), p. 211; Marshall, *Jewellery*, No. 1253, Pl. XIV, and the examples cited there.

[88] Schäfer, *Goldschmiedearbeiten*, Nos. 39, 40; both pieces are inferior to our amulet and those of the Saite and Persian periods cited above; No. 40 is without inlays.

[89] *Transactions* of the Society, Session of 1864-65, New Series, pp. 108-112.

gold, into which three longitudinal rills had previously been tooled, is soldered to the bird's breast. The material has the color of fine gold.

So far as we know, the efficacy of the amulet was the same as that of the preceding number, from which it differs only in the material and technique. The MacGregor list calls for three (or a multiplicity of?) such amulets and only occasionally were the richer inlaid specimens afforded. In the instance of Hikemsaf's burial outfit three gold amulets of the soul with wings spread were included and none was inlaid.[90] Uzahor of Hawara had only two, one inlaid, one exquisitely wrought in gold only; the former was found on the breast outside the main wrappings and the latter was included, also on the breast, with the principal array of amulets which were revealed after the outer wrappings had been cut away.[91]

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 49. Abbott catalogue, editions 1853 ff., No. 1105; edition 1915, No. 1101.

No. 106 (Plate XXVII). Amulet representing the *ded*-symbol.

Gold. Probably later than 1000 B. C. From Sakkara. Weight, 5.63 grains (0.365 grams).

This amulet was worked from the reverse and obverse by a combination of repoussé and chasing; the eyelet is in one piece with the front. The amulet is now open at the back and probably never was closed as the edges are not well finished.

The *ded*-amulet has the form of the cultus image of Osiris as he revealed himself to men at Dedu (Greek name, Busiris) in the Delta, one of his earliest sanctuaries. The small amulet is very rare, if it occurs, prior to 1580 B.C.,[92] but the form of the *ded,* the cultus image, is known as a hieroglyph and as a motif in Egyptian art from a time early in the historical period. This religious symbol is ordinarily spoken of as "*ded*-column" and in the temples of Osiris it was of a size to be manipulated with cords and was raised and lowered during certain mysterious rites of the god's worship; at least as early as 1500 B. C., it was interpreted as representing the backbone and ribs of Osiris. On the significance of the *ded* as a funerary amulet, see above page 156, and for the form, compare below, item 5 of No. 134; also Plate XXIV, at the extreme right.

An amulet similar stylistically to the present piece was found in a plundered tomb at Abydos, referred to again under No. 107, which antedates the Twenty-

[90] *Annales,* V, p. 76.

[91] See above, n. 2. Cf. the piece pictured in the *Handbook of the Museum of Fine Arts, Boston,* 1920, p. 50.

[92] Unless such units as the *deds* in the princesses' bracelets should be classed as amulets; De Morgan, *Dahchour,* I, Pl. XVI, 2; II, Pl. V, 9.

sixth Dynasty, although the possibility is not excluded that the amulets found in it are from a secondary, later burial.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1015; edition 1915, No. 1011.

No. 107 (Plate XXVII, a, b). Amulet representing the celestial cow.

Electrum. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. Weight, 12.79 grains (0.829 grams).

The piece has been very carefully cut out *à jour,* working entirely from the obverse over a bed which yielded little. The details were chased in and the eyelet made of a narrow strip of sheet metal, bent over and soldered to the reverse at the neck.

The cow agrees in most respects with the vignette of Chapter 162 in the Turin copy of the Book of the Dead, probably from the Ptolemaic period, which was published long ago by Lepsius; this chapter is known only in the late rescension and was to be spoken over the figure of a cow, made of gold, and put at the neck of the deceased. The title reads: *A chapter for causing that there be flame under the head of this glorious one* and a gloss adds: *If thou puttest it* (the amulet) *on the neck of a man after his death, he is mighty in the Abode of the Dead. No one shall drive him from the gates of the Underworld.* In the incantation, the cows speaks and calls herself by many strange names, but in a gloss she is revealed as the Sky-goddess by a reference to her son Re, (the name of the Sun-god as a purely cosmic divinity). This amulet occurs as item 53 of the MacGregor list, there called an *Image of Ahet,* who in the late period, at least at Abydos, was differentiated from Hathor, although originally the word may well have been a less theological name than Hathor (*House of Horus*) for the same goddess.[93] The artistic traditions followed by the amulet-maker were those for representing Hathor. Even so she appears by 1500 B. C. in the temple at Deir el-Bahri.[94] The object about the cow's neck in our amulet is a kind of heavy bead necklace with counterweight at the back, called the *menat,* which was much used as a cultus object in the service of goddesses.[95]

The amulet is rare before the late period, but an example in glazed pottery of the Nineteenth Dynasty was published by Mr. Petrie[96] and one of gold was found at Abydos[97] in a plundered tomb, which Mr. Mace ascribed to

[93] So Professor Sethe, *Zur altägyptischen Sage vom Sonnenauge das in der Fremde war* (Sethe, *Untersuchungen,* Vol. V, Pt. 3), Leipsic, 1912, p. 29.

[94] Naville, *Deir el Bahari,* IV, Pl. CIV.

[95] Discussed by Dr. Gardiner, *Rec. de trav.,* Vol. XXXIV (1912), p. 74; also by Dr. Blackman, *The Rock Tombs of Meir. Part I,* (Arch. Survey of Eg. XXIInd Memoir), London, 1914, pp. 23-4 and *Meir. Part II* (Arch. Survey. XXIIIrd Memoir), 1915, p. 37.

[96] *Amulets,* Pl. XXXVII, 208 c, p. 44.

[97] MacIver and Mace, *El Amrah and Abydos,* Pl. LII, D 63, pp. 79, 91.

the Twenty-second Dynasty (945-745 B.C.); in this last instance, the robbers' leavings included other gold amulets representing a *ded* (compare No. 106), a counterweight for a bead collar, and a vulture of the type of item 7 of our No. 134. If really so early, this small group [98] is of value for the chronology of the late amulets, but the evidence for dating it, as Mr. Mace himself pointed out, is not wholly satisfactory. In the late period, properly, the deceased should have two of these amulets, for the standing cow is figured twice in the Dendera list and requisitioned in two examples in the MacGregor list.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1064; edition 1915, No. 1060.

No. 108 (Plate XXVII, a, b). Amulet representing the celestial cow.

Gold. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. Weight, 8.56 grains (0.555 grams).

The figure, even to the eyelet, was nicely worked in repoussé from one piece of sheet gold and the details chased in. The color is that of fine gold.

The amulet corresponds in form to the celestial cow of the vignettes of Chapter 17, section 18,[99] and Chapter 71 of the Book of the Dead, where the cow is named Mehitweret, in one legend with the words the *Eye of Re* in apposition. Now the "Eye of Re" in some texts was no other than the goddess Hathor.[100] Here the headdress includes the tall feathers often given to Hathor. The covering over the cow's back was perhaps suggested by the decking of animals embodying divinities that were kept in the temples. What is perhaps an example of this amulet in glazed pottery of the Eighteenth Dynasty has been published,[101] but the amulet is uncommon before the late period. It is difficult to say whether, in late thought, it represented specifically Mehitweret or whether, perhaps, in a vaguer way, it insured the protection of Hathor. Possibly it may be a variant of the preceding number. A recumbent cow was found among Pedineit's gold amulets [102] but none standing; the Boston die provides for making both kinds, while the recumbent figure is unrepresented in the Dendera and MacGregor lists. An examination of Chapter 162 by someone to whom a series of late copies of the Book of the Dead is accessible would show whether the standing posture were constant to the vignettes of that incantation.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1066; edition 1915, No. 1062.

[98] According to the publication cited in the previous note, the group was assigned to Berlin, but only some rosettes belonging to it appear in Schäfer, *Goldschmiedearbeiten,* as No. 100, where Möller accepts for them, on the authority of the excavators, a date in the XXIInd Dyn.

[99] Grapow, *Religiöse Urkunden,* V, p. 38.

[100] Sethe, *Sonnenauge,* p. 28.

[101] Petrie, *Amulets,* p. 44, 208 a, Pl. XXXVII.

[102] *Annales,* III, Pt. 1, Pl. IV, 11.

No. 109 (Plates XXVII, a, b, XXX, c). Amulet representing the goddess Hathor (?).

Pale gold. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. Present weight, 10.25 grains (0.664 grams).

The horns are partially broken away. There is no indication that the figure ever had an eyelet.

The technique is like that of No. 108. Strengthening bridges of metal were left between the hands and the body, and a base left under the feet. The fineness of the work and the dignity of the conception are evident in the admirable character of the piece when enlarged to eleven diameters (Plate XXX).

The goddess is represented in an archaic, closely clinging, patterned dress which hangs from one shoulder; as adornments she wears a bead collar, bracelets and anklets; the usual wig, with one mass of hair brought forward over the right shoulder, is used as a transition between her animal head and human body. She is without additional headdress, but is characterized by the cow's head as Hathor, or a goddess closely related to Hathor. The vignettes of Chapter 162 of the Book of the Dead sometimes include a cow-headed goddess, following the celestial cow.[103] If the amulet over which this incantation was to be said admitted of variants[104] possibly the present amulet may be such a one. Pedineit's gold amulets included one figure of the cow-headed human goddess and another, as we have seen, like our No. 108; possibly he was given these instead of the two examples of the *image of Ahet* in standing form prescribed by the MacGregor list. Another view would be that the amulet insured the protection of Hathor. But we are on uncertain ground in these surmises. We do not know of any specimen of just this amulet antedating the late period.

BIBLIOGRAPHY: Abbott catalogue, editions 1854 ff., No. 1111; edition 1915, No. 1107.

No. 110 (Plate XXVII). Plaque with the goddess Hathor (?) in relief.

Pale gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 5.94 grains (0.385 grams).

The piece represents the same technique and period as No. 100 and the other amulets of the same set, and was associated with them in the old numbering, but is possibly, although not necessarily, from another burial, since the shape of the plaque, the material, and the thickness of the sheet, 0.0045 inches (0.114 mm.), all differ in this amulet.

[103] So M. Naville in *The Life-Work of Sir Peter le Page Renouf,* Vol. IV, p. 348.

[104] Aside from the cheap method of drawing the cow on new papyrus, represented in the hypocephali—inscribed disks, found under the head in some burials, which regularly have on them parts of this chapter; Petrie, *Abydos. Part I. 1902* (XXIInd Memoir. Eg. Expl. Fund), London, 1902, pp. 49-50, Pls. LXXVI, LXXVII, LXXIX, giving specimens of Dyn. XXX.

In this instance the goddess is standing or walking and carries the papyrus scepter and perhaps the symbol of life (compare under No. 112). She wears the solar disk between her horns in allusion to her association with the Sun-god, being in the various myths now his mother, now his consort, now his daughter. On the meaning of the amulet, see under No. 109.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1036; edition 1915, No. 1032.

No. 111 (Plate XXVII). Plaque with the goddess Hathor (?) in relief.

Gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 4.55 grains (0.295 grams).

The amulet was made in a die, like No. 100 and the amulets associated with it, and has an even larger number of imperfections than the others of the same set. Its color is close to that of fine gold.

The subject is the same as in the preceding number and varies from it only in having added to the headdress the tall feathers seen also in No. 108. On the interpretation see under No. 109.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1031; edition 1915, No. 1027.

No. 112 (Plate XXVII). Plaque with figures of Isis and Nephthys in relief.

Gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 8.33 grains (0.540 grams).

Also this amulet, made in a die, is full of flaws. Note especially the boss below, between the foremost figure, Isis, and the object in her companion's right hand, and the omission of Nephthys' left foot.

The amulet belongs to the same set as No. 100, and has the same color.

The two goddesses, whose efficacy for the dead has been noted above (page 159), are represented here after the scheme of the old processionals of gods carrying their gifts to the king (compare page 69). Here the immediate inspiration was the series of stock themes represented in temple reliefs and funerary texts of the late period where Isis and Nephthys, often accompanied by Horus, appear at the side of Osiris. They are unmistakably identified by the hieroglyphs with which their names were written worn as headdresses. The gift of life of the early reliefs symbolized by the hieroglyph for *life* carried in the lowered hand had become the commonest attribute of gods and goddesses and was no longer understood as of old, and the papyrus stalk symbolizing the gift of exuberant freshness, like that of growing plants,

given of old by goddesses, was also now a mere attribute in their hands. Figures such as these appear in the Dendera list.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1033; edition 1915, No. 1029.

No. 113 (Plate XXVII). Plaque representing Isis, seated, holding the child Horus.

Gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 4.78 grains (0.310 grams).

On condition, technique, and color, compare No. 100 belonging to the same set of amulets, and on the efficacy of the piece as a funerary amulet, see above page 159.

The goddess is represented here, as frequently in the reliefs of the New Kingdom and later, with a headdress of cow's horns inclosing the sun's disk (compare above No. 28). In late statuettes, as pointed out by M. Daressy,[105] these horns spread a little more and are shorter than those commonly given to Hathor (compare No. 111). Do they have their origin in an early conception of Isis as a sky-goddess, to whom the horns of the celestial cow would then be appropriate, or are they due to an assimilation of Isis to Hathor? Such questions of iconography have not as yet been much studied and with respect to Isis, aside from her funerary offices, we know very little; she did not have a cult until a comparatively late time (compare page 103).

This amulet of Isis and her infant, item 60 in the MacGregor list, is confined to the late period, with a possible rare exception, noted by Professor Petrie.[106] Even larger-sized figures in the round are unusual before this time, but there is one such statuette in London which may receive passing mention here;[107] in it, Isis is depicted as a human mother nursing her child, without attributes,[108] and wearing the large wig and pleated linen garment characteristic of the New Kingdom, after 1500 B.C.; it is altogether a gracious and engaging conception of her.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1035; edition 1915, No. 1031.

Nos. 114, 115 (Plate XXVII, a, b). Amulets representing Isis and Nephthys.

Gold. Twenty-fifth Dynasty, 712-663 B.C., or later(?). From Sakkara(?). Weight of No. 114, 14.49 grains (0.939 grams); of No. 115, 12.87 grains (0.834 grams).

[105] *Statues de divinités* (Cairo *Catal.*), Cairo, Vol. I, 1906, p. 395.
[106] *Amulets*, p. 35, No. 148 A.
[107] Hedwig Fechheimer, *Kleinplastik der Ägypter* (Vol. III in *Die Kunst des Ostens*, edited by William Cohn), Berlin, 1921, Pl. 93.
[108] The interpretation depends on the improbability that a human mother would be so represented except in the character of Isis.

Both figures have been worked entirely from the obverse; the edges were cut with a bevel and the details chased in with no great care. The thickness of the sheet, plus some relief on the reverse brought up by the use of punches, varies from 0.0183 to 0.0193 inches (0.46-0.49 mm.). The eyelets were made of strips of sheet hammered to an approximately round section, except at the ends where they were left flat for convenient soldering to the reverse of the piece. No. 115 has a specific gravity of 14.094 and a sample from it has been microchemically analyzed, establishing the presence of gold, silver, and lead (in small quantity) and the absence of tin, zinc, and mercury. The material has all the appearance of being the same in these two amulets and Nos. 120 and 121, belonging to the same set. If it were purely a gold-silver alloy the specific gravity would indicate about 13.3 carat; the small amounts of lead and solder present would alter—but not greatly—this result.

Probably these amulets may be regarded as variants of the standing figures included in the Dendera list and on the Boston die and as having the same virtue for the deceased (compare page 159). Here the goddesses kneel, mourning, even as they are seen in many pictures of the late period,[109] Isis at the foot, Nephthys at the head, of the coffin of Osiris. The hand raised to the head is a gesture of mourning and the goddesses are identified by the same headdresses as in No. 112.

Amulets representing Isis and Nephthys mourning have been recorded only for the Ptolemaic period [110] but these pieces, in material and workmanship, so much resemble certain unpublished amulets of the Twenty-fifth Dynasty from Nubia, kindly shown to us by Professor Reisner, that we are inclined to believe that ours, too, are pre-Ptolemaic in date; conceivably they may even have been found in Nubia and passed down stream to Sakkara, whence Dr. Abbott, according to the old records, got them.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 1019, 1018; edition 1915, Nos. 1015, 1014.

No. 116 (Plate XXVII). Amulet representing Anubis (?) kneeling.

Gold. Twenty-fifth Dynasty, 712-663 B.C., or later(?). From Sakkara. Weight, 5.56 grains (0.360 grams).

The amulet, although apparently not belonging to the same set, is yet sufficiently similar in technique and style to Nos. 114 to 115 to be of about the same date. The thickness of the sheet metal is 0.032 inches (0.813 mm.).

A kneeling jackal-headed god is represented, probably either Anubis, conceived as kneeling by the coffin of Osiris, or Dewamutef from a set of the Sons of Horus (see pages 159, 182). It is said to have been found with Nos. 124, 130, and 131 about the neck of a mummy.

[109] Lepsius, *Das Totenbuch der Ägypter nach dem hieroglyphischen Papyrus in Turin*, Leipsic, 1842, vignettes of Ch. 151.

[110] Petrie, *Amulets*, pp. 35, 36.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1000; edition 1915, No. 996.

No. 117 (Plate XXVIII). Plaque with the minor gods Hapi and Kebehsenuf in relief.

Gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 5.05 grains (0.327 grams).

Various small breaks, including minutely small ones and a longer one along the back of the falcon head, may be the result of strain in working the gold.

On the technique and color, see under the similar No. 100.

The little figures are identifiable as Hapi and Kebehsenuf by the baboon and falcon heads, given, after about 1300 B. C., to these two of four minor gods, usually regarded as sons of Horus. We know these gods chiefly in their funerary aspect; they once cared for the dead Osiris [111] and consequently were supposed to minister to the human dead, and in this capacity their conspicuous office in earlier times was to protect the jars containing the viscera.

As small amulets the Sons of Horus are confined to the late period, from which numerous examples have survived. They are not, indeed, included in the known written lists, or on the Kennard board, but they appear on the Boston die. We do not know whether these late amulets were a further safeguard for the protection of the viscera, or were given to procure for the mummy in a more general way the services of these gods, as the foregoing amulets Nos. 112 to 115 probably invoked for it the aid of Isis and Nephthys.

It was customary to place these small amulets of the Sons of Horus in pairs on the chest, or less often, the stomach, of the mummy.[112] Their relative position, however, varied. Thus Professor Petrie found a set in place having Imset (with human head) and Kebehsenuf at the left facing each other and Hapi and Dewamutef (with jackal's head) facing each other on the right.[113] But the pair of our amulet, facing to the right,[114] presumably had vis-à-vis Imset and Dewamutef, now lacking from the set.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 989; edition 1915, No. 985.

No. 118 (Plate XXVIII, a, b). Amulet representing a minor funerary god, Hapi.

Electrum. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. From Sakkara. Present weight, 5.66 grains (0.367 grams).

111 See New Kingdom gloss to Book of the Dead, Ch. 17, § 20 (Grapow, *Religiöse Urkunden,* V) where "the company of gods behind Osiris" of the original text is interpreted to mean the Sons of Horus. Cf. Breasted, *Rel. and Thought,* p. 157.

112 Petrie, *Amulets,* p. 40.

113 *Abydos I,* Pl. LXXVIII = *Amulets,* Pl. LI, 9, D

114 Cf. Petrie, *Amulets,* Pl. XXXII, 182 f. yn. XXX.

The lower part of the figure has been broken off.

A very narrow chisel, perhaps 1/30 of an inch (0.76 mm.) across the edge, was used in cutting out the figure with its beveled edge. The details are chased in and the substantial eyelet is made of a strip of sheet bent into ring form and soldered on. The sheet is somewhat under 0.0195 inches (0.495 mm.) thick, as this, the only measurement obtainable, includes the slight burr on the edge. Although tiny and unpretentious, the amulet is made with more than usual care.

On the identity of the figure and its meaning as an amulet, see No. 117.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1016; edition 1915, No. 1012.

No. 119 (Plate XXVIII). Plaque with figure of a minor god in relief.

Gold. About 300 B.C. to 100 A.D. From Sakkara. Weight, 7.50 grains (0.486 grams).

On the condition, technique, and color, compare under the similar No. 100.

A bearded figure closely enshrouded and seated on the ground is represented. The major gods as worshipped in temples usually were depicted standing or enthroned, and we probably have to do here with one of those innumerable minor spirits who peopled the Lower World. Such figures abound in the late period on coffins and in the vignettes of funerary texts, often as here, without distinguishing attributes, and, therefore, to us nameless, but presumably kindly disposed to the deceased and helpful to him. Of this general character, too, are the following amulets, Nos. 120 to 122.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 990; edition 1915, No. 986.

Nos. 120, 121 (Plate XXVIII, a, b). Amulets representing two funerary gods.

Gold. About Twenty-fifth Dynasty, 712-663 B.C., or later(?). From Sakkara(?). Weight of No. 120, 10.18 grains (0.660 grams); of No. 121, 12.87 grains (0.834 grams).

These two pieces belong to the same set of amulets as Nos. 114 and 115; see under those numbers, therefore, with respect to material, technique, and date.

Funerary gods standing, holding a fillet(?) clasped in both hands, and having a sash hanging down in front, are especially common in the boldly painted, interior scenes of coffins of about 1000 to 600 B. C. Our amulets appear to represent supernatural beings of the same category; No. 120 may be

human-headed and crowned with a sun-disk, No. 121, animal-headed with a headdress of horns and disk(?), but these features are not very clear. Possibly they are two of the Sons of Horus.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 1014, 1020; edition 1915, Nos. 1010, 1016.

No. 122 (Plate XXVIII). Amulet representing a funerary god.

Gold. Probably pre-Roman in date, 1000-30 B. C. Present weight, 1.57 grains (0.102 grams).

The figure has been broken in two just below the head and is now cemented together.

The piece was worked in repoussé and a few details were chased in.

The figure is hardly a major god, or it would not be kneeling; it does not represent a human being, or it would not have the disk on its head. Probably it is a minor solar divinity, helpful to the dead, possibly one of the Sons of Horus.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 995; edition 1915, No. 991.

No. 123 (Plate XXVIII). Amulet in the form of a crescent.

Gold. Roman, after 30 B.C.(?). Weight, 20.86 grains (1.352 grams).

The loop is very much worn, proving that the amulet saw long service during its owner's lifetime.

The loop was bent out of a broad strip of sheet, of which the edges had been folded over and soldered down to give a finish; it is soldered into slits carved in the solid gold crescent. The latter was cast and its surface has a slightly frosted look. The material contains a speck of hard white metal.

The probable explanation of this amulet is that it represents the crescent moon and insured the protection of the Moon-god. It is unknown before 1600 B. C. and is comparatively rare even after that date[115] until the Roman period when it attained to great repute and was often represented suspended about the neck of the living.[116] It does not figure in the Book of the Dead, nor in the late Egyptian lists of amulets.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1062; edition 1915, No. 1058.

[115] See Petrie, *Amarna,* Pl. XX, 552 for a mould for such an amulet and *Amulets,* Pl. VI, 85 a-c for XVIIIth Dyn. specimens.

[116] Petrie, *Hawara,* Pl. XI; *The Hawara Portfolio* (XXIInd Publ. Br. Sch. of Arch. in Eg. and Egypt. Res. Acc. 19th year), London, 1913, Pl. VII; compare Schäfer, *Goldschmiedearbeiten,* under Nos. 147, 276.

No. 124 (Plate XXVIII). Amulet representing a funerary god.

Gold. From Sakkara. About Twenty-fifth Dynasty, 712-663 B.C., or later(?). Weight, 1.23 grains (0.080 grams).

The thickness of the gold sheet is only 0.006 inches (0.152 mm.). The outline of the figure was scratched in the gold and the piece then cut out with open spaces between the two legs and between the body and the staff. We think the amulet is one made rapidly and crudely rather than an unfinished piece. It may have been threaded through one of the openings.

The god is too vaguely rendered to be definitely recognizable, but is obviously standing, and the object in the left hand is probably the *was*-staff ordinarily carried by gods. The scheme of presentation is, accordingly, analogous to that of No. 112, and the divinity is probably a more important one than those of Nos. 119 to 122.

On the date, see No. 116 with which this piece is said to have been found.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 999; edition 1915, No. 995.

No. 125 (Plate XXVIII, a, b). Amulet representing the god Khons-Re.

Gold. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. Weight, 67.81 grains (4.394 grams).

POINTS OF INTEREST: The heavy weight, the wear on the eyelet, showing that it had a pre-funerary use, the high carat of the gold, the nicety of workmanship, all mark this amulet as exceptional among extant pieces.

The amulet was made in five pieces of which the principal ones are castings. The largest piece is the figure itself; the sun-disk was soldered to the crescent and the latter to the figure's head; the uraeus, probably beaten work, was soldered to head, crescent, and disk, and the eyelet was soldered on of a piece of gold tooled with three longitudinal ridges. The details of collar, headcloth, and falcon head are chased in. Inconspicuous, but abundant, specks of white metal are observable in the gold; its high specific gravity, 17.646, and rich color indicate a high carat, but because of the amount of solder a determination of the carat is hardly possible.

The god represented is Khons, the child in the Theban triad, who came into prominence only after Thebes as the capital of the land had reached the height of her wealth and power. Khons in his own right, so far as we know him, was a somewhat colorless divinity, but he was assimilated to two of the great Egyptian gods, Thoth, the Moon-god, and Re, the Sun-god. The lunar disk and crescent of our amulet are borrowed from Thoth, the falcon head from the Sun-god.[117]

[117] See the important discussion of Khons by Dr. Blackman in *J. E. A.*, Vol. III (1916), pp. 246-9.

The amulet is pictured suspended from the neck in association with an interesting array of other funerary amulets on the cartonnage of a mummy of the Twenty-second Dynasty (about 950 B. C.),[118] and many examples of the actual amulet, all subsequent to the New Kingdom, have come down to us.[119]

In this amulet the solar aspect of Khons is emphasized, so much so that it often lacks the lunar crescent.[120] We may question whether it is then to be called simply Re and the disk on the head to be regarded as the solar disk. The legend attached to such an example in the MacGregor list (item 44), however, perhaps indicates that it was still Khons and we know that the Egyptians did not make statues or statuettes of a great cosmic divinity, except as some god with a cult was identified with him. They did, however, represent the cosmic divinities in drawings and as early as the latter half of the Eighteenth Dynasty a figure identical with ours, except that it lacks the crescent, occurs in the vignettes of the Book of the Dead for Re, sitting in his bark, as he traverses the waters of the sky and the Lower World.[121] The amulet probably is not mentioned in the Book of the Dead and we have no evidence for determining whether in funerary use our piece had a highly specialized magical power, or not, but we may surmise that its owner in life was a Theban,[122] who, by wearing it, put himself under the protection of Khons, one of his *city gods*.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1076; edition 1915, No. 1072.

(b) Late Amulets of Which the Interpretation Is Especially Doubtful

No. 126 (Plate XXVIII). Piece of sheet with a pectoral in relief.

Gold. Ptolemaic period, 332-30 B.C.(?). Weight, 2.24 grains (0.145 grams).

On the technique, compare under No. 97, belonging to the same set. The material is probably fine gold.

A pectoral is the object represented in relief, even to the long tubular eyelet by which it was suspended, and on the pectoral is a device, perhaps a

[118] *Annales,* Vol. II (1901), Pls. I, II accompanying a report by Mr. Howard Carter, pp. 144-5; a pair of leather straps bearing the name of Osorkon I are an indication that the date is not earlier than that mentioned above.

[119] Among them: Daressy, *Statues de divinités,* No. 38646 (glazed pottery); F. Arundale, J. Bonomi and S. Birch, *Gallery of Antiquities Selected from the British Museum,* London, 1841, Pl. 4, Fig. 8 (gold).

[120] So on the Boston die and an example found at Sakkara, *Annales,* III (1902), p. 211, No. 35371, Pl. II; *Annales,* III, p. 247; in IV, p. 81, and V, p. 76, under No. 35962, mention is made of gold figures of "Re," which are therefore, presumably, without the crescent; see also Sale *Catal. MacGregor Coll.,* p. 193, under lot 1500. Away from Thebes it was not unnatural to characterize the amulet less definitely as Khons. The amulet on the Kennard tablet lacks also the disk on the head.

[121] Speleers, *Papyrus. Nefer Renpet,* Pls. V, Fig. 4 (Ch. 102) and Fig 5 (Ch. 136 b); XIV, Fig. 28 (Ch. 130); XIX, Fig. 34 (Ch. 101). Compare the vignettes in Lepsius, *Totenbuch* (Ptolemaic), of Chs. 101, 102, 133, 136.

[122] Unfortunately the provenience of the amulet is unknown.

round-bottomed, two-handled vase. Vases and tiny plain pectorals were among Thanhebu's gold amulets [123] and ceremonial vases were included in the old Osirian equipment; one is to be seen also on the Boston die. On the other hand this device, instead of being a vase, may be a misunderstood heart (compare item 3, No. 133) and if so, its presence on the pectoral would seem more logical, inasmuch as the thought in the funerary pectoral of the period after 1580 B. C. was closely associated with that of the heart scarab and the text Chapter 30 B of the Book of the Dead (compare page 171) was often inscribed on pectorals. This pectoral in relief is of the usual architectural form in which the walls have a batter and the cornice is composed of a torus and a cavetto moulding.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 993; edition 1915, No. 989.

No. 127 (Plate XXVIII). Piece of sheet with an unidentified object in relief.

Gold. Ptolemaic period, 332-30 B.C.(?). Weight, 1.57 grains (0.102 grams).

On the technique, compare No. 97 belonging to the same set. The material is probably fine gold.

The object represented on this amulet bears some resemblance to the supposed girdle-tie [124] found on the mummy of Uzahor at Sakkara, but we can perceive no reason for calling either piece a girdle-tie, of which the proper form may be seen below in item 6 of No. 134 and in Plate XXIV, at the right. Probably both pieces are meant for the unidentified object pictured in the old Osirian equipment on coffin No. 28037 of the Cairo Collection.[125]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 991; edition 1915, No. 987.

No. 128 (Plate XXVIII). Amulet representing a vulture.

Electrum. Probably Twenty-sixth to Thirtieth Dynasty, 663-332 B. C. Weight, 10.23 grains (0.663 grams).

The form may well have been impressed in a die but the details of body, wings, and headdress have been chased in, as is evident from their sharpness. Just such a vulture with drooping wings, except that it has no headdress, is included on the Boston die and is entirely without inner details (compare page 207). The edges look as if they had been cut by a chisel. The eyelet is made

[123] *Annales,* I, pp. 269-70.

[124] *Annales,* III, p. 211, Pl. II, above, second from left.

[125] Lacau, *Sarcophages,* Pl. XXXIX, No. 184. Cf. now Jéquier, *Frises d'objets,* pp. 329-30, who gives reasons for considering it an implement used to stamp down ground which previously had been hacked up with a pick and for believing that it was given the dead to serve a ceremonial purpose.

of a flat strip of gold, hammered over a rod into cylindrical form and soldered to the head on the reverse.

The most likely explanation of this amulet is that it is a variant of No. 92, the vulture collar-amulet, which, as we have seen, retained little trace of its origin as a collar. This piece differs from the normal vulture collar-amulet in the drooping position of the wings, which would make it a misfit about the neck, and in the presence of the headdress, which perhaps was not worn by Nekhbet until about the Nineteenth Dynasty,[126] after 1350 B. C.; the headdress consists essentially of the crown of the South, appropriate to the patron goddess of the South. The object in the bird claws, when a hieroglyph, means *circle* or *to enclose,* and its symbolism is presumably derived from these meanings.

BIBLIOGRAPHY: Abbott catalogue, editions 1854 ff., No. 1113; edition 1915, No. 1109.

No. 129 (Plate XXVIII). Plaque with the hieroglyph *House of Nekhbet* (?) in relief.

Gold. About 200 B.C. to 100 A.D. From Sakkara. Weight, 4.78 grains (0.310 grams).

On the condition, technique, and color, compare under No. 100 belonging to the same set.

The hieroglyph may be read also *House of Mut* as the vulture is a word-sign for either goddess' name. The ground plan of a court with building in one corner is an old word, applied now to a stronghold, now to a town, now to a temple; it occurs also in the Egyptian writing of the names Hathor and Nephthys. Does this hieroglyph refer here to the early national sanctuary of the South, over which Nekhbet presided? Or could the plan of the walled-in court have served a magical purpose to fence in, and thus secure for the deceased, the protecting goddess and her good offices?

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1034; edition 1915, No. 1030.

Nos. 130, 131 (Plate XXVIII, a, b). Amulets representing a vulture.

Gold. About Twenty-fifth Dynasty, 712-663 B.C., or later(?). From Sakkara. Weight of No. 130, 7.44 grains (0.482 grams); of No. 131, 6.56 grains (0.425 grams).

On the date and technique compare under No. 116; here, the edges are beveled, as in Nos. 114 and 115, and the eyelets, of narrower strips of gold, are

[126] So Davis' Excavations, *Siphtah,* p. 15 and plate "Ceiling in Main Corridor;" Daressy, *Statues de divinités,* No. 39141, Pl. LIV, cf. pp. 392-3 under "atef."

soldered to the reverse between the wings. The thickness of No. 130 at the tail is 0.0148 inches (0.376 mm.), near the eyelet, 0.0222 inches (0.564 mm.). The pieces are said to have been taken, together with Nos. 116 and 124, "from a mummy, around the neck of which they were strung as beads in a necklace."

This way of representing a bird, an unsuccessful attempt at a diagonal view, goes back to a time earlier than 3000 B. C., but was later replaced in some instances by a more successful three-quarters view.[127]

Unless these amulets insured the protection of Nekhbet, or were variants of No. 92, we have no suggestion to offer as to their interpretation.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 997-8; edition 1915, Nos. 993-4.

No. 132 (Plate XXVIII, a, b). Amulet representing the goddess Isis-Serket as a human-headed scorpion.

Silver plated with electrum. Probably Twenty-sixth Dynasty, sixth century B. C. From Sakkara. Present weight, 87.81 grains (5.69 grams).

The tip of the tail with sting is broken off; the stone forming the body with the head attached to it is missing. The tail is now cemented in place, as the modern solder which shows in the illustration no longer holds.

All the extant parts of the scorpion are made of silver covered with thin sheet electrum. We think that the two metals were probably united by fusing. The legs are of tubing and the seams of the outer electrum gap somewhat; the fact that the inner silver is not solid is best seen in the open end of the right fore leg. Mr. Heins' experiments have shown that it would have been practical to make the double tubing in either of two ways: (1) by fusing together strips of the two metals and then drawing the resultant compound strip into tubing; in doing so, the trick is to scrape the two surfaces of contact clean and to have them absolutely flat and of the same size; (2) by drawing separate tubes of sheet silver and sheet electrum and slipping the one within the other and reducing in a draw-plate sufficiently to bring the two metals into firm contact. The setting for the stone was made of a strip of very thick sheet silver, giving a rectangular section, around which electrum was fitted and fused; the piece was bent with seam along the inner wall; in like manner the sting was made of a conical piece of silver covered with electrum and subsequently chased with horizontal rings; the seam shows along its outer curve. After the parts were bent into form, they were soldered to the base in the following order: first, either the eyelet and pair of fore legs, which are unconnected by solder with the other parts, or the setting for the stone and the parts connected with it. Of the latter the rear pair of legs was soldered first to setting and base, and the others in turn were soldered each to setting, base, and the

[127] Schäfer, *Von ägyptischer Kunst,* 2nd ed., pp. 137-8; cf. with our Nos. 130 and 131, Figs. 100-102.

pair of legs behind it. The visible ancient solder looks like an electrum of slightly lower carat than the outer metal layer of the parts united by it. The under surface, the base, as well as its upper surface, was electrum-covered; thus the intention must have been, as in the instance of the earlier earring No. 45, to give the effect of an object of solid electrum.

A clue to the date of our piece and to its one-time appearance is given by a similar amulet found at Memphis[128] in a stratum dated to the reign of Ahmose II (569-525 B. C.); this rare piece is of electrum, complete, with inset of beryl and human goddess' head crowned by horns and disk. Another piece, not quite so closely related stylistically to our amulet, was found in a tomb at Tell Moqdam in the Delta in association with objects inscribed with names of royal personages of the Twenty-second Dynasty.[129] Similar figures of bronze are in the Cairo Museum,[130] one of which, No. 39208, has a ring near the head by which it could be suspended. All of these small figures, whether votive offerings or amulets, have the human head with horns and disk, a headdress commonly given to Isis in the late period (compare Nos. 28 and 113), suggesting that these figures visualize the late conception of Serket (Selkis) as assimilated to Isis;[131] this view is confirmed by the inscription "Isis-Serket" on No. 39206.

Its alleged provenience from Sakkara suggests that our piece may have been a funerary amulet. But certainly the piece so like it from Memphis, which was found in town ruins on the site of the earlier palace of Merneptah, was not a funerary amulet and although Serket, a human figure with scorpion headdress, is included with her companion-goddesses of the dead, Neith, Isis, and Nephthys, in the Dendera list and on the Boston die, Isis-Serket is not found in the lists. Presumably the amulet placed the wearer under the protection of this composite divinity and there is inscriptional evidence that she sometimes protected especially against the sting of scorpions.[132] Still other late amulets, such as one on the Boston die, are in scorpion form without human parts;[133] whether or not always thought of as embodying Serket, they were probably efficacious against scorpions, in view of the occurrence of figures of scorpions on the late magic stelæ with Horus on the crocodile which protected against harmful creatures.[134]

It is of interest to note, in passing, that in early times Serket's symbol had a different form with forked tail;[135] it is doubtful whether this—"a mutilated

[128] *Museum Journal* (Univ. of Pennsylvania), Vol. VIII (1917), p. 230, Fig. 89.
[129] *Annales,* Vol. XXI (1921), p. 24, Pl. I, No. 5; material, gold and agate.
[130] Daressy, *Statues de divinités,* Nos. 39206-09, Pl. LVI.
[131] See on this point Roeder, article "Selket," columns 652-3 in W. H. Roscher, *Ausführliches Lexikon der griechischen und römischen Mythologie,* Leipsic, 1884 ff.
[132] Gardiner in *P.S.B.A.,* Vol. XXXIX (1917), p. 42.
[133] So one "of soft metal" found in a Ptolemaic tomb at Abydos and now in the Ashmolean Museum, Oxford; Peet, *Cemeteries of Abydos. II,* pp. 93, 126, Pl. XXXVIII, 2.
[134] See Daressy, *Textes et dessins magiques* (Cairo *Catal.*), Cairo, 1903; W. Golenischeff, *Die Metternichstele in der Originalgrösse,* Leipsic, 1877; very briefly, Gardiner, article "Magic," p. 267, in Hastings, *Enc. of Rel. and Ethics,* Vol. VIII.
[135] Davies, *Five Theban Tombs,* p. 10, n. 4.

and distorted human trunk," according to Dr. Gardiner's view—was a "deliberate disguise" for "mythical reasons" of an original scorpion nature or whether the scorpion became associated with Serket only in late times because of its fortuitous resemblance to her original symbol.[136] It is especially uncertain, therefore, whether the fairly numerous earlier figures of scorpions found on temple sites and in graves [137] had any reference to the goddess Serket.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 985; edition 1915, No. 981.

(c) Composite Amulets

M. Capart, at the close of his paper on the MacGregor list of late amulets, called attention to extant pieces of sheet gold each with figures of a number of amulets, chased on it; [138] these he considers intermediate between individual gold amulets and lists of such amulets inscribed on papyrus and given to the dead. In the same category are some rude pieces of the second century after Christ in the Berlin collection which have the amulets impressed in the sheet gold [139] and pieces found at Sakkara on a mummy of the Persian period [140] which apparently resemble in technique our two composite amulets.

Nos. 133, 134 (Plate XXVIII). Pieces of sheet with various amulets inscribed on them.

Pale gold. Persian or Ptolemaic period, 525-30 B.C.(?). Weight of No. 133, 7.99 grains (0.518 grams); of No. 134, 8.13 grains (0.527 grams).

The amulets were chased in the sheet gold before the strips were cut out, for in No. 133 the top of the heart has been removed and in No. 134 the upper line of the phallus and lower lines of the *ded* and of item 9 have been cut away. Both pieces contain specks of hard white metal.

These composite amulets insured for the dead the efficacy of all the individual amulets represented on them. Following the Egyptian normal order from right to left, No. 133 gave:

(1) The eye amulet, see under No. 95.
(2) The vulture collar-amulet, see under No. 92.
(3) The heart amulet, see under Nos. 101 to 103.
(4) An additional collar-amulet; the collar is stylized as in some late

[136] So in *P.S.B.A.*, Vol. XXXIX (1917), pp. 36 ff.
[137] Antedating 3000 B.C.: Capart, *Primitive Art in Egypt*, Fig. 151, p. 192, citing: Quibell and W. M. F. P., *Hierakonpolis. Part I* (IVth Publ. Egypt. Res. Acc.), London, 1900, Pls. XVIII, 15, 16, 22; XIX, 5; XX, 10; XXI, 4; XXII, 4; Quibell and F. W. Green, *Hierakonpolis. Part II* (Vth Publ. Egypt. Res. Acc.), 1902, Pls. XXIII, XXXII. Petrie and Mace, *Diospolis Parva*, p. 27. Around 2000 B.C.: Boston *Bulletin*, Vol. XIII (1915), p. 81, Fig. 16, No. 19. Around 1500 B.C.: Schäfer, *Goldschmiedearbeiten*, included under No. 22.
[138] *Ä.Z.*, Vol. 45, p. 21.
[139] Schäfer, *Goldschmiedearbeiten*, Nos. 126-8.
[140] *Annales*, Vol. I, p. 162.

temple reliefs[141] (where it is depicted being offered to the gods), in the Dendera list, and on the Boston die. Actual examples of the amulet were found in the funerary outfits of Pedineit and Harkhebit.[142]

No. 134 includes the following amulets:

(5) The *ded,* see under No. 106.

(6) The girdle-tie, see Plate XXIV, at right, and page 156.

(7) The vulture, compare under No. 129. Vultures in the pose of this one, to the number of five, are painted on two coffins from Bersheh in the Cairo collection, which date from the period around 2000 B. C. In both instances,[143] they occur in a register showing the king's regalia, and it cannot be doubted that the pictures represent objects in vulture form belonging to that regalia, rather than simply a goddess as a vulture or the bird itself. Hints as to their interpretation are not wanting: first the accompanying legends in one instance specify them as intended to be put on the head; on one coffin the five vultures are in the west frieze as pendants to five uræi of the east frieze, and on the other, they are put in the east frieze, where they replace the five uræi and bear the latters' names. We have already learned the purpose of the uræi (see No. 90). The vultures, too, we believe, were intended to be worn on the crowns and other headgear, in addition to, or perhaps at times without, the uræus, but because representing a secondary conception, they occur on the coffins less often than the uræi. As we have seen (compare page 162), the uræus was in origin the cobra set on the king's brow to protect him, just as in the myth *the blazing eye of the Sun-god,* which was Hathor, was set, transformed into a uræus, on the Sun-god's brow to defy his enemies. The tendency in Egyptian symbolism, however, to play on the thought of the Two Lands, the Delta and the Nile Valley, which in prehistoric times were once politically independent of each other, led, in the copy in the hands of the mortuary priests at Bersheh, to the idea that this uræus was the Serpent-goddess of the North who needed a pendant Vulture of the South. In their view, then, the sets of golden, jeweled uraei and vultures, which were to be the possession of the dead by virtue of these pictures, symbolized the protection of the tutelary goddesses of the North and the South. Traces of this secondary view are frequent on the monuments, when, instead of the single uræus, two uræi wearing respectively the royal crowns of the North and South, appear together on the head of some member of the royal family.[144] Again, a vulture-

[141] So *Rec. de travaux,* Vol. 35 (1913), p. 112, Fig. 6.

[142] See above, notes 3, 4; also *Annales,* Vol. XIX (1920), p. 214.

[143] Lacau, *Sarcophages,* Nos. 28083, 28088.

[144] So Queen Tiy in a relief in Brussels; Burl. Fine Arts Club, *Catal. Egypt. Art,* 1922, Pl. XII. Again, without the crowns, on the head from Sinai, Fig. 133 in Petrie, *Sinai.* Cf. Tutenkhamon's ushebti from the outer chamber of his tomb which has a vulture head and uraeus on the brow.

amulet and one representing the uræus were found together on the brow of a mummy of about 1000 B. C., included in the "second Deir el-Bahri find."[145] The late lists leave no doubt that the amulet of the standing vulture is in the same class with the small gold uræi, collars, scepters, etc., that is, it is dependent on the early idea of a royal equipment for the dead. The Kennard tablet has four of these vultures following six serpent amulets; in the MacGregor list, in addition to a goodly supply of golden uræi, there are seven items of vultures, four of them following directly upon the headdresses, requisitioning in all fifteen pieces, an ideal equipment which was nearly realized in the instance of Hikamsaf who had twelve such gold amulets.[146] A composite amulet published by M. Capart has inscribed on it the old supply of five vultures which are followed by a headdress.[147] And finally, we would mention the representation, in the second hypostyle hall of the temple at Edfu, of a diadem being presented by the king to the god Harkhentkhetai of Athribis; this diadem has the early form with two bow-knots, alluded to above, page 56, with the addition on the rim of upright figures, on the one side three vultures stylized as in the present amulet, on the other side three uræi.[148]

(8) The phallus. The phallus is enumerated by Professor Petrie under amulets of the class "Similars" and the specimens known to him are all of the Roman period. But it is included in the earlier MacGregor list as item 40 and in the funerary equipments of Harkhebit[149] and Pedineit[150] of the Persian period, and the need for it may be grounded in an episode of the Osirian tale.[151]

(9) An unknown amulet, similar to an object depicted between two mirrors on the west side of one of the coffins from Bersheh.[152]

(10) Two royal "shepherd's crooks" (compare under No. 94). Another form is represented here than in No. 94.[153]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., Nos. 1081-2; edition 1915, Nos. 1077-8.

[145] *Annales,* VIII, p. 30, No. 98. Cf. the fact mentioned above, p. 162, that on some other mummies of this find, two uraei occurred on the brow.

[146] *Annales,* V, p. 77.

[147] See above, n. 138.

[148] Marquis de Rochemonteix, *Le temple d'Edfou, publié d'après les estampages et les copies* (*Mémoires. Mission,* Vol. X), Paris, 1897, Pl. XL b, 3 d, I.

[149] *Annales,* IV, p. 81.

[150] *Annales,* II, p. 103.

[151] The god's phallus was swallowed by the Oxyrhynchos fish. See briefly Sethe in *Ä. Z.,* Vol. 57 (1922), p. 33 under 24.

[152] Lacau, *Sarcophages,* No. 28089, 32, Fig. 131. Its color is yellow, perhaps to represent gold. Cf. now, Jéquier, *Frises d'objets,* pp. 129-130, who shows that a small lance-shaped toilet knife is probably the object represented.

[153] Mace and Winlock, *Senebtisi,* p. 85, Fig. 47 and Jéquier, *op. cit.,* pp. 168-73.

F.—Statuettes of Gods

Among the earliest gold and silver statuettes of Egyptian divinities which have come down to us are tiny figures of the god Min,[1] found in tombs of the period just after 2000 B. C. From about 1500 B. C. a splendid gold figure of Amon, seven inches high, has survived.[2] But the majority of the extant statuettes representing gods and made of the precious metals are of a late period, after 1000 B. C. A few fine pieces are definitely datable to the Twenty-second,[3] the Twenty-third,[4] the Twenty-fifth,[5] and the Twenty-sixth[6] Dynasties, and others may be judged by their style to be of the last thousand years before Christ. Some of these figures come from tombs, others from the sites of towns and temples. Many are provided with loops by which they could be suspended (compare Nos. 135, 138), suggesting, together with their find-spots, that they were amulets or votive offerings; one instance is on record in which a tiny gold figure was to be suspended inside its silver box, for the loop is on the latter,[7] and Möller drew attention to a relief showing that in the far South even statuettes of cumbersome size were worn hanging from the neck.[8]

The four figures published here include two solid castings of silver (Nos. 135, 138), an oddity in the way of an ancient fraud of lead ore covered with gold foil (No. 137), and a figure made in two halves (No. 136), which is of special interest in connection with the ancient die, No. 139. Three of the figures represent gods of the Osirian cycle and the fourth portrays Nefertem, the child in the Memphite triad.

No. 135 (Plate XXXI). Statuette of the child Horus.

Silver. Probably later than 1000 B. C. Weight, 46.56 grains (3.017 grams).

The eyelet and side lock are partially broken away and the surface condition is poor.

[1] Ayrton and others, *Abydos. III,* Pl. XII, 1, 2, p. 8; Engelbach, *Riqqeh and Memphis VI,* Pl. I, 3, p. 12.
[2] Burl. Fine Arts Club, *Catal. Egyptian Art* (1922), No. 11, p. 106, Pl. XVI.
[3] So a triad of Osiris, Isis, and Harendotes in the Louvre; Vernier, *Bijouterie,* Pl. XVIII, 1, p. 113; Perrot and Chipiez, *Histoire de l'art,* Vol. I, p. 837, Fig. 571. This piece, made of gold and lapis lazuli, bears the cartouches of Osorkon II (874-853 B.C.).
[4] Petrie, *Ehnasya,* frontispiece, pp. 18-19, a solid gold figure of Harsaphes, god of Heracleopolis, found in his temple and weighing 1.25 ounces troy (38.88 grams); now in the Museum of Fine Arts; Boston *Handbook,* 1920, p. 50.
[5] Silver figure of Isis from the tomb of the Ethiopian Queen Kashtaneferuwka; Boston *Bulletin,* Vol. XIX (1921), half-tones on p. 29.
[6] A series of gold figures and one of silver covered with gold found in the town of the time of Ahmose II, above the Memphite palace of Merneptah; *The Museum Journal,* Univ. of Pennsylvania, Vol. VIII (1917), Fig. 89, pp. 228-30.
[7] Petrie, *Tanis II, etc.,* pp. 75-6, Pl. XLI, 8, 9; Petrie, *Ten Years' Digging,* p. 59, Fig. 47.
[8] In Schäfer, *Goldschmiedearbeiten,* under No. 46, citing Fig. 87, after Lepsius, *Denkmäler,* V, 62; also Cailliaud, *Voyage à Méroé,* Atlas Vol. I, Pl. XVI.

The piece is a solid casting, probably made by the "waste wax" process;[9] that is, a duplicate of the form of the desired statuette was probably cast in a stone mould (compare page 205) in wax, or in a mixture of materials capable of melting and running off without leaving a residue. This model was then perfected by hand and painted with layer after layer of some substance which would be hardened but not destroyed by heating, perhaps loam and water mixed with plaster;[10] in this mantle were reserved, by means of columns of wax attached to the model, a channel for pouring in the molten metal and air vents for the escape of the gases in the pouring. After the metal had been poured and the casting had cooled, the mantle was broken off, being used only the one time, and the figure was chased to remove superfluous lugs of metal and often to add details, although the present piece is without such details.

The little god is represented seated and nude, with arms held close to his body. The eyelet by which the piece was suspended is at the shoulders.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 883; edition 1915, No. 880.

No. 136 (Plate XXXI, a, b). Statuette of the child Horus.

Gold over a wax(?) filling. Probably Ptolemaic, 332-30 B. C. Present weight, 204.99 grains (13.283 grams).

We found the statuette broken crosswise in three pieces and lacking some particles of its core and outer gold shell. It is now held together by brass pins embedded in the core, to which it was necessary to add some wax.

The figure was pressed out in two parts in a die (compare Plate XXXI, 139 a, A) and the gold parts were soldered down the sides in overlapping seams; the hollow figure was then filled with what appears to us to be wax, or a mixture containing some wax, and some details were tooled in with a liner in the small of the back and elsewhere on the figure. The little round pedestal under the feet was separately made of a narrow band of sheet gold soldered on edge to a bottom plate; it, too, was filled and was then attached, closing the figure. There is a tiny rectangle of sheet gold on the left shoulder, probably a patch. The figure is without means of suspension.

[9] This is the usual view; see Schäfer, *op. cit.*, Nos. 46-8; Petrie, *Tools and Weapons*, p. 61; *Arts and Crafts*, p. 89; but M. Vernier, *Bijouterie*, p. 101, regards it as an open question whether or not the Egyptian jewelers used the waste wax process. On this method of casting as practised by modern craftsmen, see: Maryon, *Metalwork*, Ch. XXVI; Wilson, *Silverwork and Jewelry*, Ch. XXXII; on ancient methods, G. M. A. Richter, *Bronzes*, pp. XVIII-XX.

[10] Professor Erich Pernice in the *Jahreshefte des Oesterreichischen Archaeologischen Institutes*, Vienna, Vol. VII (1904), p. 158, n. 6, expressed the opinion, on Egyptian evidence, that moulding sand was not used in antiquity for casting but instead clay mixed with brick dust was employed (so in *Zeitschrift für bildende Kunst*, Leipsic, Vol. XXI, 1910, p. 221). Certainly the original one-piece mould in the N. Y. Hist. Society's Collection (*Quarterly Bulletin*, Vol. III, 1919-20, p. 1) is not of sand but has a plaster-like consistency and affords interesting evidence of the use of plaster for casting bronze. At least for many-part moulds to be used repeatedly it has not been thought that plaster would endure bronze; cf. Edgar, *Greek Moulds* (Cairo *Catal.*), Cairo, 1903, p. III.

In this instance the young god is standing, he raises the right hand to his lips, and is provided with the *atef*-crown. The plump body and the head, large in relation to the total height, indicate a later date for this statuette than that suggested by the proportions of the preceding No. 135.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1109; edition 1915, No. 1105.

No. 137 (Plate XXXI). Fragmentary statuette of Isis holding the child Horus.

Galena,[11] once completely covered with gold foil. Ptolemaic or Roman period, after 332 B.C.(?). From Sakkara.

The head and breast, upper arms, and parts of the lap and hands of the goddess, also the feet of the child, are missing. The gold foil is preserved only on the child's figure.

The statuette was carved from a lump of galena, then completely covered with a thin layer of plaster mixed with a binder on which the gold foil was laid. Much of the plaster remains where the gold has peeled off.

For the subject, compare the amulet No. 113. This statuette has a plinth at the back. The seat is of the type commonly given to kings and divinities. The baby has the side lock worn by Egyptian children and his hands are in the same position as in No. 135. We agree with the suggestion of the old Bonomi catalogue that the piece was probably passed off in ancient times for a statuette of solid gold.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 35, No. 51. Abbott catalogue, editions 1853 ff., No. 987; edition 1915, No. 983.

No. 138 (Plate XXXI). Statuette of Nefertem.

Silver. Probably Twenty-sixth Dynasty, sixth century B. C. From Memphis.

The lower parts of the legs (but not the base) are a modern restoration of the middle of the last century. The surface is much worn.

The piece was cast solid, presumably by the waste wax process; compare under No. 135.

This figure exemplifies a well-known type of statuette found at Memphis, where the god Nefertem was worshipped as the son in a family group in which Ptah and his consort Sekhmet were the adult divinities. The god's distinguishing attribute is a headdress, consisting of an open lotus flower surmounted by two tall upright feathers and flanked by two counterweights of the *menat*-necklace (see under No. 107). In the lotus flower, Professor Erman sees an allusion to a supposed origin of Nefertem as a flower.[12]

[11] Kindly examined by Dr. E. O. Hovey of the American Museum of Natural History.

[12] *Religion,* 2nd Germ. ed., p. 91; Engl. ed., p. 76; also Kees, *Ä.Z.,* Vol. 57 (1922), pp. 116-17.

A statuette similar stylistically to this one was found at Memphis in association with Greek coins of about 550 B. C.;[13] another (or the same one?) is included by Professor Petrie in his work Amulets as belonging to a group of the Twenty-sixth Dynasty.[14] A much finer piece in Berlin is assigned to the close of the Ptolemaic period on the strength of a demotic[15] inscription running around the base.[16]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 954; edition 1915, No. 950.

[13] Petrie, *Roman Portraits and Memphis* (*IV*), Pl. XXXI, p. 24.
[14] No. 175 e, Pl. XXX, p. 38.
[15] The late cursive writing which superseded hieratic in secular use.
[16] Schäfer, *Goldschmiedearbeiten,* No. 46, Pl. 10. Cf. the similar figure, also with demotic inscription, in Legrain, *Catal. Coll. Hoffmann,* 1894, pp. 108-9, No. 337.

G.—Tools

Very little is known about the tools used by Egyptian jewelers, for almost [1] the only extant ones indubitably identified are dies and moulds,[2] both single and composite, of which two late specimens are catalogued below. Some surviving copper and bronze tools would serve a jeweler very well; of such we publish here two characteristic pieces from the New York Historical Society's collections. M. Emile Vernier, the French engraver and medallist who was called to Egypt to study the great Cairo collection of jewelry, in his book on materials and technique, reproduced a number of ancient bronze tools, among which the knives [3] and late shears [4] are of such possible general utility that they may, or may not, have been used by jewelers, but the graver in the Cairo Museum,[5] having its cutting end shaped like a modern graver, would seem to be an important piece,[6] although lack of available information about its date and provenience detracts from its present usefulness as a datum. A bronze chisel from Thebes (1500-1200 B. C.?), not necessarily a jeweler's tool, however, has the special interest, so M. Vernier states,[7] of being composed of two layers of metal, an inner alloy rich in tin but somewhat brittle and a coating of softer bronze to absorb the vibrations from hammer blows and thus lessen the strain on the inner metal.

Much of the Egyptian manufacturing jeweler's apparatus is pictured on ancient monuments and inferences about tools may be drawn from an examination of extant jewels; these sources, however, are often open to differences of opinion, as when M. Vernier writes,[8] citing the same opinion held by M. Chassinat, that the Egyptians used only open fires and Professor Breasted, interpreting a wall-scene of the melting of gold, refers [9] to the fire as contained in a small clay furnace. The various ancient reliefs and paintings of jewelers

[1] Crucibles are mentioned in Dunn, *Mineral Deposits,* p. 23, but their date is uncertain; we cannot find that any ancient crucible used with gold or silver has been published, except one from Troy; see Dr. Henry Schliemann, *Ilios,* New York, 1881, pp. 408-9.

[2] For those tools into which sheet metal was pressed we prefer the name "die," finding it less confusing to limit "mould" to those into which the material was conveyed in a molten state. Many composite tools include both dies and moulds.

[3] *Bijouterie,* Figs. 23-7.

[4] *Op. cit.,* Fig. 22.

[5] *Op. cit.,* Fig. 162.

[6] The cutting part of the tool more nearly resembles that of a modern graver than does the corresponding part of another ancient graver, found near Mayence and probably of Roman origin, which is pictured in Blümner, *Technologie und Terminologie,* Vol. IV, p. 275, Fig. 33; the Roman tool may have been used for coarser work.

[7] *Op. cit.,* pp. 37-8, Fig. 1.

[8] *Op. cit.,* p. 53.

[9] *Ancient Times,* p. 63, Fig. 47. So also Mrs. Richardson, in the labels in the Daily Life Room of the Egyptian Department, Metropolitan Museum; *Bull. M.M.A.,* Vol. XIII (1918), cut on p. 287.

and other metal-workers at their occupation,[10] dating roughly from at least 2600 to 1300 B. C., show chiefly: scales being used to weigh the precious materials, crucibles, moulds,[11] larger and smaller mouth blow-pipes, bellows, anvils, gold-beater's blocks, stones held in the hand and used instead of hammers with a handle in beating gold sheet and gold foil, pincers for holding work in the flame, and drills in use in perforating beads of semi-precious stones.

The most extended examination thus far made of actual Egyptian work is that of M. Vernier, who illustrated his book on technique with many pictures of modern tools to elucidate the operations which he believes went on also in ancient Egypt. And the reader will have derived from the present study of a small group of jewelry some idea of the tools with which they were made. We have seen that the Egyptians possessed, in addition to the equipment recognizably pictured on the monuments, probably draw-plates of a sort (see page 40), and certainly knives, various punches, straight liners, small chisels, and a suitable yielding composition over which to do work in repoussé and chasing; in No. 23, we found evidence for a late period of the employment of binding wire, which presumably would have been of copper.

It is improbable, however, that the ancient Egyptian's tools were as highly differentiated one from another as the modern craftsman's various scorpers, punches, and pliers! Not only is there less variety in the extant tools which we may pick out as adapted to his use, a fact which by itself is inconclusive, because of the vast gaps in the material remains from antiquity, but the pictorial evidence shows him working without many a modern convenience. It is worth while to note some of the things which the Egyptian jeweler apparently had to do without during the periods when he produced his most beautiful and characteristic work, the periods covered by the wall-scenes referred to above. We have mentioned the lack of heavy hammers[12] for beating gold, and he was equally without convenient small hammers with handles, so far as any evidence shows, perhaps using with his chasing tools smaller stones or clumps of wood. He seems not to have had tongs for carrying his crucibles, but to have picked them up with stones(?) held in the hands or to have balanced them precariously between two bending rods; and among surviving tools from Egypt, tongs are not found until Roman times.[13] He was without files, so his work indicates, using instead an abrasive, sand or emery, perhaps applied with a stick and water. A lack which the modern maker of brooches and watch fobs would feel especially was that of the fine piercing saw, for which the Egyptian had no suitable material, cutting out all the *à jour* patterns instead by small chisels, on which he hammered, presumably in the fashion indicated above. And he was also without shears.

[10] References given Introduction, n. 31.

[11] Especially one scene in the tomb of Rekhmire where a great door is being cast; Erman-Ranke, *Aegypten*, p. 549.

[12] Professor Petrie, *Tools and Weapons*, p. 40, § 111, marvels that the Egyptian workman could endure the shock to the wrist consequent upon the absence of a handle.

[13] So Petrie, *op. cit.*, p. 41. Cf. Davies, *Puyemrê*, I, p. 73, green withes(?) used earlier.

If the Egyptian jeweler's equipment of the older periods was probably one which would seem very meager to a young beginner of the present day,[14] he himself was not unconscious, as time went on, of its limitations, for we may note some additions and improvements. In the third millennium B. C., in numerous wall-scenes depicting the melting of gold, two to six men surround the fire and blow with all their force through the reeds tipped with clay which served as blow-pipes, but about 1450 B. C., the air is forced into the pipes by one or more pairs of bellows, each manipulated by one man, who stands on the two bellows, rocking back and forth, expelling the air from one and releasing the other and filling it by drawing a cord, as the Egyptian bellows was without a spring to expand it automatically. Again in the older period men are pictured boring beads singly; about the time of the introduction of the bellows, however, we find represented the multiple bow-drill, that is, several drills being operated simultaneously by a single workman using one bow. By Classical times, when there is again evidence available in such matters, some of the convenient tools which were wanting earlier—shears,[15] proper hammers with handles,[16] possibly files [17]—had come into use.

Ancient tools now and then present interesting points of comparison with modern tools. Thus the Egyptian jeweler's drills did not resemble the modern drill pictured by M. Vernier,[18] having the cutting edges at the widest place, and thus making a bore of uniform diameter, but, rather, their cutting was done by the tapered ends which swerved about and produced tapering bores (Nos. 23, 83); this conclusion is based on the appearance of the bores. On the other hand, it has been shown that the ancient gold-beater's block of about 1450 B. C. was essentially like that of his modern successor, consisting of a block of wood set in the ground to carry off the shock of the heavy blows and of a great stone, set into the wood, on which the gold was beaten.[19]

[14] Mr. Wilson in *Silver Work and Jewelry*, Ch. III, mentions 40 to 50 chasing tools as sufficing for the most simple work.

[15] See Petrie, *op. cit.*, p. 48 on the convenient form peculiar to Egypt.

[16] See the Pompeian wall-painting of Hephaestus chasing a helmet; Blümner, *op. cit.*, Vol. IV, Fig. 28, and cf. Fig. 48. It may be mentioned that in Egyptian reliefs of the 4th cent. B.C. the old handle-less hammer was still represented; *Annales*, Vol. XX (1920), p. 65. But it is questionable whether this is good evidence as to contemporary practice, so much did artists of the late period take their themes from older work and even make copies of their ancestors' wall-decorations, as in the case of the tomb of Ibi at Thebes; there the scene showing gold-beaters wielding oblong or cylindrical hammers (bars of metal or a misunderstood copy of the earlier stones?) may not be dependable evidence for the 7th cent. B.C.; yet, just below the gold-beaters are depicted Canopic jars with covers in the form of animal heads unknown in the days of the first Ibi! For these reliefs see V. Scheil, "Tombeaux thébains. Le tombeau d'Aba," Pl. III, in *Mémoires. Mission*, Vol. V, Pt. 4.

[17] Blümner illustrates, *op. cit.*, p. 276, only coarse files, but see the literary evidence cited by him, p. 321, n. 2, for goldsmith's files; in the same passage, an epigram from the Palatine Anthology, a haresfoot is mentioned, and on a goldsmith's tombstone (*op. cit.*, p. 320), among other tools, a pair of dividers is represented. Cf. Petrie's statement in *Tools and Weapons*, p. 60, that compasses were unknown in Egypt until the time of Græco-Roman influence and see Edgar, *Greek Bronzes* (Cairo *Catal.*), Cairo, 1904, No. 27880, Pl. XIX.

[18] *Bijouterie*, Figs. 29, 30.

[19] Theobald in *Kunst und Kunsthandwerk*, Vol. XIV, pp. 567-8, judging by the colors of the different parts as shown in an ancient Egyptian wall-painting.

Two questions have been much discussed in the past and are occasionally revived even now, namely, whether the early Egyptians made any industrial use of iron, or even steel, and, if not, whether they and other Mediterranean peoples knew some especially effective way of hardening bronze. Although sporadic occurrences of metallic iron, reaching from the Prehistoric period down into the Iron Age, have been recorded,[20] the indications are that in early times alloys of copper, obtained by smelting impure ores, and later,[21] artificially made bronze, were the principal metals of industry. Examples of actual steel from Egypt are very rare indeed, a fact for which the perishability of steel is not the only possible explanation! Aside from an early alleged instance of the Pyramid Age[22] and some specimens of doubtful origin, mentioned by Mr. Herbert Garland,[23] we are able to cite only the set of imported tools of mild steel of the seventh century B. C. found at Thebes by Mr. Petrie.[24] Even in the last millennium before Christ, the majority of the tools were of bronze, and iron tools did not become common in the Nile Valley until the early years of the Christian era. Whatever was learned in antiquity about hardening iron, as by the Assyrians for weapons and armor[25] and by the

[20] See Gowland's list in *Journ. Royal Anthr. Inst.*, Vol. XLII (1912), pp. 283-4; the list appears with some additions in a review of Gowland's paper, *C.S.J.*, Vol. VII (1913), p. 137. Also Petrie, *Arts and Crafts*, pp. 104-6; *Ancient Egypt*, 1915, pp. 19-23.

[21] The interesting question culturally is not what are the earliest alloys which reveal the presence of tin, for these may be due to the accidental acquisition of ores containing tin (cf., however, on this point H. C. and L. H. Hoover, *Agricola*, p. 411, n. 53), but when did the Egyptians first possess an empirical knowledge of the metallurgy of bronze? This, of course, is difficult to answer. The references in Egyptian texts to "bronze of six-fold alloy," and the like, thus far noted, which show bronze-making well established, are comparatively late, of the period around 1200 B.C.; Erman, *Life in Ancient Egypt*, p. 460; Gardiner, *Anastasi I*, p. 37, n. 24. But by 1400 B.C. the Egyptians were acquainted with metallic tin (see No. 27, n. 80), and earlier, by the processes in use in antiquity, as Gowland demonstrated (*op. cit.*, pp. 241, 242), it would have been possible to make bronze by smelting tin ore with copper ore. Professor Petrie reports (*Ancient Egypt*, 1915, p. 17) an analysis of a IIIrd Dyn. sample (around 3000 B.C.) which revealed 9 per cent. of tin, a proportion which ordinarily would not be accidental, and yet might be accidental under exceptional conditions (see Gowland on this point, p. 242). Statements are conflicting about the "copper" statues of Pepi I and his son (not later than 2500 B.C.), as Dr. Gladstone found only a slight trace of tin (Petrie, *Dendereh*, p. 61) and Maspero (*Guide to the Cairo Museum*, 4th Engl. ed., Cairo, p. 75) reported an Italian analysis indicating 6.5 per cent. of tin; cf. further, on this uncertainty, H. R. Hall in *J.E.A.*, Vol. VIII (1922), p. 251. Again, the tools from Kahun, of the period of 1900 B.C., contained less than 2 per cent. of tin; cf. J. H. Gladstone, *P.S.B.A.*, Vol. XII (1889-90), pp. 227-34; Vol. XIV, pp. 223-6; Vol. XVI, pp. 97, 98; Petrie, *Illahun*, p. 12; Berthelot in De Morgan, *Dahchour*, I, pp. 136 ff. Presumably metallurgical experimenting on the part of the Egyptians began almost with their first acquaintance with metal (not later than 5000 B.C.), and Professor Petrie implies (*Ancient Egypt, loc. cit.*) that the hardening of copper by mixing in ores containing arsenic, etc., was sometimes a deliberate process, although he would have us believe that the art of bronze-making was introduced from abroad, not earlier than 1600 B.C. Maspero's view, based chiefly on the researches of Berthelot, was that bronze came in gradually, beginning with the VIth Dyn. (2500 B.C.); *Manual of Egyptian Archæology*, translated and enlarged by Agnes S. Johns, 6th Engl. ed., New York and London, 1914, p. 339.

[22] Gowland, *loc. cit.*, and Mr. Garland's comments in *C.S.J.*, Vol. VII (1913), pp. 61, 193.

[23] The chief recent exponent of the view that the Egyptians may early have had iron, and later steel, tools, with which to work their hardest stones. The old controversy over the use of bronze and iron in the Bronze Age is well summarized from the archæologist's point of view by Miss Richter in her catalogue of *Bronzes*, pp. XV, XVI, and from the natural scientist's point of view by H. C. and L. H. Hoover in *Agricola*, pp. 420-23, "Historical Note on Iron Smelting."

[24] *Tools and Weapons*, pp. 39, 44; *Arts and Crafts*, p. 106; *Six Temples at Thebes. 1896*, London, 1897, pp. 18-19, Pl. XXI.

[25] Petrie, *Arts and Crafts*, p. 106; cf. Breasted, *Ancient Times*, p. 157.

Greeks and Romans for tools to be used with wheel-power [26] and for coin dies,[27] no definite evidence is known to us of any contribution to such knowledge by the Egyptians, and it remains uncertain to what extent Egyptian artisans, even in the late period, made use of mild steel.

The old theory that the Egyptians had, in addition to regulating the composition of the alloy, some method of hardening bronze superior to cold hammering, and now lost to the world, may be regarded as demonstrably weakened, now that the tests of the new science of physical metallurgy have been applied to a selected series of ancient Egyptian copper and bronze tools. In every instance Mr. Garland found [28] the very microstructure characteristic of modern castings whose "cores" have been deformed by cold hammering.[29] Further, as the application of intense heat to an alloy which has been cast and then cold hammered results in a recrystallization, it may be affirmed that after these ancient tools were made, they were not subjected to any kind of tempering involving severe heat. After examining the structure of the tools as they had come down from antiquity, Mr. Garland annealed some of them, which then revealed under microscopic examination irregular crystal grains. Thus the microscopic appearance and the behavior of the alloys composing the tools are in favor of the view that well-known processes, and not mysterious lost arts, were used in their production.

In flint the Egyptians possessed a material with the hardness of 7 (Smithsonian tables),[30] which would cut many substances intractable to bronze tools. M. Vernier suggested [31] that also flint tools were employed by Egyptian goldworkers, and we think it not improbable that this hard material, so abundantly

[26] Pernice, *Jahreshefte,* Vol. VIII (1905), pp. 51-2; G. M. A. Richter, *Bronzes,* p. XXIII.

[27] The mooted question of the material used for coin dies was discussed again interestingly in favor of a hard metal by S. W. Grose in *Numismatic Chronicle,* 4th Series, Vol. XVI (1916), pp. 113 ff.

[28] *C. S. J.,* Vol. VII, pp. 45-61, 186-9; *The Journal of the Institute of Metals,* London, 1913, Vol. IX, pp. 118-19; Vol. X, pp. 329-43; also a reference to this investigation in Walter Rosenhain, *An Introduction to the Study of Physical Metallurgy,* New York, 2nd ed., 1919, p. 255.

[29] In this connection the open moulds of "thick pottery lined with a smooth coat of clay and ash," dating from about 1900 B.C. and used for casting chisels and knives, are of interest. The blades were cast ¼ of an inch (0.635 cm.) thick and then hammered down to the required thinness; so Petrie, *Tools and Weapons,* p. 61 and Pl. LXXVII, 249. With this statement may be compared Mr. Garland's description of the process as deduced from these tools which he examined: "The metal was smelted, either directly from the ore, or from blocks previously reduced, cast approximately to shape, and, when cold or almost cold, the cutting edge was hammered out. The amount of hammering does not appear to have been excessive, but owing to the entire oxidation of all thin sections, it has not been possible to make microscopical examination to the extremity of the cutting edges: for this reason also it cannot be said whether the edges were afterwards ground, but presumably they were ground a little" (*C. S. J.,* Vol. VII, p. 188). A great difficulty in producing good working tools in this way is the tendency of the metal to become brittle under hammering. Metallurgists have also pointed out the effect of bismuth and other substances found in early copper alloys not only to harden but to render the alloys brittle. Undoubtedly these disadvantages had to be struggled with and they limited the results that could be effected with tools of which copper was the chief ingredient. We have seen above how one bronze tool was made suitable both for cutting and enduring percussion (p. 198). We doubt not that the Egyptians were constantly experimenting to regulate the composition of the alloy and the amount of hammering according to the use to which the respective tools were to be put.

[30] In which 10 represents the hardness of the diamond.

[31] *Bijouterie,* p. 62.

available and known to have been in use in the land in the historic periods, may have been found more enduring for cutting sheet gold and some other purposes. Yet we do not see that its use was essential. Copper, gold, and silver all have the same range of hardness, 2.5 to 3, and for many processes, the metal to be worked would be in a softer state than the tools used, even were the latter pure copper. But as analyses have shown that ancient Egyptian tools were commonly of alloys of copper, whether reduced from ores containing all their component metals, or put together by man, these certainly were efficient enough on the precious metals,[32] although they readily lost their keenness. The Egyptians possessed hones,[33] and if their metal tools wore out more readily than modern steel tools, they were also comparatively easy to make.

The question of the engraving of gem-stones is less important in Egyptian jewelry than in that of Greece, although there exist a few elaborate Egyptian designs engraved in carnelian, sard, and jasper, of which the majority date from about 1500 to 1400 B. C.[34] No discussion of the technique of these older gems has yet appeared, but since the Egyptians employed the bow-drill in bead-making, the bow may well have furnished power and rapidity of action to the tools and the abrasive used with them. In the engraving of Classical gems, of which two examples are included in the present catalogue (Plate XVIII, 88 c, 89 c), there is evidence for the use both of the wheel and the bow.[35]

As we have indicated above, the material for the consideration of goldsmith's dies and moulds is a little less scanty than that available for other tools. Many of stone, of late date, a large proportion of them in the Classical style, have been found in Egypt,[36] but very few which go back to the Eighteenth to Twentieth Dynasties have been published, and none from Egypt, so far as we know, antedates 1500 B. C. Among the oldest Egyptian moulds is a composite one in Berlin,[37] which was designed to produce, in ad-

[32] Cf. Vernier, *op. cit.*, p. 123, rejecting the necessity of steel for gold-workers, and the experiments referred to by Blümner, *op. cit.*, p. 51, establishing the efficacy of bronze tools on bronze, at least for chasing, if not for engraving. Professor Pernice's experiments (*Jahrshefte*, VIII, p. 51, n. 3) proved that bronze could be engraved with bronze by using a tool of an alloy richer in tin than the surface to be engraved. Thus bronze would surely have sufficed for the nobler metals. The problem of the carving of statues of hard stones in early times does not concern us, but see Mr. E. S. Thomas' remarks, citing evidence from Dr. Reisner's excavations unfavorable to the theory of the use of iron or steel; *C. S. J.*, Vol. VII, p. 193.

[33] In the IIIrd millennium B.C., in the scenes of the slaughter of animals, the butcher usually has what looks like a hone attached to his person by a cord and is often represented sharpening a knife. The knives, however, following some authorities, were of flint, and if so the instrument was one for re-flaking the edge by rapid, skillful pressure; *Ä. Z.*, Vol. XXXV (1897), pp. 105-6; Borchardt, *Sahu-re*, II, p. 37. Mr. Winlock has kindly reminded us of the gritstone hone included in a shaving set of the XVIIIth Dyn., No. 12.182.7 of the Metropolitan Museum's collection; another is published in Carnarvon and Carter, *Five Years' Explorations*, p. 72, Pl. LXV.

[34] *J. E. A.*, Vol. III (1916), Pl. XI, pp. 73-5; Perrot and Chipiez, *Histoire de l'art*, I, pp. 738-9, Figs. 496-9.

[35] G. M. A. Richter, *Catalogue of Engraved Gems of the Classical Style*, M. M. A., New York, 1920, pp. XLVII-LIV, and the authorities there quoted.

[36] Schreiber, *Toreutik*, Ch. I. To the examples listed there may be added two dies with purely Egyptian designs: (a) Berlin, No. 18,846; Schäfer, *Goldschmiedearbeiten*, p. 71, Fig. 77; (b) the large unpublished die in the Museum of Fine Arts, Boston; see our pp. 155, 207.

[37] Berlin *Verz.*, p. 205, No. 8920; Schreiber, op. cit., p. 279, Fig. 1; Schäfer, *op. cit.*, p. 51, Fig. 33.

dition to other ornaments, pendants imitating the form of a poppy-fruit or corn-flower, motifs especially common in the Eighteenth and Nineteenth Dynasties. For the use of stone dies in this period, we may cite the evidence of such figures as our Nos. 9 to 11, which present all the appearance of having been made with a tool differing from No. 139 a (Plate XXXI) only in the style of the figure. These dies and moulds were not confined to Egypt but have been found in Italy,[38] in Greek lands,[39] and in Assyria.[40] Nor were the dies invariably made of stone, for some of bronze are extant, including a piece of the middle of the seventh century B. C.[41] Further, there are stone moulds, and perhaps dies, which were bronze-worker's, rather than goldsmith's, tools. Some of the extant stone moulds are open, others are two-part moulds, of which usually one part is missing. The oldest three-part stone mould known to us is an incomplete one figured by Mr. Marshall,[42] which is dated to the first Late Minoan period (about 1600-1500 B. C.) by the distinctive form of the signet ring to be cast with its aid; none has been made known of so early a time from Egypt; Möller published part of one bearing a Greek inscription, of uncertain provenience;[43] the special interests of a late Roman (?) mould for rings, reproduced by M. Vernier,[44] are that all three parts are preserved and that three rings were to be cast at one time.[45]

Long ago Layard remarked[46] that the stone moulds found by him were "precisely such as are used to this day by Arab goldsmiths," a remark later quoted by Perrot[47] and by Schreiber,[48] but no one of these authors described how the Arabs employed the moulds. Tacitly, however, everyone assumed that in the goldsmith's moulds molten gold (or silver) was cast, into the bronze-worker's moulds, molten bronze was poured; the gates were there for the passage of the molten stream and registers were present for the matching together of the two parts, or three parts, when the moulds were not open; it was less evident how the air displaced by the molten metal was to escape from the closed moulds, but this question seems not to have been discussed. Then early in the present century, Professor Pernice undertook, at a foundry in Berlin, an extensive series of experiments,[49] endeavoring, in modern stone moulds made

[38] Marshall, *Jewellery,* p. LIII.
[39] Marshall, *op. cit.,* p. LI.
[40] Schreiber, *op. cit.,* pp. 281-2.
[41] Marshall, *op. cit.,* pp. LI, LII; *J. H. S.,* Vol. XVI (1896), pp. 323 ff. See also the Roman composite die published by Miss Richter; *Bronzes,* No. 1710. Although the proportion of extant bronze dies to those of stone is small, it does not presumably represent their relative numbers in antiquity.
[42] *Op. cit.,* p. 40, Fig. 7.
[43] In Schäfer, *Goldschmiedearbeiten,* p. 51, Fig. 31; cf. Berlin, *Verz.,* p. 364, No. 11,337.
[44] *Bijouterie,* Figs. 130-34.
[45] Cf. Berlin *Verz.,* p. 364, No. 8876.
[46] Austen H. Layard, *Discoveries in the Ruins of Nineveh and Babylon,* New York, 1853, pp. 595-7. Parts of several two-piece moulds were included in Layard's finds.
[47] Perrot and Chipiez, *Histoire de l'art,* II, p. 766, n. 1.
[48] *Op. cit.,* p. 282.
[49] *Jahreshefte,* Vol. VII (1904), "Über antike Steinformen," pp. 180-97; see especially pp. 194-6, with respect to stone dies and moulds from Egypt.

in imitation of the various materials, workmanship, and designs of ancient moulds, to cast bronze, with the result that his stone moulds, even when heated in advance as much as is practicable, were seriously injured by the hard-flowing metal and the castings obtained were too poor to be utilized. His conclusion was that stone moulds could have been employed only for the easy-flowing metal lead, or for wax, and that when the latter was used, the intention was to produce a model, afterwards to be perfected in its details and cast by the waste wax process. He found no evidence in examining actual bronzes for the use before about the fourth century B. C. of many-part plaster moulds [50] which could be used over and over again; rather, even after this mechanical means of duplicating wax models for bronzes was known, the Greek artisans often continued to perfect an individual model for each casting. Now whatever is true of the deleterious effect of molten bronze on a stone mould would hold presumably also for the precious metals, as their melting points are close to that of bronze.[51] Yet Professor Pernice's results, although favorably received, have not been universally applied and possibly need confirmation with respect to goldsmith's moulds. M. Vernier, who does not indicate that he was familiar with them, with all his technical training, did not hesitate to say that gold could be cast in the talc moulds which came under his observation [52] and Möller [53] and Mr. Marshall [54] both implied the direct use of three-part stone moulds in casting signet rings of hard-flowing metals.

With those tools which we have termed dies, namely those into which sheet metal was impressed, it is easier to experiment without danger of injuring the ancient pieces. Clearly with bronze dies impressions could be struck.[55] From a die of the third century B. C. in the Egyptian Department of the Metropolitan Museum of Art,[56] impressions in sheet brass were obtained in the following way: the modern sheet brass was placed on a lead block, the ancient die was set over the brass and its reverse protected by a block of wood, then one or more sharp blows were struck with a metal hammer to force the die down-

[50] *Zeitschr. f. bild. Kunst,* Vol. XXI (1910), p. 222.

[51] According to Charles D. Hodgman and others, *Handbook of Chemistry and Physics,* 8th ed., Cleveland, 1920, p. 90, a bronze of 90 per cent. copper, 10 per cent. tin melts at 1010° C; the melting point of pure gold is 1065° C, of pure silver, 961° C, that of lead only 327° C. Miss Richter, discussing in the *Bull. M. M. A.,* Vol. XVI (1921), p. 56, two pairs of Greek earrings with animal's heads dating from the 4th cent. B.C., calls attention to the two heads of each pair as cast from separate moulds; this being true, they were presumably cast from individual models by the waste wax process, and not directly in such a stone mould as that for an animal-headed earring in the British Museum (Marshall, *op. cit.,* No. 2112), but the latter may have been used to produce the model in its first stage.

[52] *Bijouterie,* § IX, pp. 104 ff., especially p. 109, n. 1, and see also in *Annales,* Vol. VIII (1907), p. 117, the verdict of Monsieur Cayeux, attached to the national School of Mines, Cairo, that the properties of talc used for goldsmith's moulds which made it especially suitable to this purpose are its softness, rendering it easy to carve, and its ability to resist a high temperature.

[53] In Schäfer, *Goldschmiedearbeiten,* p. 50, b.

[54] *Op. cit.,* p. LI.

[55] Provided, however, in the use of gold sheet, that the design was not very deeply cut. The gold would tear if very much relief must be secured.

[56] Access. No. 20.2.24. We are indebted to the Museum for photographs of the two faces of the die and the impressions struck from them. With this die we should think that gold sheet would endure striking.

ward on the sheet metal; the resultant impressions are very sharp and clear. It is less certain how the stone dies were employed. Obviously the procedure just described would be too violent. Professor Pernice suggested two ways: (a) placing the die face upward with the sheet to be impressed over it and a layer of wax above the sheet which was then to be struck with a wooden hammer; (b) as less precarious for the die, and therefore more probable, rubbing the sheet gold into the die with wooden sticks, or into the deeper depressions with metal tools; in this way he succeeded in securing impressions with all the sharpness of the die. The suggestion in a label attached to the Egyptian stone die in Boston (compare page 155) that the gold sheet was forced into the die by the use of a stiff brush does not take into account the liability of sheet gold to develop rents when subjected to strain. Another and interesting suggestion, which has survived some practical tests, is that fine linen bags about three-fourths filled with emery may be used gently to push the sheet into all the interstices of the depressions.[57] The same idea of pushing rather than striking was carried out by our preparator, Mr. Hoffmann, who made lead positives from the New York Historical Society's original dies (Plate XXXII, A, B) and pressed modern sheet gold between the negatives and positives, being obliged, however, to interrupt the process to anneal the gold. (Plate XXXII, C-G.) Mr. Heins, also, was so kind as to try both pushing gently with a positive and working the gold sheet into the die with metal burnishers. Both ways in his opinion had advantages and disadvantages. By using a positive the work is done more rapidly and the sheet is unable to move about, hence the danger of doubling any line is avoided. By tooling the gold in, it is possible to stretch it first to help secure the relief, and sharper impressions may be made (Plate XXXII, H-L); the ruffles produced around the edges by the former process are avoided, but this way takes more time. Mr. Heins proceeded as follows: (a) he annealed the sheet gold, (b) stretched by rubbing with a burnisher the part to be pressed into the die; this made the gold hard and (c) he annealed it again and (d) tooled it into the die, annealing one or more times during the process, according to the depth of the depression. The sheet gold used for the modern impressions shown in Plate XXXII was of 22 carat quality and was 0.002 inches (0.051 mm.) in thickness, corresponding in thickness to a number of the ancient amulets in our collection (so No. 100 and the pieces associated with it) which have been impressed in dies. Mr. Heins, having examined the die-made amulets of the present collection (section E), believes hand-tooling was the means employed in securing the impressions in the majority, if not in all, the pieces; as we pointed out in a number of instances, these amulets are frequently imperfect, having rents in the metal, folds, or parts of the design wanting, due to failure to be impressed. We ourselves believe that, however the dies were used, the sharpness of the original was often not obtained when the material of the die was stone.

[57] A method used by the late Mr. Richards in the Repair Department of the Metropolitan Museum of Art.

Only when the thickness of the sheet and the annealing are suited with special nicety to the character of the carving in the die and the operation is carried out very carefully is this possible. We do not think that such amulets as our Nos. 105 and 128 (Plates XXVII, XXVIII) could be executed with stone dies, although conceivably they might be with bronze dies, especially if struck, and we consider the vagueness and softness of such work as Nos. 9 to 11 (Plate V) just the effect commonly got from stone dies, as contrasted with metal dies. In the Boston stone die it is interesting to observe that the details of wings and body are omitted from some amulets, which presumably were to be especially carefully finished by chasing.

No. 139 (Plates XI, c-g), XXXI, a, b; compare Plate XXXI, A, B). Goldsmith's combination die and mould.

Steatite. Late Ptolemaic or Roman period, first century B. C. to third century after Christ.

The stone is slightly abraded here and there, but is unbroken. It had never been used in antiquity, so far as its condition indicated.

Both faces of this tool were carved in intaglio with the designs to be reproduced by its aid. On the face *a* (Plate XXXI) the design is shallow and was used as a die. The face *b,* however, was used as a mould, as indicated by the greater depth of the form to be cast, the channel for the inflow of liquid material, and the holes (registers) for the attachment of a second piece having corresponding holes; the attachment was probably effected by pins of lead, such as have been noted in position in at least one instance.[58] The lines on the edges of the piece probably matched others on the missing part of the mould and helped the workman to put together the two parts of the mould quickly and correctly (Plate XI, c). The missing part of this two-piece mould completed the figure in the round, we may assume, since the registers, designed to avoid any variation in the relative position of the two parts, would hardly be necessary with a blank covering piece. But this part of the mould could be used, on occasion, to produce the design in high relief for use as an appliqué, or as a figure to be viewed only from the front, by simply binding over it a flat cover. Professor Pernice remarked[59] that such moulds could also be used for impressions in sheet metal, but our preparator, with the most careful annealing, was unable to get a perfect impression from this mould; instead, the gold was rent here and there, because of the greater depth of the design in intaglio. We conclude that the present tool was for the use of a goldsmith, or conceivably a silversmith, because of the small size of the two figures to be reproduced and especially because one of the faces served

[58] Pernice, *Jahreshefte,* VII, p. 184.
[59] *Op. cit.,* p. 193.

as a die, for it would not have been advantageous to make hollow in thin sheet so tiny a figure except as one of the nobler metals was to be used.

The piece is assigned to a late date on stylistic grounds. The theme of both figures, the little god Horus, is Egyptian, but the treatment of the drapery in the design A and the pudginess of the body in the seated Horus are late Classical, not traditional Egyptian. The design B, cast solid in gold, may have had a loop soldered on subsequently and have been worn as a pendant; the kind of statuette to be produced with the help of face *a* is illustrated by the original figure, No. 136, in the New York Historical Society's collection. Other dies are known showing the front half of figures of similar style, but we believe that this one for the back of a figure is unique among published specimens; indeed such figures were often finished plain at the back.[60]

BIBLIOGRAPHY: Abbott catalogue, 1915, p. 84, No. 74, in the Edwin Smith collection.

No. 140 (Plate XXXII, a-c; compare A-L). Part of a composite combination die and mould.

Steatite. First century after Christ. From Sakkara.

It is impossible to determine the original size and shape of this tool; quite possibly less than half of it is preserved. Eight dies are carved in intaglio in the extant part, but the registers in both faces and the marks along the edge (Plate XXXII, c) for matching to it another part indicate that moulds for casting were included in the lost part.

The majority of the dies are of geometric patterns such as might have been used by a goldsmith for impressing diadems or other ornamental bands. Face *a,* however, has one Egyptian motive (L), two serpents facing each other, perhaps reminiscent of the patron goddesses of the North and the South. At the left end of *b* is a bust of Serapis—Osiris-Apis—god of the dead, revered both by Egyptians and by Greeks and Romans at this time. This is the most deeply cut of the dies and the one with the greatest number of fine details; we did not succeed in getting a good impression from it in the gold used (see above, page 206) and think it may have been intended for gold foil. The date of the tool is fixed by the form of the bust[61] in this last-mentioned die.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 12, No. 68. Abbott catalogue, editions 1853 ff., No. 303; edition 1915, No. 306.

Nos. 141, 142 (Plate XIV, a, b). Two chasing tools (?).

Bronze. Provenience and date unknown.

Neither tool shows any mark of hammer blows on the outer end and it is probable that they were not used in antiquity. The working edges have so

[60] Schreiber, *op. cit.,* pp. 298, 299.
[61] P. Bienkowski, *Revue archéologique,* 3rd series, Vol. XXVII (1895), pp. 293 ff.

much oxydized that it is difficult to say whether these pieces are small chisels or chasing tools, but if, as we think, the edges were somewhat blunt, we may regard them as straight liners, capable of such work as that shown in the photomicrograph of Plate IV, 17 d. On the method of their production, see above, note 29. Characteristic of the form is its oblong section and double slope to the working edge. It is not to be supposed that the tools were inserted in handles, since they are without tangs or sockets. Similar-shaped tools are known from the First Egyptian Dynasty, not later than 3400 B. C.[62] But as these pieces are of bronze, not copper, they are likely to be much later, nevertheless pre-Classical.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., included under No. 845; edition 1915, under No. 842.

[62] See the material in Petrie, *Tools and Weapons,* pp. 19, 20, Pls. XXI, XXII.

H.—Miscellaneous

In this section are catalogued the remaining objects of the New York Historical Society's Egyptian collections which belong within the scope of Part I of the exhaustive catalogue and do not fall within the foregoing sections A to G. Some of these pieces are not closely datable, others are single representatives of their kind, and of still others the interpretation is uncertain.

No. 143 (Plates XIV, a, XXX, b). Bracelet.

Fine gold. About fourth century B. C. From Sakkara. Weight, 235.62 grains (15.268 grams).

Except for a disturbance of the small wires, which in places overlap or are spread apart—the consequence chiefly of much handling—the bracelet is in excellent condition.

Eight coiled wires surrounding an inner heavy gold wire, the latter 0.059 to 0.079 inches (1.5-2.0 mm.) in diameter, compose the main part of the bracelet; the inner wire projects at each end and has been riveted down to a small sleeve, which itself was soldered to a nine-lobed sleeve, thus forming an ornamental knob, perhaps intended to represent a lotus flower; the nine lobes were chiseled in. It is noticeable that the outer coiled wires do not fit closely about the inner wire and that the wires are soldered to one another for about a half inch (1.27 cm.) from the inner edge of each knob. The procedure was probably about as follows: the eight small wires were laid side by side with ends projecting each slightly beyond the one next to it, giving a diagonal termination at each extremity; they were then soldered together at the ends and the resulting compound band was coiled about a rod slightly larger in diameter than the present inner gold wire; the edges of the last coils at each end were next soldered together to prevent the band of wires from uncoiling. The mandrel was now removed and the heavy gold wire, which in the meantime had been finished with a knob at one end by the addition of two sleeves, as noted above, was slipped in its place; the other knob was then completed and the edge of the coils and inner edges of the knob at each end were soldered together. Finally this finished long piece was bent into bracelet form by exerting pressure on the inner wire. The inner wire, where visible between the coils, exhibits various planes, which suggest that it was produced by hammering and lengthwise burnishing. The outer small wires have the same pleasing dull surface and uniform diameter as the far earlier and somewhat smaller wires of No. 2, but differ from them in the lesser promi-

nence of the seams; in part the seams may be turned under in coiling the wires; on their technique, see page 41. The present smoothness of these wires may be due in part to wear, the more so as a microchemical analysis has revealed that their material is fine gold. The solder in some lights, in contrast to the rich yellow of the gold, has a slightly orange tint.

This late piece is the only example in the present collection of an article of jewelry which was popular in Egypt with both men and women from prehistoric times down through the centuries. In its essential construction, it belongs to a universal type of bracelet, namely, the hoop of metal with an opening to allow it to be passed or sprung on the arm, thus differentiated from unbroken hoops, which must be slipped over the hand, and flexible and hinged bracelets, which must be tied or clasped on. This type was represented, among others, in Pharaonic Egypt;[1] variants, in which the ends overlap somewhat, were found in the Second city of Troy;[2] it was common in Assyria[3] and occurred also in Cyprus[4] and Italy[5] as early as the eighth or seventh century B. C.; it is represented in Persian reliefs[6] and throughout Classical times was wide spread in Mediterranean lands;[7] and, omitting its intervening history, we may note that it is still made by present-day Egyptian jewelers.[8] Dr. Pollak expressed the opinion[9] that the styles with animal heads *en face,* guarding the opening, entered Mediterranean countries from Assyria, and Legrain pointed out[10] evidence for their occurrence in Egypt toward the close of the Twenty-sixth Dynasty, or beginning of the Persian period. But in their later history, when the hoops were wound spirally with small wires, or consisted of several heavier wires twisted together, they seem the counterparts of the earrings with animal's head (Plates XVII, XVIII) and may have followed the same lines of development and dissemination.

Stylistically our piece is related to the earrings just mentioned. Its dainty knobs occupy the place of the commoner animal heads and the delicacy of its

[1] So some of about 1900 B.C.: De Morgan, *Dahchour,* I, p. 61, Nos. 10, 11; p. 66, No. 17; *Dahchour,* II, p. 53, No. 6; p. 60, No. 13 = Vernier, *Bijoux,* I, Pls. VII, VIII, Nos. 52,022-3, 52,050. Again, about 1200 B.C.: Vernier, *Bijoux,* II, Pl. XXIX, Nos. 52,584-5 = Davis' Excavations, *Siphtah,* p. 40, No. 18.

[2] Dörpfeld, *Troja und Ilion,* Pl. 43, I.

[3] Perrot and Chipiez, *Histoire de l'art,* II, Figs. 8, 29, worn with the plain opening on the inside of the wrist and ornamented with a rosette opposite the opening. Judged by a photograph, the bracelet worn by the foremost figure in the Louvre relief = Perrot and Chipiez, *op. cit.,* II, Fig. 23, is decorated with animal heads at the opening. Cf. the armlet represented in a relief of Assurbanipal (mid-7th cent. B.C.) in the British Museum = C. Bezold, *Nineve und Babylon* (*Monographien zur Weltgeschichte,* XVIII), Bielefeld, 1903, Fig. 39; here, again, a photograph in our possession shows clearly ram's heads *en face* at the opening.

[4] With animal heads at the opening, worn by a lady of rank, represented in a statuette not later than about 700-650 B.C.; Myres, *Handbook. Cesnola Coll.,* p. 197, No. 1262; later Cypriote examples, pp. 392-3.

[5] Marshall, *Jewellery,* Pl. XV, Nos. 1368, 1369.

[6] An especially good example in Robert Koldewey, *Das wieder erstehende Babylon,* Leipsic, 1913, Fig. 80, color of gold, with one end plain(?), the other having a pyramidal knob = Koldewey, *The Excavations at Babylon,* translated by Agnes S. Johns, London, 1914, Fig. 64.

[7] Marshall, *op. cit.,* Pl. XXXIX, Nos. 1985, 1989; Pl. LXVI, Nos. 2763, 2769.

[8] Legrain, *Annales,* Vol. VIII (1907), p. 52.

[9] Pollak, *Goldschmiedearbeiten,* p. 135, with useful bibliography. Cf. on this point, Myres, *op. cit.,* p. 393.

[10] See above, n. 8. Later examples found in Egypt: Vernier, *Bijoux,* I, Pl. XIII, No. 52,097 (heads, horned lions); Pl. XII, No. 52095 (sphinxes, plain hoop); II, Pl. XXI, No 52,587 (ram's heads, plain hoop).

design is enhanced by the unusually small diameter of the outer coiled wires. The bracelet would fit only a small wrist, a woman's or a child's.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 45. Abbott catalogue, editions 1853 ff., No. 994; edition 1915, No. 990.

No. 144 (Plates XI, b-d, XXXIII, a). Box, said to have contained the finger ring No. 25.

Wood. Presumably Eighteenth Dynasty, 1448-1420 B. C. From Thebes.

The box has obviously been tinkered with in modern times, as the broad cross-strip of some dark tropical wood on the cover, the wooden pegs and glue by which it is secured, the adjacent narrow strip of bone glued on, and possibly also the floor and the cleats on the bottom, are modern. This leaves as indubitably ancient the side and end walls of the box, with knob on one end, and the main part of the cover. In Prisse d'Avennes' day, either the original second cross-piece with knob, or a modern substitute, was in position on top of the cover at the front (see Bibliography below), and a second strip of bone bordered the present dark wood on the other side. We found that the modern restorations could not be removed without danger to the fragile old parts and they are probably not far from giving a correct picture of the box as it was in antiquity. A light brass rod has now been inserted crosswise within the box to keep the cover from dropping into the interior.

The construction of the box is clear in Mr. Hall's plan, elevation, and section (Plate XI), showing it as it is today. It is to be noticed that the side walls inclose the end walls, the floor, and the cover. There are no grooves on the inside for the cover to slide in, but when the front cross-piece, for whose presence originally the ancient cutting in the wood of the main piece is evidence, was in place, the cover would not drop down, because prevented by the projecting ends which rested and moved on the top surface of the side walls; the lid could be drawn out only until the front cross-piece hit the one at the back, when about two-thirds of the box was open.

Prisse d'Avennes referred to the piece as a "boitelette de sapin." We are greatly indebted to Professor I. W. Bailey of the Bussey Institute of Harvard University for his kindness in examining the box with reference to its wood. The species could not be named, as it was impossible to take a specimen suitable for so close a determination, but it is of interest to know certainly that the surviving ancient parts, with the exception of the knob, are of coniferous wood—probably imported into Egypt, since there is no reason to believe that coniferous trees grew in the lower Nile Valley in historical times and we have literary evidence for the importation of wood from Syria.[11] Coniferous wood dating not later than about 2750 B. C. was found used in cultus objects of the

[11] Breasted, *Records,* II, § 838; III, § 94; IV, § 577. Cf. *History,* pp. 95, 252, 265, 513.

pyramid-temple of the Fifth Dynasty king Neferirkere,[12] and later, "cedar" coffins[13] were much used in burials of the wealthy. The surviving knob, the present floor, cleats, and pegs of the box are of dicotyledonous wood, certainly of more than one kind.

When it was desired to insure that the box should not be tampered with, a cord was wound about the two knobs, knotted, a lump of Nile mud pressed over the knob, and this stamped with a scarab, or other kind of seal. Thus, presumably, in the tomb of some prominent Theban, if the old record is authentic, the box was found, guarding its valuable contents. To be sure we are unable to cite any account of a similar discovery in scientifically conducted excavations, but so few records are available of finger rings found in position that we need not for this reason cast doubt on the early statement, which in itself is plausible enough. A goodly number of wooden jewel boxes which held an entire treasure of jewels are known,[14] some of them splendid with appliqués or inlays of gold, silver, ivory, and other rich materials.

BIBLIOGRAPHY: Not separately listed in the Bonomi catalogue, 1843, but see p. 32, No. 3. Abbott catalogue, editions 1853 ff., No. 477; edition 1915, No. 483. Prisse d'Avennes, Monuments, Pl. XLVII, 24.

Nos. 145, 146 (Plate XXXIII, a, b). Two bell-shaped pendants.

Gold. About Twenty-fifth Dynasty, seventh century B. C.(?). From Sakkara. Weight of No. 145, 21.02 grains (1.362 grams); of No. 146, 23.26 grains (1.507 grams).

Both pieces are bent out of shape and somewhat broken open at the top; the gold of No. 146 seems to have been burned in antiquity and then crudely patched around the loop for suspension.

Each pendant consists of three parts: (1) a main piece of sheet of variable thickness around 0.01 inches (0.25 mm.), cut on a curvilinear plan, bent over and soldered together in an overlapping seam to form the bell shape, and possibly somewhat domed on the interior; (2) a strip of gold only 0.08 inches (2 mm.) wide, bent over into a cylinder, and soldered to piece (1); (3) a loop of wire about 0.02 inches (0.5 mm.) in diameter, soldered into piece (2); a longitudinal seam is prominent on the wire of one loop. The color of the metal is close to that of fine gold.

The suggestion made for the date of the pendants is based on a comparison

[12] Borchardt, *Nefer-ir-ke-re*, p. 63, "Tannenholz" (Abies. sp.) rather than "Kiefer" or "Fichte," according to the scientist, Geh.-Rat Wittmack, who examined it.

[13] Breasted, *History*, p. 168; examples also in the Metropolitan Museum of Art, including that of the lady Senebtisi, published: Mace and Winlock, *Senebtisi*, pp. 26 ff., Pls. VII, XVII; numerous in Lacau, *Sarcophages*.

[14] A. C. M[ace], *Bull. M. M. A.*, Vol. XV (1920), pp. 151-6; Carnarvon and Carter, *Five Years' Explorations*, pp. 53, 80, 87, Pls. XLV, XLVI.

with similar pieces of the Twenty-fifth Dynasty, as yet unpublished, from Professor Reisner's excavations.

BIBLIOGRAPHY: Bonomi catalogue, 1843, page 34, Nos. 41, 42. Abbott catalogue, editions 1853 ff., Nos. 1038-9; edition 1915, Nos. 1034-5.

No. 147 (Plates XI, b, c, XXXIII, a). Bead.

Gold. Date uncertain. From Sakkara. Weight, 4.83 grains (0.313 grams).

The bead is hollow, having been made in two halves from sheet pressed in a die, soldered together, and subsequently pierced twice for double threading; the holes are in the lower half and are not visible from above; three show a slight burr turned outward, and the fourth is larger and has the edges forced into the interior. Where the surface is scratched, the metal is paler, below a rich yellow surface, almost that of fine gold.

We have been unable to find any dated parallel, but think the bead is pre-Classical.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1010; edition 1915, No. 1006.

No. 148 (Plate XXXIII). Bead.

Pottery gilded. Date uncertain. From Sakkara.

One end has a chip broken out and portions of the gold have peeled off.

The gold is very rough and gritty in quality and appears to be at least as thin as modern dentist's foil (that is, about 0.00025 inches, 0.006 mm.); it may have been put on in sheet form and then fired on.[15] The way the gold overlaps and peels seems to us to indicate that it was not rubbed on as a paste. The color is that of fine gold.

We have no definite clue to the date of the bead.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., under No. 1022; edition 1915, under No. 1018.

No. 149 (Plate XXXIII). Bead.

Glass and gold leaf. Roman, about second century after Christ(?). From Sakkara.

The technique of this kind of bead is described on page 44.

BIBLIOGRAPHY: Same as that of the preceding number.

[15] Cf. Vernier, *Bijouterie*, pp. 132, 133; the gold of our bead adheres too closely presumably to have been put on only with a binder.

No. 150 (Plate XXXIII). Bead.

Gold. Date uncertain, but probably late. From Sakkara. Weight, 1.94 grains (0.126 grams).

The piece was made in two halves, each pressed in a die, and is soldered or fused together lengthwise.

The old records describe this number as representing a grain of wheat, but it has a symmetrical, eight-ridged form. As it is not perforated, it must have been held in position on the mummy by the preservatives and bandaging.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., under No. 1021; edition 1915 under 1017.

No. 151 (Plate XXXIII). Mouth-covering (?).

Silver. 1300-1100 B.C., or later(?). From Sakkara(?). Present weight, 42.86 grains (2.777 grams).

While being cleaned the piece broke in two at one end, where it had previously been sharply bent; it has now been soft-soldered together.

This object is a charming example of primitive decoration executed with the simplest means. The silver sheet was beaten out very thin (0.0062-0.0064 inches, 0.157-0.163 mm.) and its surface quality is porous, probably because the anvil and implement used as a hammer were not quite smooth. Its outline was first chased in and then the shape was cut out with a chisel, for along one edge miscuts are visible and parts of the chased guiding line are left. The edges in some places look as if they had been burned in annealing. In cutting out the piece and in decorating it, the silversmith used no mechanical aid, as we may judge by the unsymmetrical form and unevenness in the lines of bosses. The bosses were punched in from the reverse, but the holes in each end, through which strings or wires for fastening the piece in position were passed, were punched from the obverse. A microchemical analysis has proved the presence in the alloy of silver and lead and the absence of gold, copper, tin, zinc, and mercury.

The decoration of lines of small bosses punched in from the back does not help in dating the piece, as it is found in objects as widely separated as the Mochlos ornaments [16] (Early Minoan, antedating 2000 B. C.) and a large gold boss from Naucratis of the first century after Christ.[17] But it seems probable that our piece is contemporary with the Cypriote mouth-coverings of similar size and outline.[18] If it was not brought into Egypt from Cyprus in modern times, but really, as Dr. Abbott believed, was found at Sakkara, it may have

[16] Seager, *Mochlos*, p. 77, Fig. 20, No. XXI, 14, etc.

[17] Petrie, *Naukratis I*, p. 44, Pl. XXVII, below at right = Marshall, *Jewellery*, No. 3123, Pl. LXX.

[18] See especially Marshall, *op. cit.*, Nos. 190, etc., Pl. III, and on their date, p. 1; compare Myres, *Handbook. Cesnola Coll.*, p. 376, Nos. 3003-4, p. 386, Nos. 3290-6.

come from the grave of a Cypriote, who died in Egypt and was given the kind of burial customary in his own home; no such pieces have been recorded from the tombs of Egyptians.[19]

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 956; edition 1915, No. 952.

No. 152 (Plate XXXIII, a-c). Ornaments of thin sheet.

Copper, gilded. Date uncertain, but probably late. From Sakkara. Weight, 7.93 grains (0.514 grams).

The entire lot of thin sheet, as we found it, crumpled together, is pictured in *a* and *b*. A portion of it, after being cleaned and flattened out, is given in *c*.

The sheet, of which the thickness is about 0.002 inches (0.05 mm.), has been tooled from the reverse over a yielding bed,[20] in a pattern of radiating lines and ribs, which show on the obverse in slight relief. Presumably it once covered some heavier surface, which may have been roughly cone shaped. It consists of two metallic layers, a heavier ground of copper sheet and applied over it, possibly with the aid of a binder, a surface of gold leaf.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1001; edition 1915, No. 997.

No. 153 (Plate XXXIII, a-c). Figure of a tortoise.

Bronze, gilded. Date uncertain, but probably late. From Sakkara. Weight, 125.70 grains (8.145 grams).

The under surface of the piece was never gilded. The gold lies thick in the depressions of the shell and head, but is almost gone from the exposed surfaces.

The bronze figure is a one-piece, solid casting, probably made by the waste wax process;[21] whether from an individual model or one produced in a permanent two-part mould[22] is not to be determined with certainty, although the rough under surface suggests the use of a rather coarse abrasive to obliterate markings perhaps left in the model by a two-part mould. The question of how the gold was applied has considerable interest. Some technicians have thought the piece fire gilded, and it may well date from a period subsequent

[19] We refer to the size and shape. "Tongue-plates" laid over the lips and coverings in which the form of the lips is impressed are well known from Egypt. See, for instance, Schäfer, *Goldschmiedearbeiten,* Nos. 130, 136-8, Pl. 18.

[20] At Amarna in the late XVIIIth Dyn., the "yielding bed" consisted of a resinous mass. Such a mass, bearing the impression of the scene in relief worked over it, is published in Borchardt, *Mitteilungen der D. O. G.,* No. 55 (1914), Pls. 3, 4, and interpreted in *Mitt.,* No. 57 (1917), p. 2.

[21] See under No. 135.

[22] Cf. section F, n. 10.

to the discovery of mercury.[23] The color is paler than that of fine gold but this in itself is not an objection to a theory that it was gilded by the use of mercury, for the mercury would unite with the component metals of a gold-silver alloy, and a mixture of an amalgam of gold with an amalgam of silver would be formed, which would be paler than an amalgam of fine gold.[24] The gold has a burnished surface and seems too firmly attached to have been cold-burnished on or to have been put on with a binder. If the piece was not amalgam gilded, or lead gilded,[24a] perhaps the gold may have been fused on and subsequently burnished.

The utility [25] of the little tortoise figure, if it was not a late *genre* piece, is also uncertain. According to the old catalogues it was the headdress of a divinity, and Mr. Griffith in the eleventh edition of the Encyclopædia Brittanica [26] does indeed mention the tortoise in a list of the sacred beasts kept in the various temples. But the only trace we have come upon of a tortoise or turtle god is the very minor guardian in the Lower World called *Tortoise Face* [27] who figures in the Coffin Texts and in Chapter 136 of the Book of the Dead. Possibly it is he who is represented in a wooden statuette from the Salt collection,[28] now in the British Museum. But even so, our piece shows no mark of attachment to another part and the form below is not suited to a headdress. Perhaps the likeliest guess is that the figure was an amulet, since the tortoise was pictured occasionally in late times among maleficent beings,[29] and perhaps could be conjured just as were scorpions and serpents by "Similars." Professor Junker has discussed [30] the symbolic meaning of animal sacrifices and burnt offerings in temple ceremonies of late times and has shown that the victims were not regarded as food for the god, but as his enemies who were reduced to impotence by being slain and in part burnt. Among

[23] According to Von Lippmann, *Entstehung u. Ausbreitung der Alchemie,* p. 601, Aristotle, who died 322 B.C., and not Theophrastus, was the first author in Greece to mention mercury, and a hitherto unnoticed passage in the *Indica* of Ctesias, Ch. 3, gives evidence that mercury was well known at least by the beginning of the 5th cent. B.C. On the process of mercury gilding, see: Wilson, *Silverwork and Jewelry,* pp. 237-9; Vernier, *Bijouterie,* p. 133; G. M. A. Richter, *Bronzes,* p. XXVI.

[24] So Mr. Nyland tells us.

[24a] See Möller's discussion (in Schäfer, *Goldschmiedearbeiten,* pp. 207-8) of fire gilding, agreeing with Vernier (*Bijouterie,* p. 133), who followed Berthelot, in assuming the use of lead in Egypt before mercury was available.

[25] The actual tortoise had utility in ancient Egypt. Tortoise shell bracelets are recorded in: Petrie and Mace, *Diospolis Parva,* p. 38; Ayrton and others, *Abydos. III,* p. 50; Wainwright, *Balabish,* pp. 31, 32, 51; MacIver and Mace, *El Amrah and Abydos,* p. 27. Tortoise shell comb and dish: MacIver and Mace, *op. cit.,* pp. 88, 89. Ivory and tortoise hilts to bronze daggers were found at Kerma: *J. E. A.,* Vol. I (1914), p. 219. An entire tortoise shell was included in a scribe's outfit found at Thebes: Carnarvon and Carter, *Five Years' Explorations,* p. 76, Pl. LXVI, No. 15.

[26] Vol. IX, p. 46.

[27] Lacau, *Sarcophages,* No. 28,083, Floor I, 15; Graf Schack-Schackenburg, *Das Buch von den zwei Wegen,* Leipsic, 1903, Ch. XII, b.

[28] With a tortoise or turtle as head; Arundale, Bonomi and Sharpe, *Gallery of Antiquities,* p. 48, Fig. 88, from Valley of the Kings. Cf., too, Lanzone, *Dizionario,* p. 123, a minor tortoise or turtle god of the Lower World called "Apesh."

[29] Daressy, *Annales,* Vol. XII (1912), pp. 143, 144; also *J. E. A.,* Vol. I, p. 283.

[30] *Ä. Z.,* Vol. 48 (1910), pp. 71, 76-7.

the creatures symbolic of darkness and evil was the tortoise, and either the actual creature or wax effigies of it were transfixed with a spear in certain ceremonies.[31] Again in the Book of the Dead [32] we are told that *Re (the Sun-god) liveth, the tortoise dieth.* As an amulet,[33] the piece would have been carried about, or suspended on the person tied to a string, or set somewhere in the house, and eventually, as its find-spot, Sakkara, indicates, buried with its owner.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 34, No. 48. Abbott catalogue, editions 1853 ff., No. 986; edition 1915, No. 982.

No. 154 (Plate XXXIV). Ornaments from the neck of a mummy.

Pale gold. Probably Roman, about second century after Christ. From Sakkara. Total weight, 44.00 grains (2.851 grams).

Many pieces are now incomplete and even the best preserved are chipped about the edges. One unit is simply flat unworked sheet cut to the general outline of the other ornaments.

The separate units were executed in a die from stock around 0.004 inches (0.102 mm.) in thickness. Some five of the pieces show under the microscope particles of white metal.

The ornaments were probably amuletic in character, since each incloses a crescent (compare under No. 123).

In antiquity it was customary to cover the bodies of well-to-do persons in burial more or less lavishly with gold, sometimes in the form of masks,[34] most frequently in the form of jewels and other ornaments. Often this gold was outside, or in the midst of, the burial clothing, sometimes in direct contact with the body. In Egypt, from the time the processes of mummification were well developed, in burials of the very rich, gold coverings, like so many thimbles, incased the tips of the fingers and toes to prevent the loss of the nails, while the body was immersed in the bath of salt, which was one of the principal processes in preserving it.[35] Especially characteristic of the Roman period in

[31] Rochemonteix, *Edfou,* Pl. XLc, 3g., IV.

[32] Ch. 161 and elsewhere.

[33] Petrie, *Amulets,* § 239, classifies all his amulets representing reptiles of this order as *Trionyx triunguis* and water turtles are represented in Egyptian art; see Blackman, *Meir. III* (Arch. Survey of Eg. XXIVth Memoir), London, 1915, Pl. VII, p. 15, citing Naville, *Deir el Bahari,* III, Pl. LXIX. Also, ancient shells of *Trionyx triunguis* have been found; Cl. Gaillard and Daressy, *La faune momifiée de l'antique Egypte* (Cairo *Catal.*), Cairo, 1905, Nos. 29,586, 29,587, Pl. XXXIII. But our piece apparently represents a small terrestrial tortoise, therefore, perhaps *Testudo leithii,* Günther = *T. kleinmanni,* Lortet, which has been observed in modern times in the Nile Delta; see Anderson, *Zoology of Egypt,* I, pp. 28-31, Pl. II.

[34] Among the most famous examples are the masks found by Schliemann in the shaft graves of Mycenæ. The faces of Egyptian mummy masks were very often gilded.

[35] Smith, *Royal Mummies,* No. 61,092, p. 106, one preserved on a mummy of the XXIst Dyn. A nearly complete set of silver cases of a late period, mentioned Petrie, *Tanis II, etc.,* p. 24; *Annales,* Vol. I (1900), p. 269, etc. The Egyptian custom was followed in the burial of Ethiopian kings; Reisner, Boston *Bulletin,* Vol. XVI (1918), p. 74.

Egypt was the placing of gold leaf,[36] as in some examples in the New York Historical Society's collections,[37] or thin sheet[38] (so No. 156 and probably Nos. 157 to 160), in direct contact with the skin. From the wording of the old record,[39] one would suppose that the present ornaments were actually in contact with the body; yet possibly this is not what was meant and they were taken from the neck of such a mask as one of the second century after Christ in Berlin[40] which has round ornaments in position about the neck.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., under No. 1037; edition 1915, under No. 1033. These numbers included also the gold circlet, No. 2 of the present volume. There is not the slightest ground for thinking the ornaments and circlet contemporary. Probably it was convenient to exhibit the loose ornaments within the area fenced off by the circlet and so they were given a common number.

No. 155 (Plate XXXIV, a, b). Rosette.

Gold. Date uncertain. From Sakkara. Weight, 11.30 grains (0.732 grams).

A circle of gold sheet was hammered out, then tooled over a yielding bed, chiefly from the reverse; the punching in of the bosses near the edge helped to raise the edge; from the obverse (*a* in Plate XXXIV), the central depression, the only part of the design not in relief, was punched in. The color is about that of fine gold.

According to the old record this rosette formed the central ornament in the clasp of a girdle found on a mummy.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1023; edition 1915, No. 1019.

No. 156 (Plate XXXIV). Triangular piece of sheet from the mummy of a little girl.

Gold. Roman period, about second century after Christ. From Sakkara. Weight, 31.44 grains (2.037 grams).

The piece is much crinkled and has its edges rent here and there.

[36] Discussed by Möller in Schäfer, *Goldschmiedearbeiten*, p. 209; see also the older account in the *Boston Journ. of Philosophy and the Arts*, No. V, April 1824, of the examination of a mummy brought to Paris by Cailliaud: p. 552, "The chest and one part of the abdomen were gilded irregularly upon the epidermis;" p. 553, "The arms were gilded in places like the breast." Another example is given in colored Pls. I, II of the following work: *A History of Egyptian Mummies and an Account of the Worship and Embalming of the Sacred Animals by the Egyptians*, by Thomas Joseph Pettigrew, London, 1834; descriptions, pp. XVI, 63, 64.

[37] Abbott catalogue, ed. 1915, p. 98, a skull, with considerable remains of gold leaf, presented in 1861 by Robert L. Stuart; p. 15, Nos. 218-21, gilded hands and feet.

[38] Cf. Möller in Schäfer, *op. cit.*, p. 71; also Clédat in *Rec. de trav.*, Vol. 38 (1916-17), p. 28.

[39] "Several circular, thin plates of gold, taken from the neck of a mummy, around which they were placed as a necklace."

[40] No. 13,462; *Verzeichnis*, 2nd ed., p. 345; Schäfer, *op. cit.*, Fig. 79.

It was cut from sheet about 0.002 inches (0.051 mm.) in thickness and has a color close to that of fine gold.

This piece covered the vulva of the child.[41] Probably, as in other recorded instances,[42] she was provided also with gold coverings for the eyes, breasts, navel, finger nails, and toe nails, and with a "tongue-plate" laid across the lips.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 35, No. 53. Abbott catalogue, editions 1853 ff., No. 1046; edition 1915, No. 1042.

Nos. 157-160 (Plate XXXIV). Coverings for the orifice of the ears of mummies (?).

Gold. Probably Roman, first to third century after Christ. Weight of No. 157, 2.44 grains (0.158 grams); of No. 158, 7.02 grains (0.455 grams); of No. 159, 4.81 grains (0.312 grams); and of No. 160, 6.39 grains (0.414 grams).

Nos. 159 and 160 are of pale gold, No. 157 is somewhat warmer in color, No. 158 is the yellowest of the four. The pieces were apparently cut from sheet metal, as Nos. 157 and 160 exhibit a few chisel marks—miscuts—near the edge. Their thickness, however, varies from one to the other and in one and the same piece; it ranges from 0.0038 to 0.0137 inches (0.096-0.348 mm.). No. 158 contains particles of white metal.

In the old Abbott catalogue the definite statement is made that the two pieces mentioned were "taken from the ears of a mummy." We do not know of any record from scientific excavations of such an instance.

BIBLIOGRAPHY: Abbott catalogue, editions 1853 ff., No. 1047; edition 1915, No. 1043. We found four, instead of two, pieces associated with No. 1043.

[41] There is no cartouche as described in the old catalogue, but the sheet gold was tooled from the reverse.

[42] See especially Schäfer, *Goldschmiedearbeiten,* Nos. 132, 133, of the 2nd cent. after Christ. Cf. also above under No. 154.

I.—The "Menes Necklace and Earrings"

Plate XXXVI.

Almost rivaling in fame the ring inscribed with the name of Khufu (No. 34), the necklace and earrings which are the subject of the present section owe their reputation[1] to an analogous circumstance, namely that they bear the name of Menes, the first historical king of Egypt. Unfortunately the early interest in them cannot, as in the instance of Neferibre's ring, be fully maintained on other grounds; instead, their present chief value is that of an illustration of a forgery, made at some time in the decade 1833 to 1843.

Even Prisse d'Avennes, who always believed that the ring was contemporary with the reign of Khufu, was less confident that the necklace and earrings were as old as Menes' time, and he observed a difference between the workmanship of the three gold pendants and that of the other gold units, which led him to suggest that the pendants did not belong originally to the necklace, having been added to it later. But no doubt of the genuineness of this jewelry, if ever entertained,[2] got into print in Dr. Abbott's day, and the first, and, so far as we know, the only, reflection which has ever been cast on it hitherto is that of Maspero, who expressed himself as follows: "The gold medallions engraved with the name of Menes are ancient, and perhaps go back to the Twentieth Dynasty: the setting is entirely modern, with the exception of the three oblong pendants of cornelian." Maspero never saw the originals, and it is of little consequence that he called the blue glass pendants "cornelian" and thought the medallions, which were actually made in a die, "engraved." By modern "setting" he surely intended to cover the gold loops and small oval pieces of gold intervening between the medallions with the name, but whether or not he suspected that the three gold pendants were not genuine is less certain. In contrast to Maspero's opinion may be noted that of Professor Wiedemann, who accepted the entire necklace and earrings and suggested for them a date in the Twenty-sixth Dynasty, and that of M. Gauthier, who referred to them as "no doubt" of the Twenty-sixth Dynasty.

We ourselves did not come on Maspero's partially adverse verdict until after long independent consideration of the merits of the pieces. From the

[1] The technical literature referred to in this section is listed below under "Bibliography." The necklace is mentioned in nearly all the works cited in n. 1, p. 229 and was evidently one of the objects on which Dr. Abbott set very great store. See also: Harriet Martineau, *Eastern Life,* under Feb. 9, 1847, p. 226; Gustav Seyffarth, *Summary of Recent Discoveries in Biblical Chronology, Universal History, and Egyptian Archæology, with Special Reference to Dr. Abbott's Egyptian Museum in New York,* New York, 1857, p. 12.

[2] We suspect that Lepsius' unfavorable impression of the collection was largely influenced by this jewelry; *Denkmäler,* Text, Vol. I, p. 9.

first we were distrustful of them in the form in which they had come down from Dr. Abbott's day. The most noticeable fact was the inorganic character of the design of the necklace, and we at once assumed that, as put together, it was not in order. Three dark-blue glass pendants in the form of cornflowers or poppy-fruits, a motif and a material characteristic of the time around 1350 B. C., a single well-formed, but injured, barrel-shaped amethyst bead of about the nineteenth century B. C., and two blue glass beads in the form of flattened spheres, of a good period but with surfaces in poor condition, were combined with certain gold parts in a particularly un-Egyptian and bungling way to mark the center of the supposed necklace. The interlacing ornament of the small ovals looked to our eyes like a modern Mohammedan design, the links proved to be made out of scraps of sheet gold of uneven width, and we soon came to an opinion similar to Maspero's, that the necklace sold to Dr. Abbott was a combination of ancient and modern parts. The one amethyst bead and the few glass beads were obviously ancient, and at first we trusted the medallions with the name Menes and the three gold pendants, but the gold earrings were difficult to date at any time which would suit the gold medallions with Menes' name, and if the set of medallions and the pair of earrings were both ancient, because of the name, they would presumably have formed parts of the same lot of jewelry. The earrings have the name Menes rudely executed with punches; their form is wholly unlike that of the types of earring known from the earlier Egyptian periods, and their edges have a burr of a kind produced by cutting with shears. In Classical times some earrings had a separately made hook soldered on at the back, which then hung free when the earring was in position; the hook was inserted from the front of the ear (see above, Nos. 56, 57). But the earrings with the name of Menes were made in one piece and were intended to have the hook inserted from the back of the ear and its point snapped into a little hollow punched into the top of the main part; at least we do not think that these earrings were designed to be worn the other side up, for, not only would the name then have been in the wrong position, but the sharp-edged sheet where it begins to widen would have come in contact with the ear. Because of their unconvincing design and exceeding crudeness, irreconcilable with ancient standards, we soon set aside these pieces as modern productions, made to accompany the necklace.

There then remained as the only parts—aside from the beads—which it seemed plausible to accept as ancient the eight die-made gold medallions with the name of Menes and the three die-made gold pendants; and some connection with ancient Egyptian work these two sets of pieces undeniably have. The three pendants contain elements of design suggestive of the art of the latter half of the Eighteenth Dynasty—perhaps a metal vase on a high foot[3] and over it a cover in the form of the symbolic plant of the South inverted. Even more

[3] We confess that we do not understand the handles, if such they are.

tantalizing is the name *Mny* in the medallions, because of the writing in which the final sign differs from that usually found in ancient writings of the name, although it can probably be paralleled once among them.[4] That we, nevertheless, finally hesitate to accept even these pieces as ancient is due in part to certain technical considerations.

It will be worth while at this point to speak of the published illustrations of the necklace and earrings. The Bonomi catalogue contained a lithograph made on the island of Malta not later than 1846, the year when the catalogue was printed, and this lithograph was reproduced in every edition of the catalogue, down to, and including, the one of 1915. Our Plate XXXVI shows the actual pieces as we found them, not one missing, and arranged as in the lithograph, except that one of the earrings was photographed purposely by us from the reverse, that the necklace having parted in a number of pieces was not again joined into one piece, and that the position of the two name-medallions on the left had at some previous time been altered—unless we assume that the lithograph corrected an obvious mistake in their position as originally arranged.[5] Prisse d'Avennes' colored plates, on the other hand, attempted to restore and complete the design by adding pendants like the three actual gold ones to the other medallions with the name Menes; apparently Prisse did not notice that the other medallions have no holes for the attachment of pendants, and therefore never had pendants. To complete our account of the illustrations, we add that Maspero's cut of a part of the necklace reproduced a drawing by Faucher Gudin which was based on the earlier of Prisse's plates.

Concerning the three gold pendants, it is to be remarked further that, if ancient, we should expect them to be pierced for suspension and presumably to be pierced in the same way, but when we examined them in this regard, we found that one of the three is pierced from side to side, that is, two holes were punched through the gold that the pendant might be suspended on the middle festoon; the two pendants which were hung on single loops, however, are each pierced through the top, once; in this particular the pendants were adapted to the position which they were to occupy in the necklace acquired by Dr.

[4] See Gauthier, *Livre des rois,* I, p. 2, III, citing: (a) Ramesseum relief, Lepsius, *Denkmäler,* III, 163; (b) "scarab of Fl. Petrie collection," Petrie, *Historical Scarabs: A Series of Drawings from the Principal Collections. Arranged Chronologically,* London, 1889, No. 1. Professor Erman informs us that the files of the Berlin Dictionary do not afford additional examples. The known instances of this writing, however, evaporate to a possible one, *viz.* (a) of Gauthier's enumeration, for, on consulting Petrie, *Historical Scarabs,* No. 1, M. Gauthier's second example is found to be, not a scarab in the Petrie collection, but a piece in the Louvre, the gold-sheet covering of a scarab-base in which the name *Mny* is chased, and the genuineness of this piece was questioned by Professor Petrie, as well as by Pierret, in whose *Salle Historique,* on p. 105, it was described as No. 456. See further our remarks on p. 224. We wish warmly to thank Dr. Ludlow Bull for undertaking at considerable trouble to collate the writing of Menes given in Lepsius, *Denkmäler,* III, 163 with the original. The name is in so inaccessible a situation that he was unable to satisfy himself fully, but he thought the Lepsius reading probably correct.

[5] They are placed upside down. The necklace has never been repaired, or otherwse altered, within the memory of the Librarian Emeritus of the New York Historical Society, Mr. Robert H. Kelby. We note on the proofs of Plate XXXVI that the last medallion on the right was inadvertently wrongly placed in photographing the pieces, it is right in the old lithograph.

Abbott, and there is no indication that they ever occupied any other position elsewhere. The name-medallions, too, are rudely pierced, probably with the same awl as the pendants, and show no trace of attachment in any previous and different context. We consider it, then, as probable that also these two sets of pieces were made in modern times, possibly in dependence on ancient designs or even in ancient dies. We believe that there were natives and Levantines in Egypt in Dr. Abbott's time astute enough, having picked up a little acquaintance with Egyptian royal names,[6] to anticipate the great value afterwards actually attached to the necklace and earrings because of the presence on them of Menes' name. The suggestion has been made to us[7] that late scarabs furnished the model to the forger; if the die for the medallions, too, was modern, we should think this not impossible, although it is to be reckoned with that the published scarabs[8] of late date bearing Menes' name show writings different from the one on the jewelry in question. It is a striking and perhaps significant circumstance that the Louvre contains a piece of sheet gold, also of suspicious character, in which the name *Mny* appears in the same writing as in our medallions, a piece which was included in the Louvre collection by 1876, when Pierret's catalogue was published.[9] Is it possible that the Louvre piece and our "Menes jewelry" came from the same source? The Louvre piece, to judge by the published drawing of it, is as crude-looking as the earrings of the present set, and the details of its design other than the name seem to us of a character wholly unlikely to be ancient Egyptian.

Occasionally, since the present catalogue was undertaken, the remark has been made to us: "But at least there were no forgeries at that early time." We should like therefore to refer briefly to two early articles lamenting the growing prevalence of forgeries in Egypt in the decade of the forties of the last century. One of these, by Prisse d'Avennes,[10] attributes the lamentable condition to a recent effort of Mohammed Ali to found a national museum[11] and the accompanying prohibition of excavations, except under a permit from the Pasha; the travelers must have antiquities and the natives, no longer able freely to dig for them, began to make them. An open letter to De Saulcy by another Frenchman, printed in 1847,[12] describes in detail the different kinds of forgeries then being made, the majority of them, it would seem, not at all clever, and indulges in facetious remarks at the expense especially of English tourists, finally telling a story of an Englishman who went out to Egypt and died there, eventually to be brought back to his native land, in the character of an

[6] Conceivably in Lepsius' employ, as Mr. Lansing suggested to us.

[7] By Professor Erman; also by Professor Reisner, to whom we submitted for examination one each of the different kinds of gold units included in the necklace and who was willing to be quoted as considering them all forgeries.

[8] Gauthier, *op. cit.*, pp. 2, 3, under VII-IX; Petrie, *Scarabs and Cylinders*, Pl. VIII, two examples.

[9] See above, n. 4.

[10] *Revue archéologique*, Vol. II, Pt. 2 (1846), pp. 729-30.

[11] An abortive effort, especially as Mohammed Ali was in the habit of giving away the best pieces, as they accumulated, to titled visitors; it was not successfully resumed until 1857 by Mariette.

[12] *Revue archéologique*, Vol. III, Pt. 2, pp. 650-57.

ancient Egyptian mummied Pharaoh, by a compatriot, who had demanded a mummy and whom the natives, having no ancient mummy available, had satisfied in this gruesome way. It should not be a cause of disappointment, then, if a few modern things turn up in the Abbott collection. The number which we have observed is very small, to be counted on the fingers, and, except for the present instance, includes only lesser objects in the collection.

BIBLIOGRAPHY: Bonomi catalogue, 1843, p. 30, No. 1. Abbott catalogue, 1853, printed by Varey, No. 1050; 1853, printed by Watson, and thereafter, No. 1052; edition 1915, No. 1048. Prisse d'Avennes, Revue archéologique, Vol. II, 2 (1846), p. 732, Plate 40 bis, Nos. 5, 6; Monuments égyptiens, pp. 8, 9, Plate XLVII, Nos. 1, 2; Histoire de l'art, II, "Art industriel," Plate 20, Nos. 7, 8. Wiedemann, Ägyptische Geschichte, I, pp. 165-6; Supplement (1888), p. 13, citing Ebers, Ægyptiaca, II, p. 287. Maspero, Dawn of Civilization, edited by A. H. Sayce, translated by M. L. McClure, 5th ed., London, 1910, p. 235. Gauthier, Livre des rois, I, p. 2, under III.

The Early Catalogues
and Concordances of Old Numbers

Chronological List of Outstanding Jewels from
Egypt and the Upper Nile Valley,
with Selected Bibliography

THE EARLY CATALOGUES AND CONCORDANCES OF OLD NUMBERS

The first catalogue of the Abbott collection was written by Joseph Bonomi in 1843, but probably was not printed until 1846. It preserves for us, under 100 + 414 + 55 numbers, a record of the size and content of the collection at that early time and of its arrangement in Dr. Abbott's house, then one of the show places of Cairo.[1] The title-page of the copies in the possession of the New York Historical Society reads: "Catalogue of a Collection of Egyptian Antiquities, the Property of Henry Abbott, Esq., M. D., Cairo, 1846." The author's name with the year 1843 are at the end of the text. Three lithographic plates and twenty-one wee line cuts illustrate the book, of which the plates were made on the island of Malta, and the text with its cuts was printed by William Watts, Crown Court, Temple Bar, London. We have cited this interesting old document in the bibliography of the different numbers of the present catalogue as "Bonomi catalogue, 1843," and for the convenience of persons owning or consulting copies, those of its numbers included here are given with their present equivalents in the following table:

Bonomi catalogue	*Numbers in present catalogue*
p. 12, No. 68	140
" 30, " 1	See pp. 221-5
" 31, " 2	34
" 32, " 3	25, 144
" " " 4	28
" " " 5	33
" " " 6	20
" " " 7	19
" " " 8	43
" " " 9	38
" " " 11	27(?)
" " " 12	26(?)
" " " 14	24
" 33, " 18	30(?)
" " " 25	51
" " " 27	85

[1] *N.-Y. Hist. Soc. Quarterly Bull.*, Vol. IV (1920-21), pp. 9-11; also the following contemporary testimony: James Ballentine, *The Life of David Roberts, R. A., Compiled from His Journals and Other Sources,* Edinburgh, 1866, p. 110, journal entry of Jan. 24, 1839: "Dined with Dr. Abbott à la Turk"; also p. 113 under Feb. 3, 1839; Eliot Warburton, *Crescent and Cross,* New York, 1845, Vol. I, p. 243; Francis L. Hawks, *The Monuments of Egypt; or, Egypt a Witness for the Bible, with Notes of a Voyage up the Nile,* New York, 1850, p. 23 of "Voyage up the Nile"; J. V. C. Smith, *A Pilgrimage to Egypt, Embracing a Diary of Explorations on the Nile with Observations Illustrative of the Manners, Customs, and Institutions of the People and of the Present Condition of the Antiquities and Ruins,* Boston, 1852, pp. 74, 75, 242-55; J. M. Wainwright, *The Land of Bondage; its Ancient Monuments and Present Condition, being the Journal of a Tour in Egypt,* New York, 1852, pp. 59-63.

Bonomi catalogue				*Numbers in present catalogue*
p. 33, No.			28	40(?)
"	"	"	31	88, 89
"	"	"	32	86, 87
"	"	"	33	75, 76(?)
"	"	"	34	83
"	"	"	35	70–74(?)
"	34,	"	36	59, 60(?)
"	"	"	37	67(?)
"	"	"	39	41(?)
"	"	"	40	69
"	"	"	41	145
"	"	"	42	146
"	"	"	43	81
"	"	"	44	80
"	"	"	45	143
"	"	"	46	10, 11
"	"	"	47	7
"	"	"	48	153
"	"	"	49	105
"	"	"	50	104
"	35,	"	51	137
"	"	"	52	17
"	"	"	53	156
"	"	"	54	4, 5, 98

In 1853, when the augmented collection was placed on public exhibition in New York, another catalogue was issued. Many of the entries of the earlier catalogue, just as Bonomi had written them, were incorporated in it; others were rewritten in an effort to popularize them. It is uncertain whether or not Dr. Abbott himself made the new catalogue, but at least he wrote a preface for it and William C. Prime wrote an introduction. Several editions of this catalogue appeared in 1853. The first of these, containing 1107 numbers, has a cover and title-page reading: "Catalogue of a Collection of Egyptian Antiquities, the Property of Henry Abbott, M. D., now Exhibiting at the Stuyvesant Institute, No. 659 Broadway, New York. Printed for the Proprietor by Edwin Varey, 1853." In this edition, there were only five text illustrations, and on the four plates nearly all the objects were reversed. Prisse d'Avennes' illustrations for an article, "Collections d'antiquités égyptiennes au Kaire," printed in 1846 in the Revue archéologique, were drawn on for four of the line cuts; the other illustrations were in part from the Bonomi catalogue, in part, it would seem, from new drawings. The next edition with 1109 items was printed by J. W. Watson; plates were abandoned and the text illustrations, partly new, and partly taken from the previous catalogues and Prisse's article, were increased to 30. Pictures were added to the cover, namely, two just alike representing one and the same ushebti of the Clot Bey collection, which were derived from one of the plates of Prisse's article, and a Horus eye and a Soul, the latter similar to, but not, our No. 104,

of which we have been unable to locate the source. In another printing by J. W. Watson in 1853 some typographical errors were corrected and a text illustration for No. 541 was added. The copies of the catalogue dated 1854 still bear the title-page of J. W. Watson, but name on the cover J. W. Harrison, Printer, 197 Centre St. These duplicated the previous Watson catalogue, except that a few additional objects had been added to the exhibition, and the number of catalogue items had now reached 1113. Before the year was out J. W. Harrison had removed to 447 Broome St. and the number of entries had become 1118. It was in these two editions that an extract from the Easy Chair of Harper's Magazine, June, 1854, treating of the collection, was reprinted. Toward the end of this year another printing gave the firm name as T. B. Harrison and Company. Except for the change of printer, the title-page had undergone no alteration since Varey first produced the book. In 1857 the catalogue was copyrighted, and in 1860 the stereotyped plates for it passed, with the Abbott collection, into the ownership of the New York Historical Society, and it was thereafter issued bound with the catalogue of paintings and received the title-page: "Catalogue of the Museum and Gallery of Art of the New-York Historical Society." In 1874 the numbers were increased to 1127 by the entry of a cast of the Rosetta stone, of a mummy sent to America by Dr. Abbott shortly before his death, and of gifts from other persons. In 1915 the catalogue was again brought out separately with slightly changed numbers totaling 1121.[2] The title-page now reads: "Catalogue of the Egyptian Antiquities of the New York Historical Society," and to the old Abbott catalogue were appended Miss Leonora Smith's inventory of the collection of her father, Edwin Smith, a summary of the Anderson, Minturn, and Haight collections, and a list of miscellaneous gifts of Egyptian objects. In our Bibliographies we have used the abbreviation "Abbott catalogue, editions 1853 ff." to cover all the issues except the last, which is cited as "edition 1915," and we have referred to the first printed record of Egyptian objects from other collections owned by the Society by the page and number in the "Abbott catalogue, 1915." A concordance of numbers follows:

Abbott catalogue, editions 1853 ff., Nos.	*Abbott catalogue, edition 1915, Nos.*	*Present Catalogue, Nos.*
303	306	140
477	483	144
845	842	141, 142
883	880	135
954	950	138
956	952	151
964	960	24
965	961	30
968	964	32
972	968	35
973	969	37

[2] The numbering was made consecutive, omitting half-numbers and closing gaps in the older numbering.

Abbott catalogue, editions 1853 ff., Nos.	*Abbott catalogue edition 1915, Nos.*	*Present catalogue, Nos.*
974	970	36
975	971	21
976	972	22
979	975	53
980	976	54
981	977	55
982	978	62
983	979	63
984	980	26
985	981	132
986	982	153
987	983	137
988	984	16
989	985	117
990	986	119
991	987	127
992	988	97
993	989	126
994	990	143
995	991	122
996	992	9
997	993	130
998	994	131
999	995	124
1000	996	116
1001	997	152
1002	998	81
1003	999	69
1004	1000	102(?)
1005	1001	101(?)
1006	1002	46–49
1007	1003	66
1008	1004	14
1009	1005	52
1010	1006	147
1011	1007	12
1012	1008	92
1014	1010	120
1015	1011	106
1016	1012	118
1017	1013	99

Abbott catalogue, editions 1853 ff., Nos.	*Abbott catalogue edition 1915, Nos.*	*Present catalogue, Nos.*
1018	1014	115
1019	1015	114
1020	1016	121
1021	1017	13, 150
1022	1018	148, 149
1023	1019	155
1025	1021	1
1026	1022	42
1027	1023	96
1028	1024	91
1029	1025	3
1030	1026	8
1031	1027	111
1032	1028	100
1033	1029	112
1034	1030	129
1035	1031	113
1036	1032	110
1037	1033	2, 154
1038	1034	145
1039	1035	146
1040	1036	94
1041	1037	93
1042	1038	17
1043	1039	11
1044	1040	10
1045	1041	39
1046	1042	156
1047	1043	157–160
1048	1044	95
1049	1045	40
1050[3]	1046	34
1051[4]	1047	82
1052[5]	1048	pp. 221-5
1053	1049	74
1054	1050	77
1055	1051	15
1056	1052	59
1057	1053	60

[3] In 1853 ed. printed by Varey, No. 1051.
[4] In 1853 ed. printed by Varey, No. 1052.
[5] In 1853 ed. printed by Varey, No. 1050.

Abbott catalogue, editions 1853 ff., Nos.	*Abbott catalogue edition 1915, Nos.*	*Present catalogue, Nos.*
1058	1054	50
1059	1055	61
1060	1056	64
1061	1057	65
1062	1058	123
1063	1059	57
1064	1060	107
1065	1061	78
1066	1062	108
1067	1063	68
1068	1064	41
1069	1065	58
1070	1066	4
1071	1067	5
1072	1068	6
1073	1069	85
1075	1071	7
1076	1072	125
1077	1073	51
1078	1074	18
1079	1075	43
1080	1076	38
1081	1077	133
1082	1078	134
1083	1079	20
1084	1080	29
1085	1081	25
1086	1082	33
1087	1083	19
1088	1084	31
1089	1085	28
1090	1086	27
1091	1087	88
1092	1088	89
1093	1089	80
1094	1090	86
1095	1091	87
1096	1092	79
1097	1093	75
1098	1094	76
1099	1095	104

Abbott catalogue, editions 1853 ff., Nos.	*Abbott catalogue edition 1915, Nos.*	*Present catalogue, Nos.*
1100	1096	70
1101	1097	71
1102	1098	83
1103	1099	72
1104	1100	73
1105	1101	105
1108	1104	98
1109	1105	136
1854 ff.		
1110	1106	90
1111	1107	109
1112	1108	56
1113	1109	128
Abbott catalogue, 1915, p.	84, No. 74	139
" " " "	92, " 288	44
" " " "	97, Hand of a mummy, etc., Minturn gift	23

Anyone who has had to do with old collections formed before modern standards of Museum management were established will wonder, not that here and there confusion exists in the old numbering, but that it has been possible to make a concordance which is so near to being complete and in all probability is accurate with respect to a very large majority of the numbers.[6]

Incidental references to other objects are as follows:

Abbott catalogue, editions 1853 ff.	*Abbott catalogue, edition 1915*	*Present catalogue*
11	11	p. 5, n. 30
49, 52	50, 51	" 57, " 41
77	78	" 148, " 4

[6] The table above represents the numbers of the 1915 catalogue as we found them distributed in 1919, together with their earlier equivalents from 1853 on. As we have noted in the body of the present catalogue, the old numbers are not quite in order with respect to our Nos. 101-103 and 157-160 and in the numbering, as we found it, 1070, "A gold ring with two drop stones" is unaccounted for; is it properly our No. 65 which, however, was found numbered 1057? Also the sets of amulets under Nos. 1008-1016 and 1027-1032 may not have been preserved in their original composition, and No. 1009 was found on our present No. 103. Some of the gaps in the sequence of numbers above are explained by the fact that the objects bearing the absent numbers do not belong within the scope of the present Part I of the new catalogue. The entry in the old Bonomi catalogue, p. 32, No. 10, "Ring with a cornelian scarabæus," does not occur in the later Abbott catalogues and we may be confident that the ring never formed a part of the collection exhibited in New York. Some items, such as No. 15 on p. 32, "Silver Ring. From Sakkara," are too vague for identification in the later, enlarged collection.

Abbott catalogue, editions 1853 ff.	*Abbott catalogue, edition 1915*	*Present catalogue*
149	150	p. 65, n. 84
216–219	218–221	" 219, " 37
291	294	" 11, " 61
	and	" 57, " 41
370, 371	375, 376	" 79, " 24
458	464	" 98, " 100
612, 614	619, 621	" 172, " 77
734 (one)	741 (one)	" 69, " 98
805	803	" 65, " 89
931	927	" 195, " 10
967	963	" 98, " 99
	p. 87, No. 155	" 172, " 78
	" 98, Phoenix gift	Pls. XXIV, XXV
		pp. 160–61
	" " Schieffelin gift	p. 88, n. 68
	" " Stuart gift	" 219, " 37

CHRONOLOGICAL LIST OF OUTSTANDING JEWELS FROM EGYPT AND THE UPPER NILE VALLEY, WITH SELECTED BIBLIOGRAPHY

(a) First Dynasty, around 3300 B.C., or Earlier.

Four bead bracelets, principally of gold and semi-precious stones, belonging to a queen; without clasps, having been designed to tie or button on; Cairo Museum. Colored plate and full description: Petrie, *Royal Tombs, II,* pp. 16-19. Clear photographic views: Vernier, *Bijouterie,* Pls. II, 2, 4, III, 3, 4. Details enlarged: Rosenberg, *Aegyptische Einlage,* Figs. 5-8. Construction, material (some glass?): Vernier, *Bijoux,* I, Nos. 52008-11. Very accessible: Breasted, *History,* Fig. 17; Maspero, *Art in Egypt,* Fig. 2; Petrie, *Arts and Crafts,* pp. 84-6, Fig. 93.

Gold ornaments of a provincial grandee, including a circlet for the head, bracelets, finger rings, amulets representing a bull and gazelle, amulet case in form of a beetle, and variously shaped beads; also garnet, carnelian and syenite(?) beads. Published in full: Reisner, *Naga-ed-Dêr,* I, pp. 30, 31, 143-4, Fig. 54, Pls. 5-9.

(b) Fourth Dynasty, around 2800 B.C., or Earlier.

Silver cylinder seal, bearing the name of Khafre (Chephren), builder of the Second Pyramid, Giza; Museum of Fine Arts, Boston. Unpublished.[1]

Gold cylinder seal bearing the name of Menkure (Mycerinus), builder of the Third Pyramid, Giza; Berlin Museum. Schäfer, *Goldschmiedearbeiten,* No. 7, Pl. 2.

(c) Sixth Dynasty, around 2500 B.C., or Earlier.

Gold chain, five feet long, with links of form shown in our Pl. XXXVIII, 69 f, belonging to a private person; Cairo Museum. Garstang, *Mahâsna and Bêt Khallâf,* pp. 2, 30, Pl. XXXVII; Petrie, *Arts and Crafts,* p. 86, Fig. 94.

Funerary, broad bead collar, the earliest of its kind yet published; of thin gold over a core and blue-glazed pottery, belonging to a noble; Museum of Fine Arts, Boston. Boston *Bulletin,* Vol. XI (1913), p. 59 and Fig. 14.

(d) Late Sixth to Tenth Dynasties, 2500-2160 B.C.

Two solid gold "button" seals; Berlin Museum and private possession. Schäfer, *Goldschmiedearbeiten,* No. 9, Pl. 3. Hilton-Price Sale *Catalogue,* 1911, Pl. XXIII, No. 969 = Burlington Fine Arts Club, *Catal. Egypt. Art,* 1922, p. 25, No. 20, Pl. L.

(e) Eleventh Dynasty, around 2100 B.C.

Complete set of jewels of an infant princess of the house of King Nibhapetre-Mentuhotep II; consisting of five bead necklaces of gold, silver, carnelian, green felspar, and blue glass. Recovered in their original arrangement and in part on their original strings of linen or on leather bands; without clasps; Metro-

[1] We are indebted to Mr. Ashton Sanborn for his kindness in looking through this list with reference to objects in the Boston Museum.

politan Museum of Art, New York. Preliminary publication: *Bull. M. M. A.,* November, 1921, Part II, p. 52, Fig. 30.

(f) Twelfth Dynasty, 2000-1788 B.C.

Jewels of five princesses of the houses of Amenemhet II and III and Sesostris III, including, whole, or broken up into units: diadems, necklaces, broad collars, pectorals, cylindrical amulets, armlets, bracelets, finger rings, girdles, and anklets; made principally of gold, silver, and semi-precious stones, illustrating in design and workmanship the finest accomplishment of the Egyptian jeweler, and affording examples of many important technical processes, such as chasing, chain-making, inlaying with stones (cf. our No. 104), and granulated work (cf. our No. 1); Cairo Museum. Published in full, with four colored plates; De Morgan, *Dahchour,* I and II. Vulture on one of the diadems: Vernier, *Bijouterie,* Pl. XIX, 2. Detail of pectoral enlarged: Rosenberg, *Aegyptische Einlage,* Fig. 14, and *Zellenschmelz I,* Fig. 5. Construction of end-piece of collar: *Rosenberg, Einlage,* Fig. 25, and *Einführung,* Fig. 96. Construction: Vernier, *Bijoux,* I, (pectorals, bracelets, clasps) and II (finger rings). Construction, present condition, of inlaid silver diadem: Rosenberg, *Einlage,* pp. 4-5, Fig. 10. Supposed glass mosaic: Newberry, *J. E. A.,* Vol VI (1920), p. 159, Pl. XVI, 1 (in colors). Granulated work: Rosenberg, *Granulation,* pp. 37-8; Figs. 57, 58; Curtis, *Memoirs Am. Academy in Rome,* I, pp. 66-8, Pl. 16, 1-3. Especially accessible: Breasted, *History,* Figs. 97, 98; Maspero, *Art in Egypt,* Figs. 226-30; Petrie, *Arts and Crafts,* pp. 87-91, Figs. 97-101. Jewel-units in private possession, belonging to one or more of the above-mentioned princesses, or to others buried at Dashur: Sale *Catal. MacGregor Coll.,* pp. 184-5, Pl. XXXIX; Burlington Fine Arts Club, *Catal. Egypt. Art,* 1922, pp. 20-23, No. 10, Pl. L.

Jewels of a princess of the house of Sesostris II, including pieces analogous to the foregoing and of equal importance and artistic quality; divided between the Cairo Museum and the Metropolitan Museum of Art, New York. Published in full, with seven colored plates (less good than those of *Dahchour,* I): Brunton, *Lahun I.* See also: A. M. Lythgoe, *Bull. M. M. A.,* Dec. 1919, Part II, numerous illustrations, pectoral in colors; *J. E. A.,* Vol. I (1914), Pl. XXIX. Discussing composition of jewels, especially of cowry-shell girdle: Winlock, *Ancient Egypt,* 1920, pp. 74-87. In pectorals, a blending of static and dynamic symmetry, according to Jay Hambidge, *The Diagonal,* New Haven, Vol. I, No. 9 (July, 1920).

Uraeus for the head, a jewel belonging to the king Sesostris II; a solid gold casting with inlays of lapis lazuli, carnelian and garnet; Cairo Museum. *Ancient Egypt,* 1920, Part III, p. 67, half-tones on cover and first plate.

Jewels of a well-to-do woman of court circles, including: circlet for the head, rosettes for the wig, necklaces, with one sliding clasp in the form of a reef knot, broad collars, a cylindrical amulet, bracelets, girdles, anklets; made of gold and silver (in part economically, over a core), semi-precious stones, some substitutes for stones, and glazed pottery; in Metropolitan Museum of Art. Published in full, with admirable construction drawings and plates, three colored: Mace and Winlock, *Senebtisi.*

Pectoral of a private person, similar in material and technique to the Dashur pectorals, but less fine, and other jewels; Manchester Museum, England. Excavator's account: Engelbach, *Riqqeh and Memphis VI,* Ch. III, Pl. I, 1-4 (in colors) = colored plate in preliminary account, *Ancient Egypt,* 1914, Part I, pp. 3-4. Good half-tones: *J. E. A.,* Vol. I (1914), Pl. VI. Also well set forth in: Burl. Fine Arts Club, *Catal. Egypt. Art,* 1922, p. 17, No. 1, Pl. L.

Necklace, 1.09 yards (1 m.) long, of graduated amethyst and gold beads, with gold figures of recumbent lions as end-pieces, pleasing gold wire bracelets, and other jewels; belonging to a resident of the town at the second Nile cataract; University Museum, Philadelphia. MacIver and Woolley, *Buhen,* pp. 200-201, colored frontispiece.

(g) Thirteenth to Seventeenth Dynasties, 1788-1580 B.C.

Inlaid silver diadem, with gold uraeus, of a king Intef (variously placed, but surely not of Eleventh Dynasty); Leyden Museum. Original publication: Leemans, *Monumens égyptiens,* Part II, p. 18, Pl. XXXIV, 1 a. After removal of parts not original to diadem: Boeser, *Ä.Z.,* Vol. 45 (1908), pp. 30-31 and *Beschrijving van de Egyptische Versameling. Leiden,* III, p. 8, Pl. XVIII. Pictured: Jéquier, *Frises d'objets des sarcophages,* Fig. 107.

Signet ring inscribed with name of the Hyksos king, Apophis, consisting of green-glazed steatite scarab, set in gold, with gold shank; Davis collection, on loan in Metropolitan Museum of Art. Newberry, *Scarabs,* Pl. I, No. I.

Complete jewelry of a provincial woman, including earrings (among the earliest specimens from Egypt), a dainty girdle, necklace and other pieces; made of gold and electrum. Petrie, *Qurneh,* Ch. III, Pl. XXIX.

Large gold pendant in form of a bivalve shell, inscribed with name of King Sekenenre-Tao, possibly from royal jewelry. Petrie, *Scarabs and Cylinders,* Pl. XXIII.

(h) Eighteenth Dynasty, 1580-1350 B.C.

Jewels of Queen Ahhotep, including: bead and hoop bracelets and others hinged and inlaid, an inlaid pectoral, splendid chains, three large pendants in the form of flies, a sumptuously wrought and inlaid scarab-pendant, units from an elaborate broad collar, and other pieces, but no granulated work; materials, chiefly gold and semi-precious stones; Cairo Museum. In comparison with the royal jewels of the Twelfth Dynasty, some falling off in the merit of the designs and workmanship is to be noted. Published in full, with four of the plates in colors: Von Bissing, *Ein thebanischer Grabfund.* Conditions of finding: Daressy, *Annales du Service,* IX (1908), p. 63, XII (1912), pp. 64-8 and literature cited by him. Enlargement of inlays in vulture bracelet: Rosenberg, *Aegyptische Einlage,* Fig. 17, and *Zellenschmelz I,* Fig. 7. Comparison with Dashur jewels: Rosenberg, *Einlage,* p. 9. Gold falcon heads inlaid, not with steel, as: Désjardins, *Revue de l'architecture,* XVIII, 105, cited by Rosenberg, *Einlage,* p. 10, Figs. 22-3, but probably with niello: Von Bissing, *op. cit.,* col. 17; cf. col. 1, n. 2; Rosenberg, *Niello,* p. 3, Figs. 1, 2. Forerunner of enamel(?) in one kind of inlay; Rosenberg, *Zellenschmelz I,* pp. 7-8. Good reproductions: Vernier, *Bijouterie,* Pls. II, 1; VIII, 1, 2; X, 1, 4, 7; XIV; XV, 1, and *Bijoux,* I, Pls. III, IX, and X.

Also: Petrie, *Arts and Crafts,* pp. 91-2, Fig. 102; Maspero, *Art in Egypt,* Figs. 400, 403.

Two pairs of gold armlets, and a single bracelet, the last inscribed with name of Thutmose III, Leyden Museum; a single gold armlet, Berlin Museum. Leemans, *Monumens égyptiens,* II, Pl. XLI, Nos. 316, 318, 320. Schäfer, *Goldschmiedearbeiten,* Fig. 11, No. 59, Pl. 11. Wilkinson, *Manners and Customs,* ed. Birch, II, p. 342, 2 in Fig. 448.

Gold vulture collar (not headdress): Davis' Excavations, *The Tomb of Queen Tiyi,* London, 1910, p. 20, No. 8, Pl. XX.

Massive gold signet rings, inscribed with royal names: (1) Amenhotep II, ring in Louvre; Newberry, *Scarabs,* Pl. I, No. II (cf. our Nos. 25, 26, and Hall, *Catal. of Scarabs,* I, No. 2657); (2) Nefertiti, consort of Amenhotep IV, ring in Edinburgh Museum; *J. E. A.,* Vol. IV (1917), p. 45; (3) Tutenkhamon, ring in Metropolitan Museum of Art; *Bull. M. M. A.,* Vol. XVII (1922), p. 172.

Silver signet rings inscribed with name of Amenhotep IV (Ikhnaton): (1) in British Museum; Hall, *Catal. of Scarabs,* I, No. 2678; (2) in private possession; Newberry, *Scarabs,* Pl. I, No. IV. Cf. electrum ring with same name, in Berlin; Schäfer, *op. cit.,* No. 78, Pl. 13.

Ornaments of a young girl in private life, including earrings, fancy hairpins, four necklaces, bracelet, scarab worn as a finger ring, and girdle; gold and semi-precious stones, except bronze in hairpins (some gold-covered) and glazed pottery in scarab (set in gold); all but two pieces in Berlin Museum. Schäfer, *op. cit.,* pp. 25 ff., Nos. 20-26, Pls. 5-7. The bracelet and girdle disappeared when excavated long ago by Passalacqua, but, according to his statement, were similar to other jewels found by him, now in Berlin, *loc. cit.,* Nos. 35, 37, Pls. 8, 9.

(i) Nineteenth Dynasty, 1350-1205 B.C.

Massive gold signet ring inscribed with name of King Harmhab, in Louvre. Good photographic view: Vernier, *Bijouterie,* Pl. I, 6. See also: Newberry, *Scarabs,* Pl. I, No. V; Perrot and Chipiez, *Histoire de l'art,* I, Fig. 500, showing other faces of the bezel.

Jewels of reign of Ramses II, one bearing his name, found by Mariette in three burials in the Serapeum; including various inlaid pectorals, handsome amulets and chains; made of gold, semi-precious stones, and glass (?) (probably not enamel, as so often stated); in Louvre. Reproduced in colors: Mariette, *Sérapéum.* Discussion, accompanied by half-tones: Maspero, *Egyptian Art. Studies,* Ch. XVI. Detail of one pectoral enlarged: Rosenberg, *Einlage,* Fig. 20. Additional illustrations: Vernier, *Bijouterie,* Pls. VII, 1, VIII, 4, XI, 2; Perrot and Chipiez, *Histoire de l'art,* I, Figs. 566-8; Maspero, *Art in Egypt,* Figs. 407, 408; Petrie, *Arts and Crafts,* p. 93, Fig. 105.

A pair of gold and lapis lazuli hinged bracelets, with cartouche of Ramses II; with granulated decoration and various gold appliqués; Cairo Museum. These are two of the most gorgeous Egyptian jewels extant, but lack the delicacy of design and workmanship characteristic of many earlier pieces. Edgar in Maspero, *Le Musée Egyptien,* Vol. II, Part 3 (1907), p. 106, Pl. LIV; Vernier, *Bijoux,* II,

Pl. XVIII, Nos. 52575-6; Rosenberg, *Granulation,* Figs. 59, 60; Curtis, *Memoirs of the Am. Acad. at Rome,* I, p. 71, Pl. 16, 7; Maspero, *Egyptian Art. Studies,* pp. 158-9, with good half-tones, and *Art in Egypt,* Fig. 406.

Jewels of which some bear the names of Seti II and Queen Tewosret, found in the Valley of the Kings, Thebes; including a diadem, units from a necklace or collar, large, heavy earrings, a variety of finger rings, bracelets and amulets; made of gold, electrum, silver, semi-precious stones and glazed pottery; interesting, but often overloaded, designs, workmanship poor as compared with that of earlier periods—good examples, however, of filigree work; wire appliqués imitated in repoussé; the greater share of the treasure is in the Cairo Museum, parts of the necklace are in the Davis collection, on loan in the Metropolitan Museum of Art. Davis' Excavations, *Siphtah,* pp. 35 ff., with excellent plates, three in colors. Vernier, *Bijoux,* II, Nos. 52261-7, 52331, 52397-402, 52577-8, 52580-5, Pls. XIX, XX, XXV, XXVI, XXVIII, XXIX.

A remarkable gold finger ring, bearing on the bezel figures in the round of a pair of horses, also some granulations; in Louvre. Maspero, *Egyptian Art. Studies,* p. 151, Fig. 3, opposite p. 146. Vernier, *Bijouterie,* Pl. I, 4. Perrot and Chipiez, *Histoire de l'art,* I, Fig. 574.

A pair of large earrings, one fragmentary, ascribed on stylistic grounds to reign of Ramses II; made chiefly of gold, but with pottery core in main piece and glazed pottery inlays; having a complicated, but well-organized, design and decorated also with granulated and filigree work and appliquéd wires and bosses; in Berlin Museum. Schäfer, *Goldschmiedearbeiten,* No. 92, Pls. I a (in colors) and 14; technique described in detail by Möller. Pictured: Rosenberg, *Granulation,* Fig. 61.

A pair of hinged bracelets, inlaid, and *à jour,* made of gold, semi-precious stones, and glass or paste (not enamel); date uncertain, but resemble stylistically the Serapeum jewelry; in Louvre. Vernier, *Bijouterie,* Pl. VII, 2. Prisse d'Avennes, *Histoire de l'art,* Atlas Vol. II, under "Art industriel," Pl. 20, Fig. 14 (in colors). Perrot and Chipiez, *Histoire de l'art,* III, Fig. 598. Rosenberg, *Zellenschmelz I,* Figs. 9, 10, the latter, an enlargement.

(j) Twentieth Dynasty, 1200-1090 B.C.

Pectoral, found on the mummy of Ramses III (contemporary? or dating from time of rewrapping of mummy in the next dynasty?), a shallow box of sheet gold, filled with a sustaining composition (resin and plaster?), having designs, including the king's cartouches, chased on both faces, but no inlays; also beads of gold, the larger ones with a core of other material, by which the pectoral was suspended; Cairo Museum. Vernier, *Bijoux,* I, No. 52005, Pl. IV, and *Bijouterie,* Pl. XIX, 3. Conditions of finding: Maspero, *Les momies royales de Déir el-Bahari* (*Mémoires. Mission,* Vol. I, 4), Cairo, 1889, p. 769, reprinted in G. Elliot Smith, *Royal Mummies* (Cairo *Catal.*), p. 85.

A pair of imposing gold earrings bearing cartouches of Ramses XII (Menmare-Setepneptah), with pendants hanging from chains, granulated work, and appliquéd wires; even larger than earrings previously listed, and distinctly poorer in workmanship; Cairo Museum. Vernier, *Bijoux,* II, Nos. 52323-4, Pl. XXVII;

Rosenberg, *Granulation,* p. 40, enlarged detail of names, appliquéd grains and wires, Fig. 63. Conditions of finding: Mariette, *Catal. Abydos,* No. 1370, pp. 528-9. Also: Maspero, *Art in Egypt,* Fig. 405; Petrie, *Arts and Crafts,* Fig. 106.

Units from a collar, of solid gold, found with foregoing earrings, and in contrast to them, of charming and delicate workmanship. No illustrations are available, but see descriptions: Mariette, *Notice,* p. 267, No. 857; Maspero, Cairo *Guide,* 4th Engl. ed., p. 441, No. 973.

(k) Twenty-Second and Twenty-Third Dynasties, 945-718 B.C.

Pendant in form of a triad of gods, Osiris, Isis and Horus, solid gold and lapis lazuli, inscribed with names of Osorkon II; beautiful workmanship; in Louvre. Vernier, *Bijouterie,* Pl. XVIII, I; Perrot and Chipiez, *Histoire de l'art,* I, Fig. 571.

Large electrum amulet of type of our Nos. 8, 9, inscribed with names of an Osorkon and the "King's Wife," Tedibast; in Louvre. Vernier, *Bijouterie,* Pl. XIX, 1; Perrot and Chipiez, *Histoire de l'art,* I, Fig. 569; Hilton Price, *Catal.,* 1897, No. 2520.

Solid gold statuette (pendant) of the god Harsaphes; Museum of Fine Arts, Boston. Boston *Handbook,* p. 50; cf. above, p. 194, n. 4.

(l) Ninth to Fifth Centuries B.C.

Jewels of the Ethiopian royal house, Egyptian in style, and probably in part the work of Egyptian craftsmen, found in kings' and queens' tombs at Napata; many pieces now in the Museum of Fine Arts, Boston; as yet only partially available in preliminary notices. Necklaces, finger ring, figure of child Ptah, of gold, garnet, and carnelian, from early tumuli: Boston *Bulletin,* Vol. XIX (1921), p. 29. Two silver figures of a goddess, a falcon of silver with inlays of "colored paste" in gold cloisons, amulet of crystal and gold, time of Piankhi: *op. cit.,* pp. 29, 30. Beautiful hinged collar of burnished sheet gold with two chased plaques appliquéd front and back and border wires, time of Shabataka: *op. cit.,* p. 35. Gold finger ring, amulets, and ornaments, time of Taharka; Boston *Bulletin,* Vol. XVI (1918), p. 72. Gold cylinders, bead collar of gold, amethyst, and amazon stone, from tomb of Aspalta: Boston *Bulletin,* Vol. XV (1917), p. 33, Fig. 13; Vol. XVI, pp. 79, 80. Beautiful chased gold breast plaque of goddess Isis with wings spread: Boston *Bulletin,* Vol. XVI, p. 67; *Harvard African Studies,* II (1918), Pl. XVII, 6.

(m) Twenty-Sixth Dynasty, Reign of Ahmose II, 569-525 B.C.

Jewels found in town ruins on the site of the palace of Merneptah at Memphis, including: six figures of gods, some in solid gold, others in silver covered with gold; two remarkable amulets of electrum; gold beads in form of cowry shells; globular gold bead covered with granulated work, chalcedony bead with granulated gold caps; onyx beads, one a ram's head marvelously cut; and a few other pieces; divided between the Cairo Museum and the University Museum, Philadelphia. Preliminary publication: *The Museum Journal,* Vol. VIII (1917), pp. 228-30, Fig. 89.

(n) Persian Period, Early Fifth Century B.C.

Funerary jewelry of Thanhebu, including excellent examples of chased, inlaid, and carved gold; Cairo Museum. Maspero, *Egyptian Art. Studies,* Ch. XXIII, and *Art in Egypt,* Fig. 565. See further, above, p. 154, n. 5.

(o) Early Ptolemaic Period, about 300 B.C.

Rich gold bracelets of several designs, heavy gold chain terminating in animals' heads, in Greek Hellenistic style and inlaid, gold collar-amulet in Egyptian style; Cairo Museum. Edgar in Maspero, *Le Musée Egyptien,* II, 2 (1906), pp. 57 ff., Pls. XXII, XXIII. Vernier, *Bijoux,* I, Nos. 52093-8, Pls. XII, XIII, and *Bijouterie,* Pls. II, 3, III, 2, IV, 5, 6, XII, 3. Maspero, *New Light on Ancient Egypt,* translated by Elizabeth Lee, London, 1908, Ch. XXXVI.

(p) First Century after Christ.

Meroitic jewels, showing Egyptian and Classical influence, including bracelets, finger rings, earrings, amulets, and other pieces, illustrating many techniques, among them a kind of enameling; divided between the Munich and Berlin Museums. Published in full, with accurate and detailed descriptions and plates, one of the latter in colors: Schäfer, *Goldschmiedearbeiten.* See also: Rosenberg, *Zellenschmelz I,* p. 42, Figs. 26, 59.

"Enameled" gold bracelet from Barkal; Museum, Boston. Boston *Bulletin,* Vol. XV (1917), p. 33; cf. Vol. XXI (1923), pp. 19, 24-7, including some pieces of first century B.C.

(q) Late Roman Period, Principally Sixth Century after Christ.

Treasure including thirty-six gold pectorals, medallions, necklaces, armlets, bracelets, set with pearls, sapphires, and emeralds, in the late Roman style; from the Morgan, Burns, Freer and Gans private collections, some pieces have come into the public collections of the Berlin Museum, the British Museum, and the Smithsonian Institution. Published in full: Dennison, *Gold Treasure.*

GENERAL INDEX

[1] Numbers refer to pages unless preceded by n. for note, Ch. for Chapter, § for paragraph, or Pt. for Part. Under the main catch words, items beginning with a small letter are to be read after the catch word, items beginning with a capital, in whole, or in part, before the catch word.

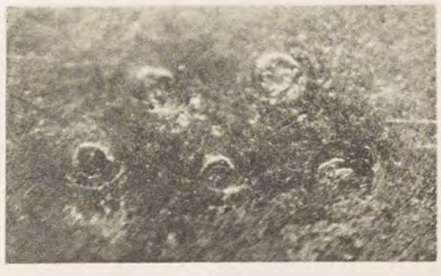
1 a

1 c

1 b

1 d

A



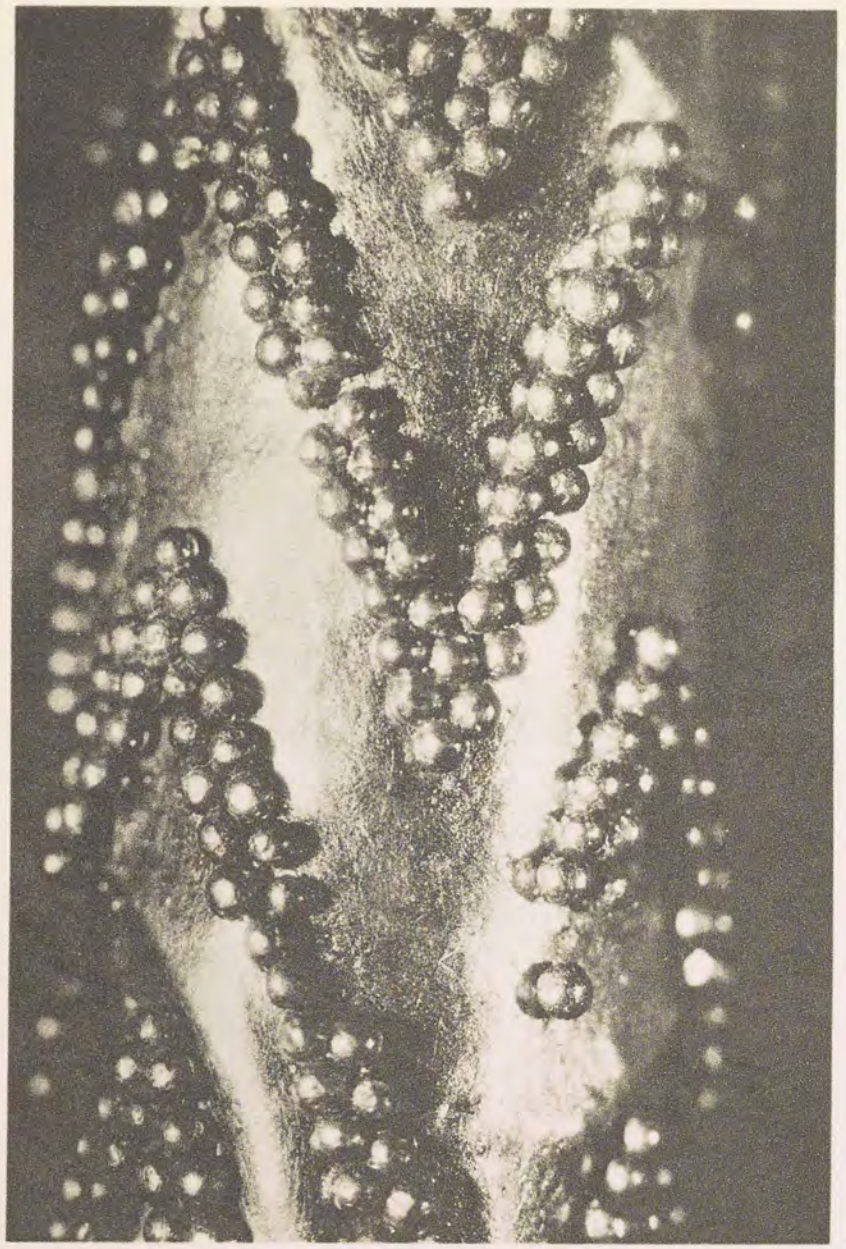
1 e

B

Women's Cylindrical Amulets

A, in University Museum, Philadelphia; B, in Brooklyn Museum, New York

1 a, b, and B, actual size; A, enlarged about 1/5; 1 c-e, 37 diameters



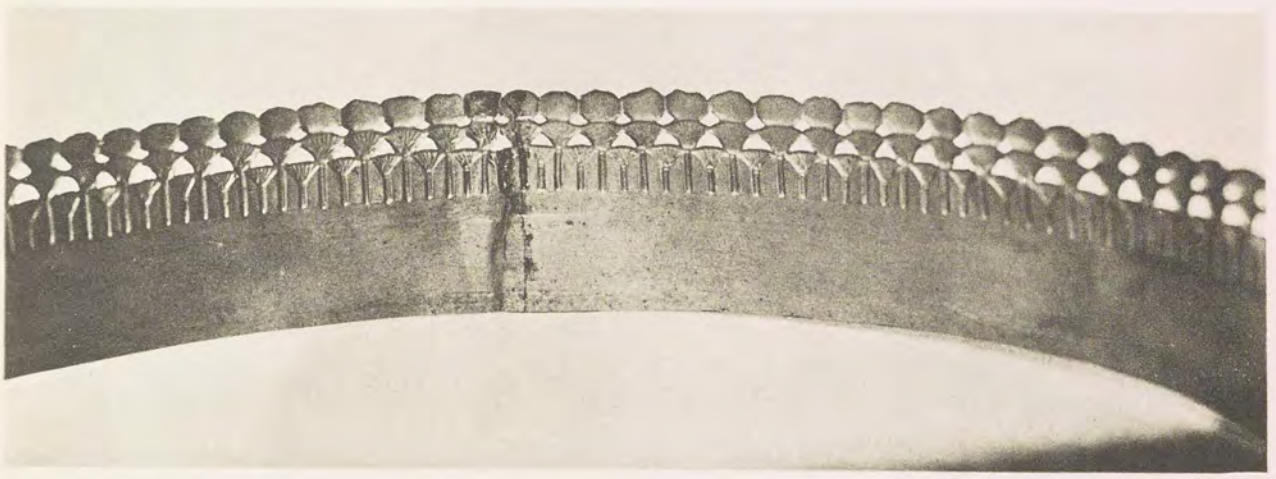
1 f

1 g

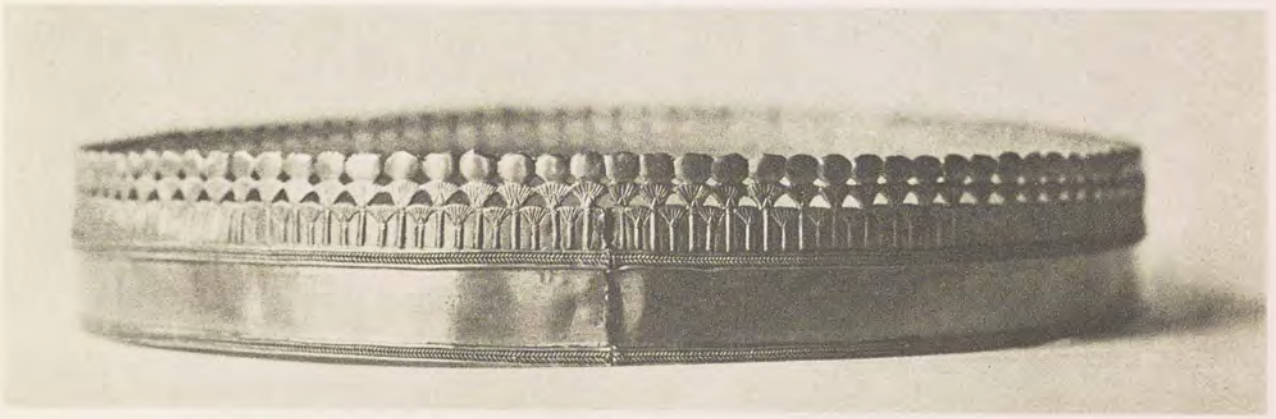
Granulations, or "Shot Work," of the Nineteenth Century B. C.

1 f, 15 diameters; 1 g, 68 diameters

2 a

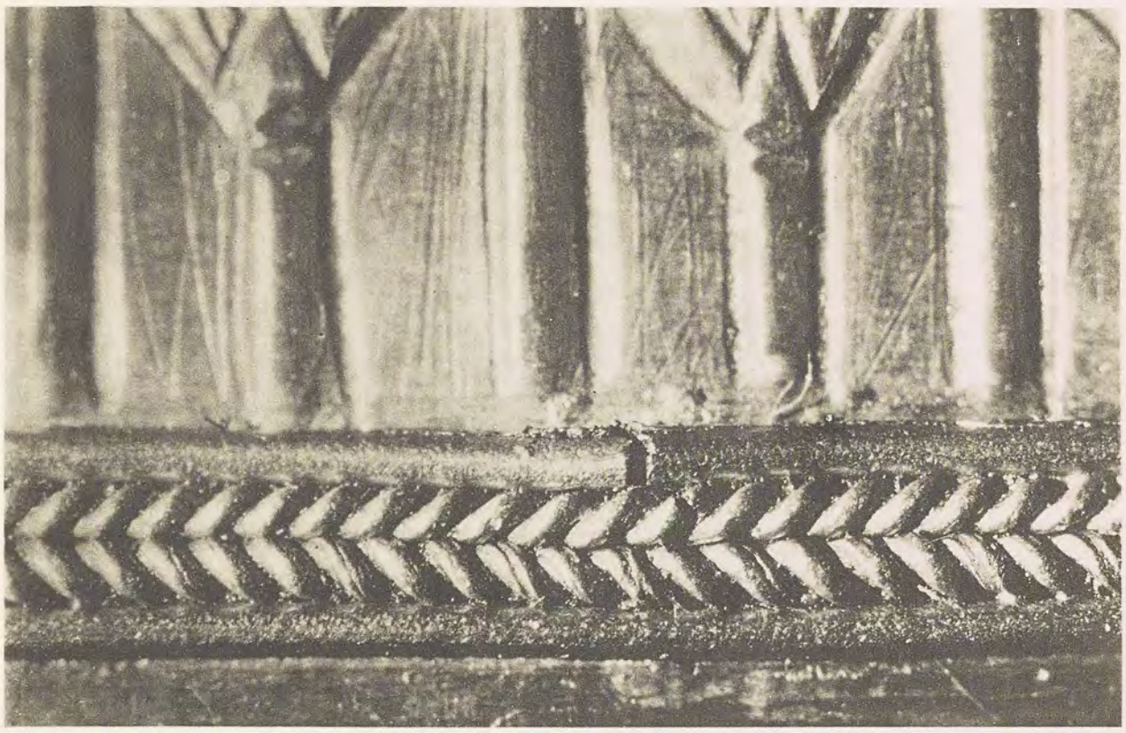


2 b



Gold Circlet for the Head 2 c

Diameter, 6½ inches (0.165 m.)



2 d

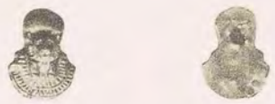
17 d

Above, Appliquéd Wires; below, Hieroglyphs Chased in Sheet Gold

2 d, 15 diameters; 17 d, 23½ diameters

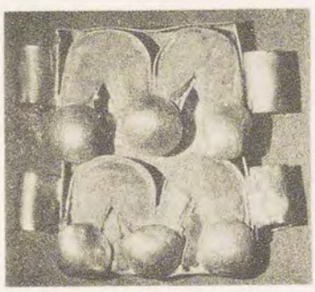
8a, b

3a



9a, b

4a, b



3b

5a, b

7

12a

6a, b

13

14

10a

10b

10c

11a

11b

11c

Part of a Clasp, the Earlier Beads and Amulets

Actual size, except 3 b, 2½ diameters

20 a

20 b

20 c

20 d

20 e

15 d

15 a, b

17 a

16 a, b

15 c

15 e

17 b

18 a, b

17 c

Scarabs, and Finger Rings Set with Scarabs

Actual size, except 17 c and 18, slightly enlarged

23 b

23 c

23 d

23 e

23a

Plate VII

Funerary Finger Ring of about 525–200 B. C.

In position, and after removal from the mummy hand

Actual size

19 a

24 a, b

26 a, b

25 a, b

21

26 c

22

27 a

27 b

28 a, b

27 c

29 a, b

Finger Rings

Actual size, except 26 c and 27 c, 2½ diameters

30 a, b

31 a, b

32 a, b

33 a, b

34 a

34 c

34 b

35

36

37

38 a

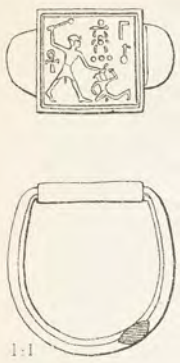
43 a

43 b

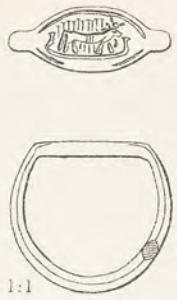
Finger Rings

The solder of 37, the glass inset of 43 a, modern

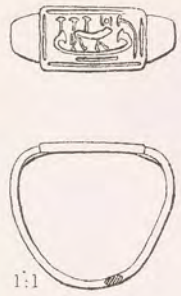
Actual size, except 34 c, 2½ diameters



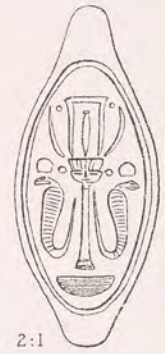
26 d,e

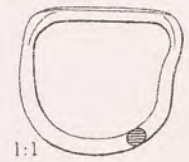


31 c,d



32 c,d

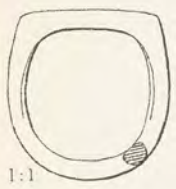




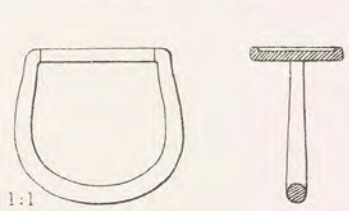
29 c,d

19 b

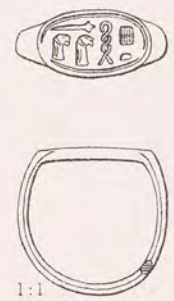
38 b



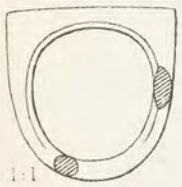
28 c,d



25 c-e

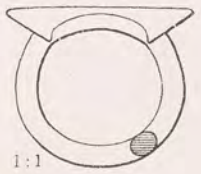


30 c,d



27 d,e

33 c-e

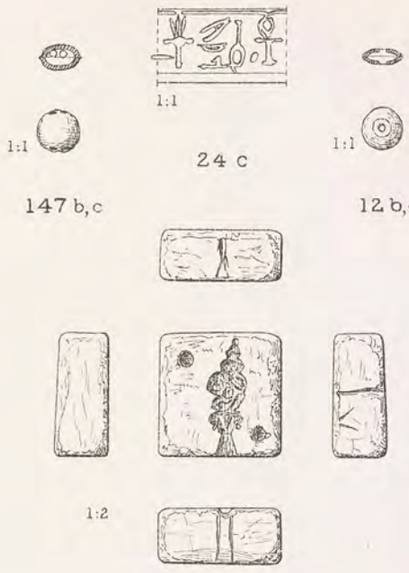


34 d,e

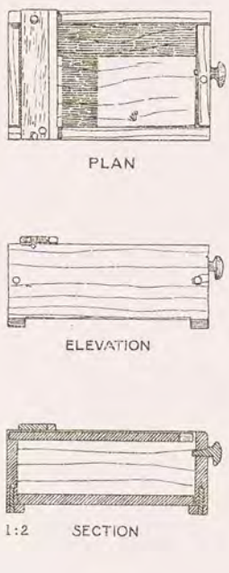
Finger Rings

Actual size, except 27d, 29c, 34d, 2 diameters

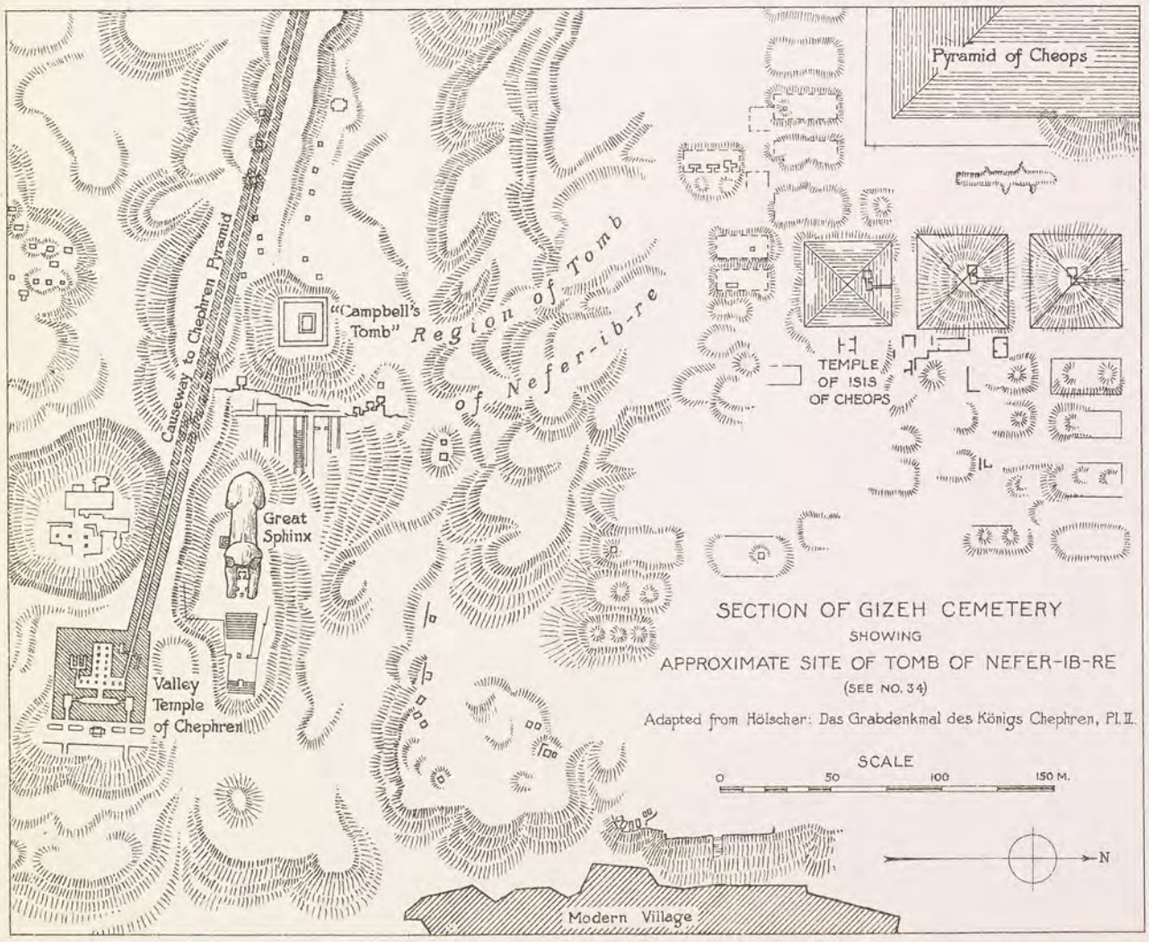
17 e



147 b,c 24 c 12 b,c 139 c-g



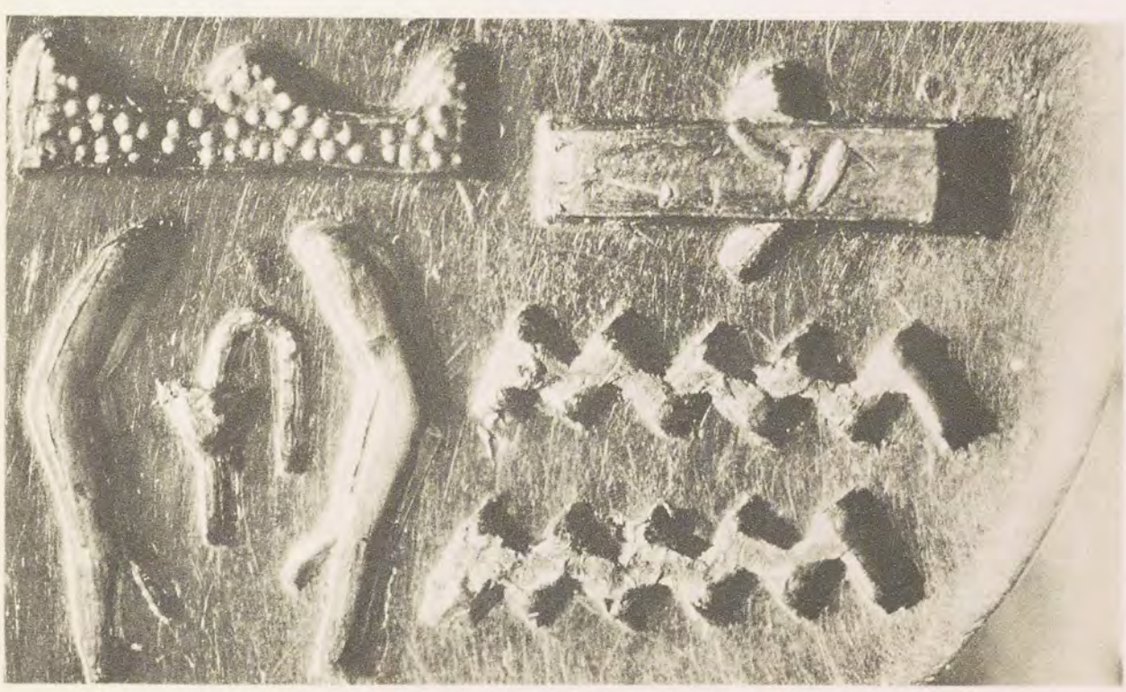
144 b-d



Inscriptions, Beads, Map, Goldsmith's Die and Mould

12, 24, and 147, actual size; 139 and 144, half actual size

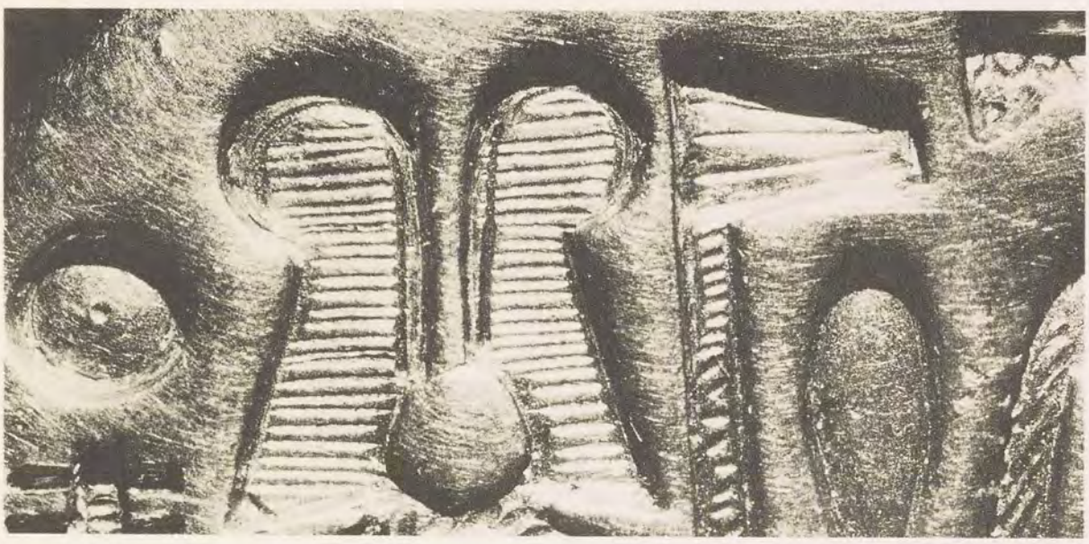
34 f



34 g

Hieroglyphs Carved and Chased in Solid Gold

23½ diameters



34 h

34 i

Hieroglyphs Carved and Chased in Solid Gold

23½ diameters

39

40 a, b

41

74 b

42

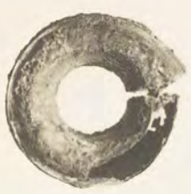
141 a, b

143 a

142 a, b

Serpent Rings, Earring, Bracelet and Tools

Actual size, except 74 b, 2½ diameters



45 a

45 c

44 a

44 b

45 b

45 d

52 a

52 b

46 a, 47 a

46 b

48, 49

50

51

53

54

55

Earrings with Slit, "Leach" and "Boat-Shaped" Types, and their Late Derivatives

Actual size, except 44–51, slightly enlarged

57a

61

56

59, 60

62a

62b, 63b

63a

66

58

64

65

67

68

69a

Earrings with Hook for Insertion in the Ear or with Catch

Actual size

71a

72a

73

74a

75a

76

70a

77a

78a

83a

80a

79a

83b

79b

82a

82b

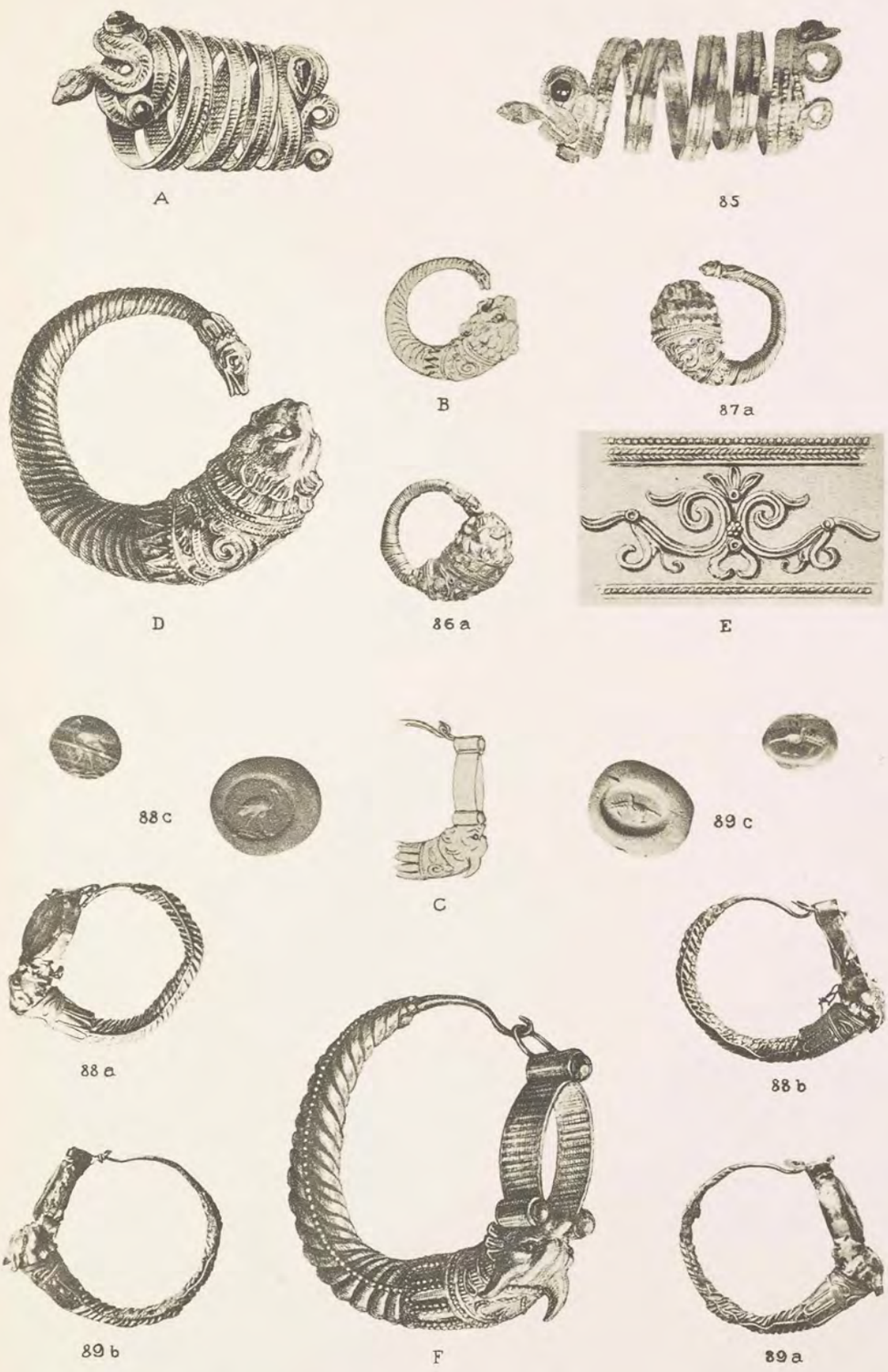
81a

84

81b

Earrings with Animal's Head

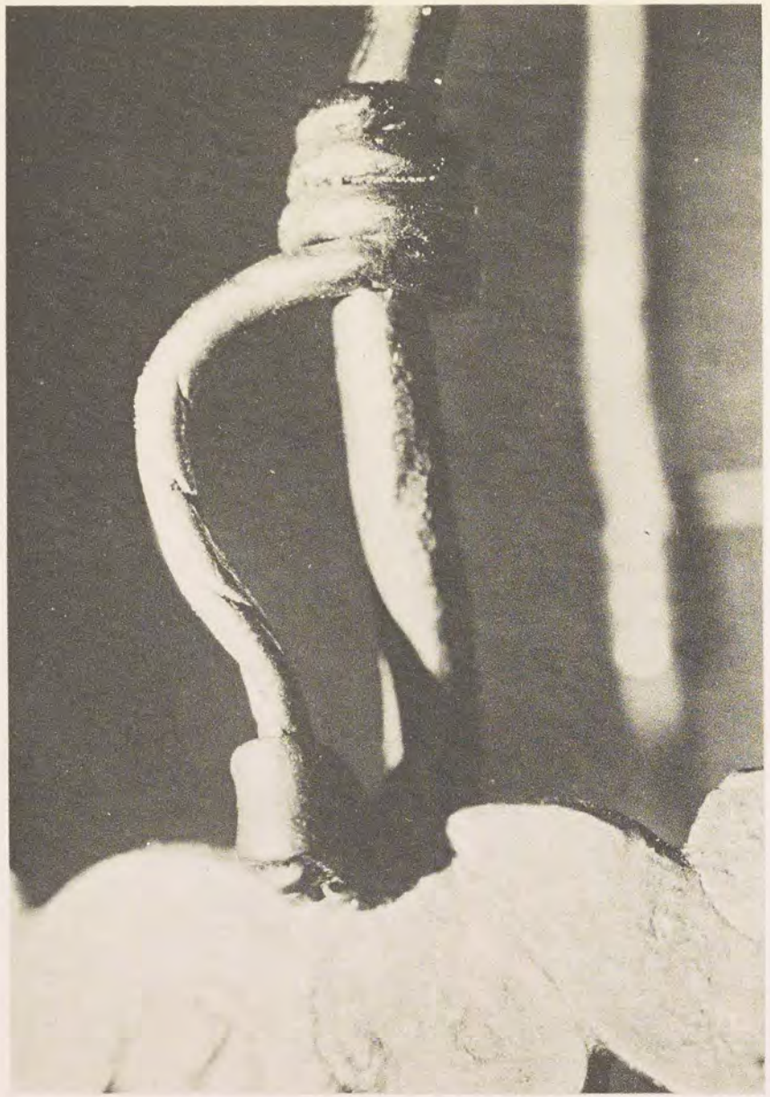
Actual size, or nearly so



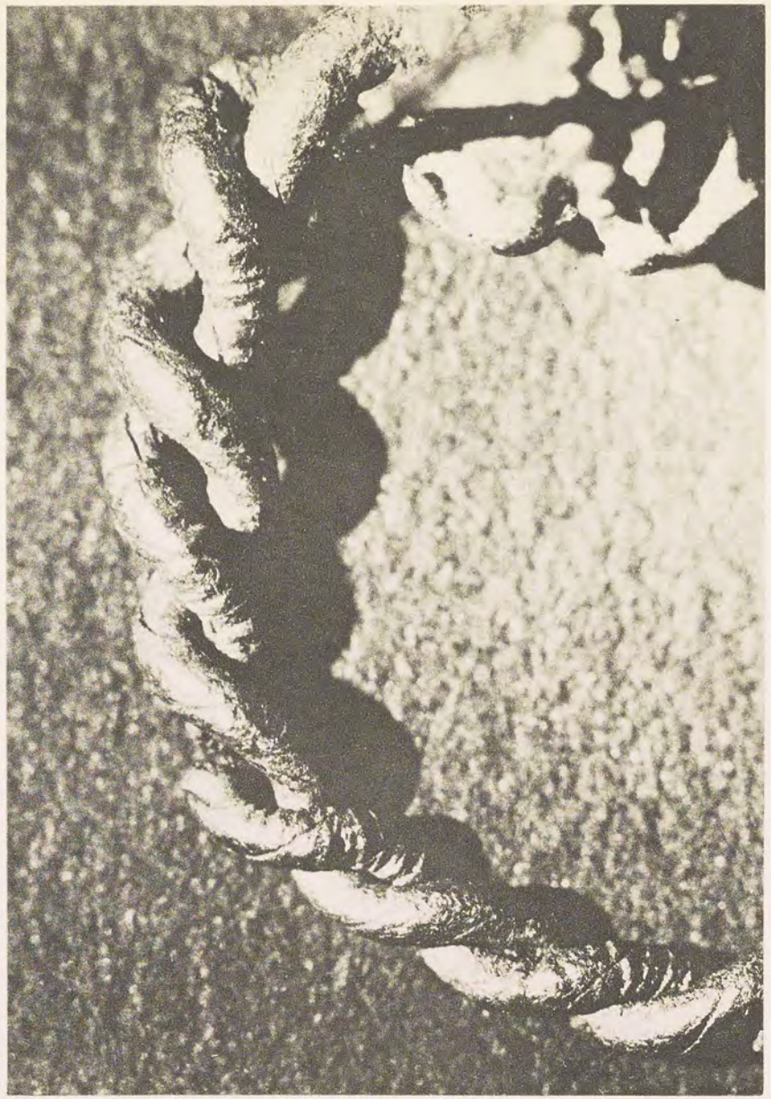
Serpent Ring and Earrings from the Greek Island Ithaca

A–F, drawings by Haller von Hallerstein, after *Antike Denkmaeler*, I, Plate 13

85–89, A–C, actual size; D–F, enlarged



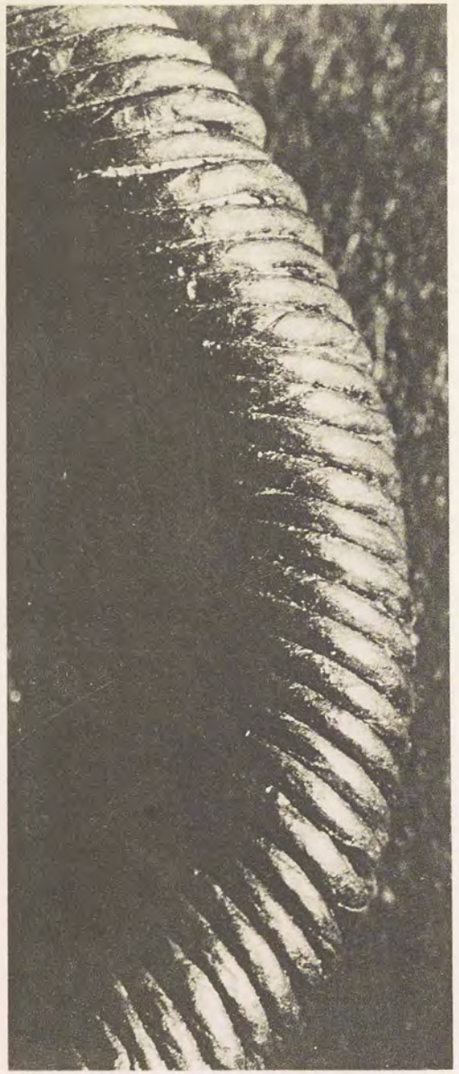
57 b



78 b

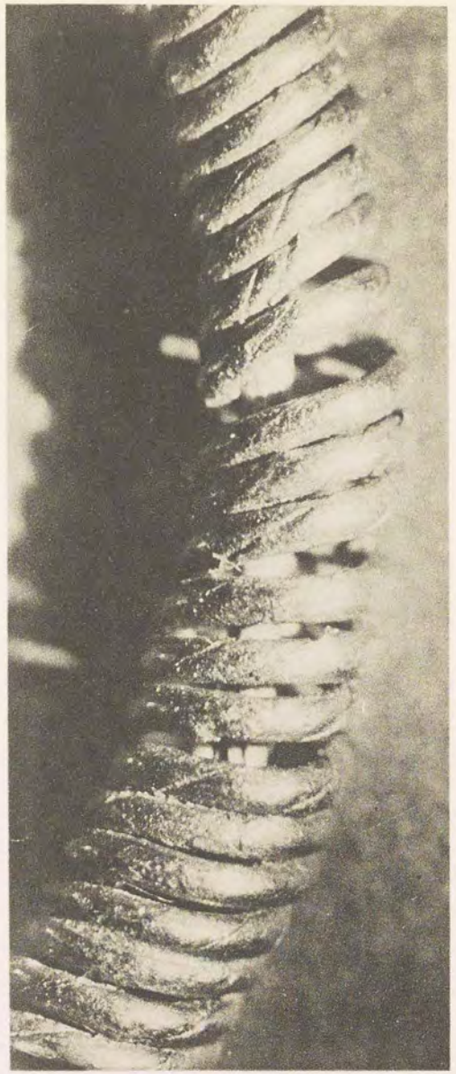
Small Wires Made Each of Two Strips of Sheet Gold Coiled Together

15 diameters



72 b

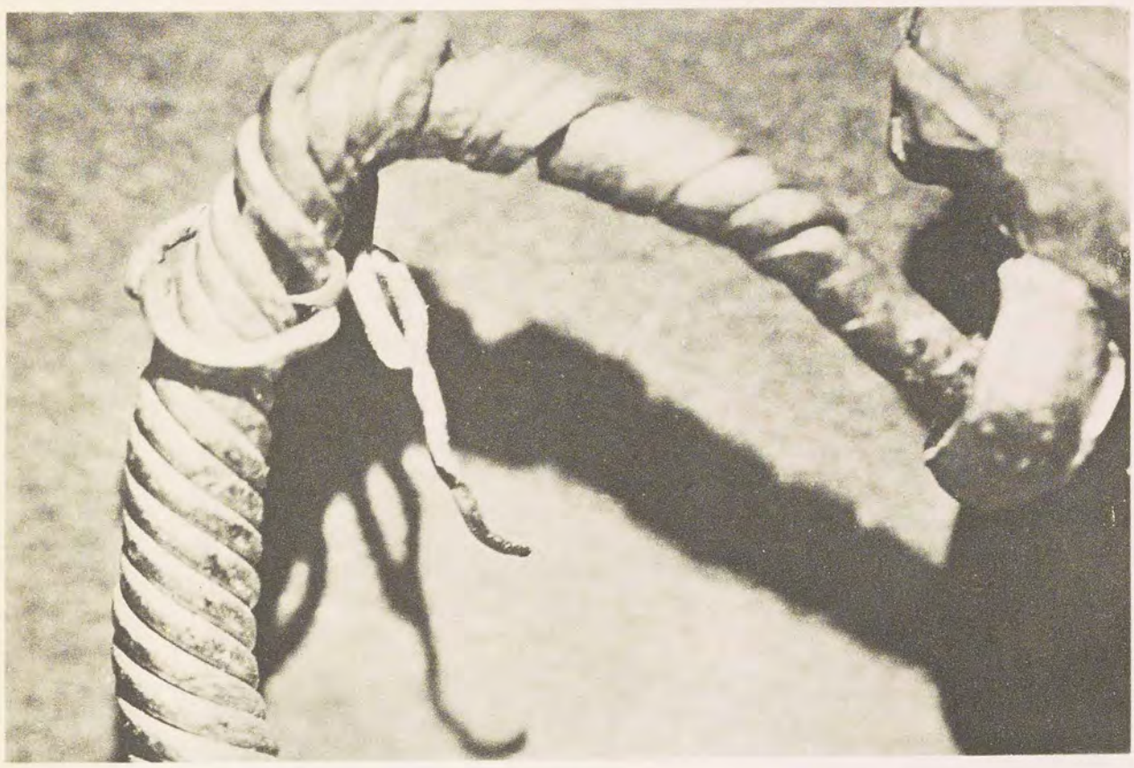
75 b



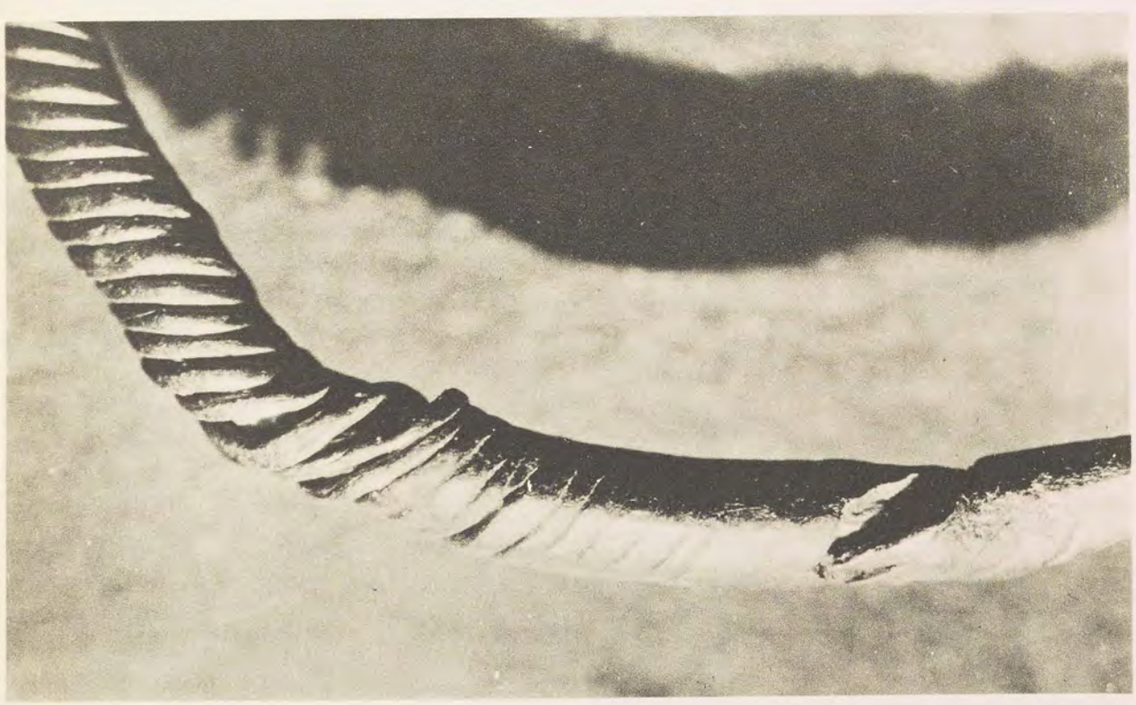
83 c

Small Wires Made Each of a Single Coiled Strip of Sheet Gold

15 diameters



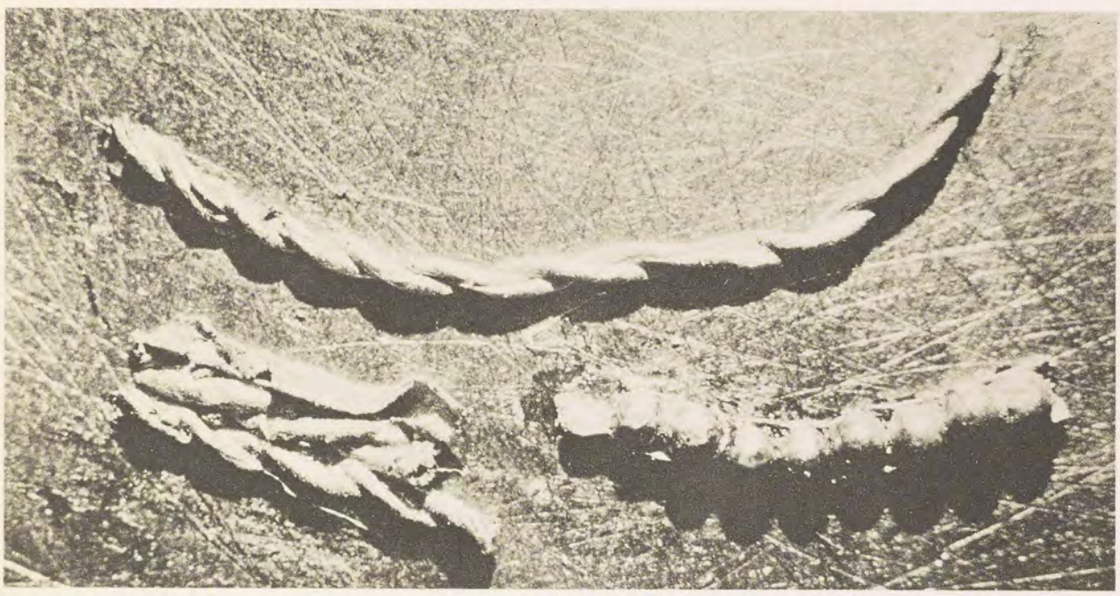
70 b



71 b

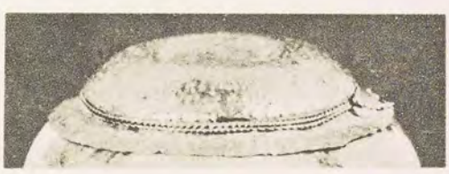
Wires Running Out into Strips of Sheet

15 diameters



80 b

A



B

C

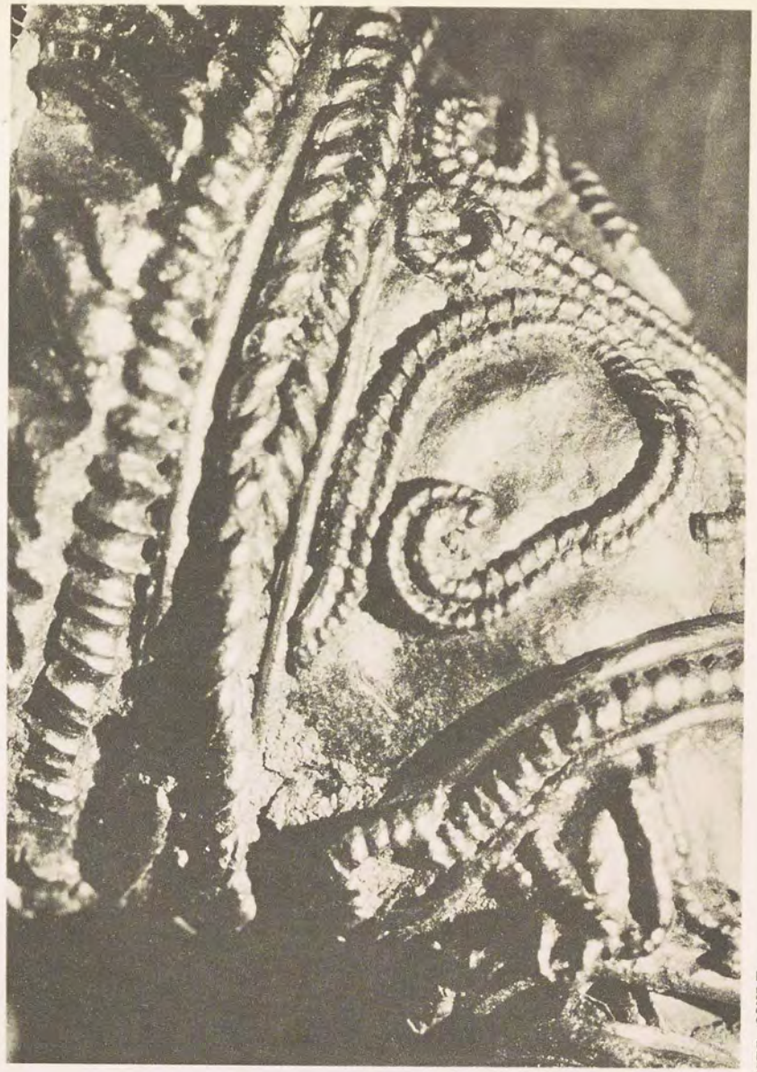
D E F

Twisted Wires and Granulations

A–F, antedating 3000 B. C., in Museum of Fine Arts, Boston

15 diameters, except B and E; height of E, $2\frac{7}{16}$ inches (0.062 m.)

87 b



87 c

Plate XXIII

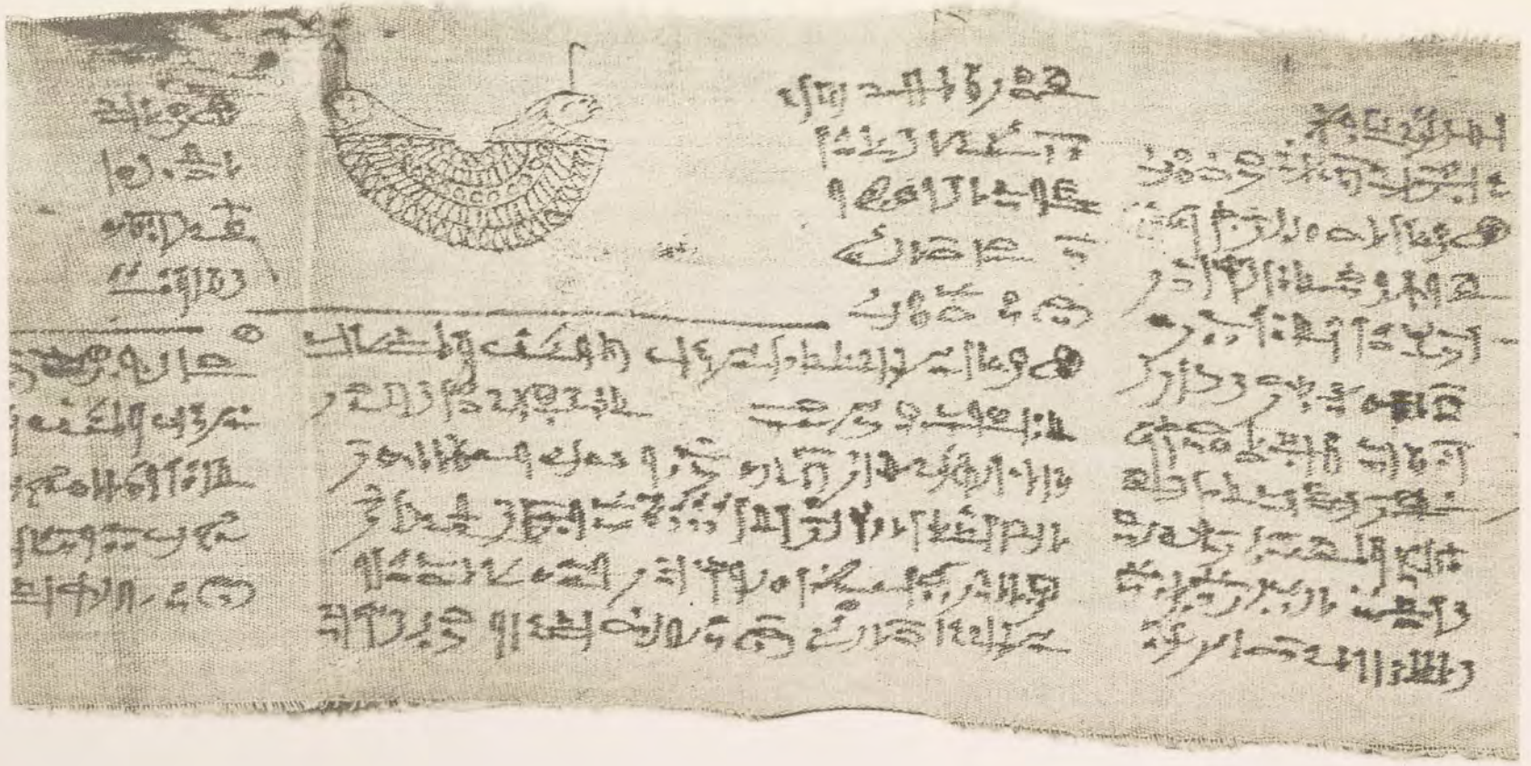
At left, Core Visible between Wires; at right, Appliquéd Wires

15 diameters

Mummy Bandage with Vignette of Gold Vulture-Amulet and Funerary Texts

For comparison with No. 92, Plate XXVI

Actual size



Mummy Bandage with Vignette of Gold Collar-Amulet and Funerary Texts

For comparison with No. 91, Plate XXVI

Actual size

90 a

91 a

92

90 b

91 b

95 a

96

93, 94

95 b

97 a, b

98 a, b

100

101 a, b

99 a, b

102 103

Late Amulets

Actual size

107 a

104 a

108 a

107 b

104 b

108 b

109 a, b

105 a

110 111

112

105 b

113

114 a, b

106 116

115 a, b

Late Amulets

Actual size

117

118 a, b

119

120 a, b

121 a, b

122

123

125 a, b

124

128

126

127

129

130 a, b

131 a, b

133

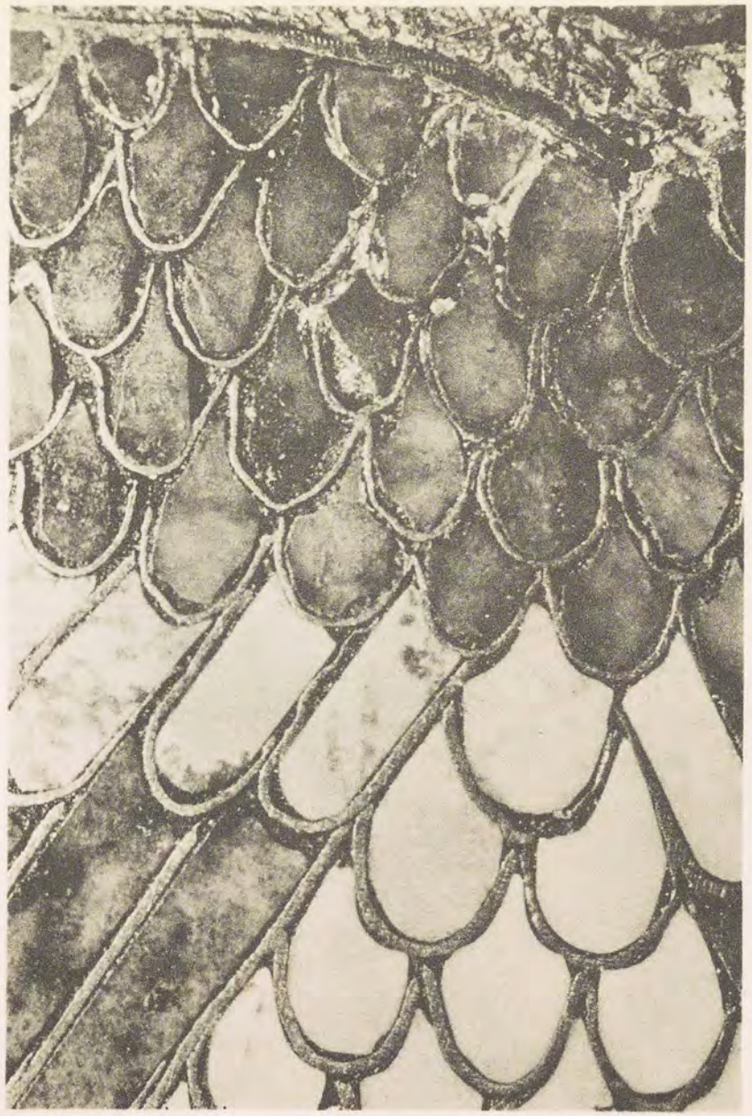
132 a, b

134

Late Amulets

Actual size

95c

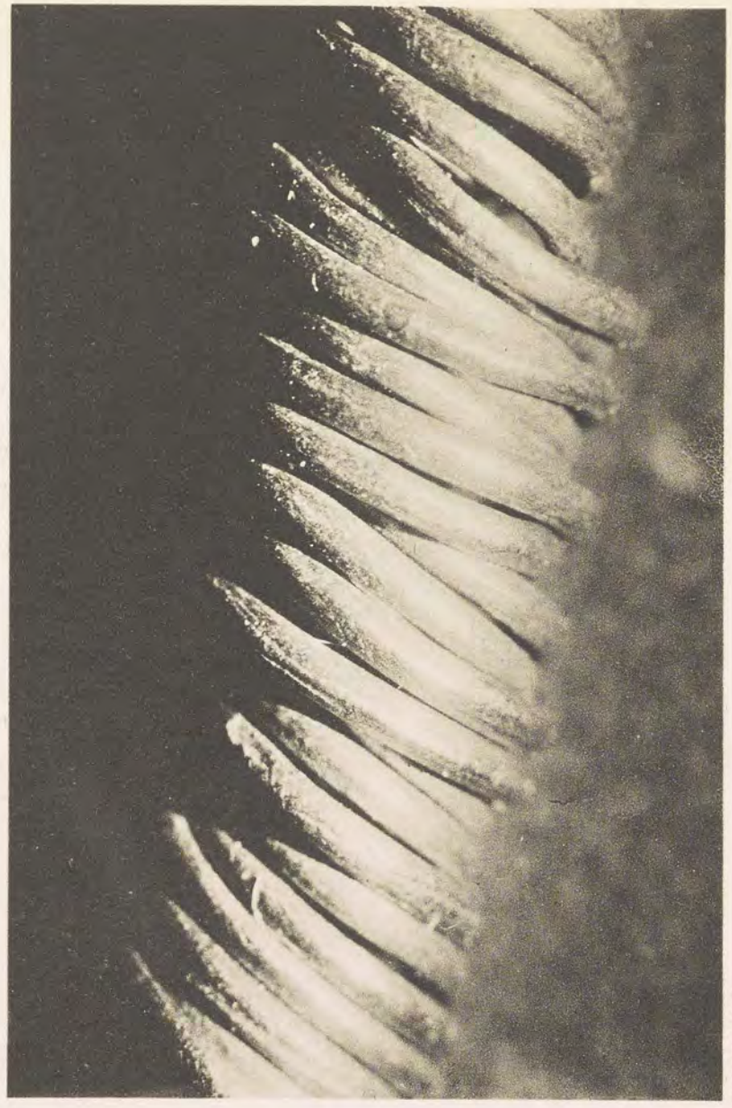


104c

At left, Wire Appliqués; at right, So-Called Cloisonné Work

15 diameters

109 c



143 b

At left, Goddess' Figure, with Details Chased in; at right, Drawn Hollow (?) Wires

109 c, 11 diameters; 143 b, 15 diameters

135

138

137

139 a

136 a

A

139 b

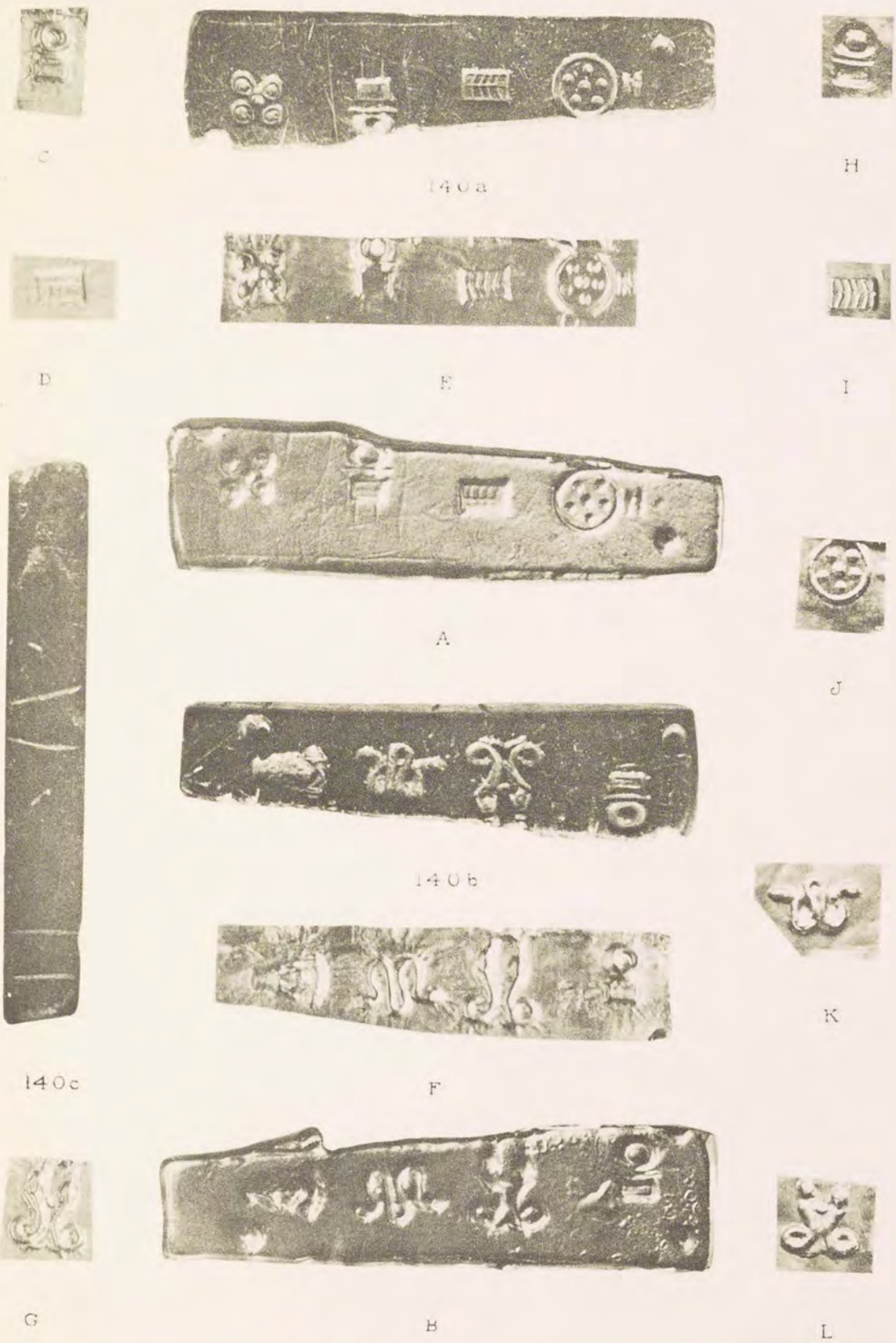
136 b

B

Statuettes of Gods, Goldsmith's Combination Die and Mould

A, B, modern wax impressions from 139 a, b

Actual size



Goldsmith's Combination Die and Mould

A, B, modern lead positives from 140 a, b; C–L, modern impressions in sheet gold

Actual size, except A and B, slightly enlarged

151

145 a

152 a

146 a

145 b

152 b, c

146 b

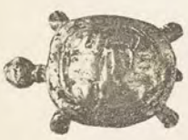
147 a

148

150

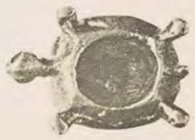
149

144 a



153 a

153 b



153 c

Mouth Piece, Box for Ring, Figure of Tortoise, Beads, and Ornaments

Actual size

154

155 a

155 b

157

158

156

159

160

Ornaments and Gold Coverings for Parts of the Mummy

Actual size

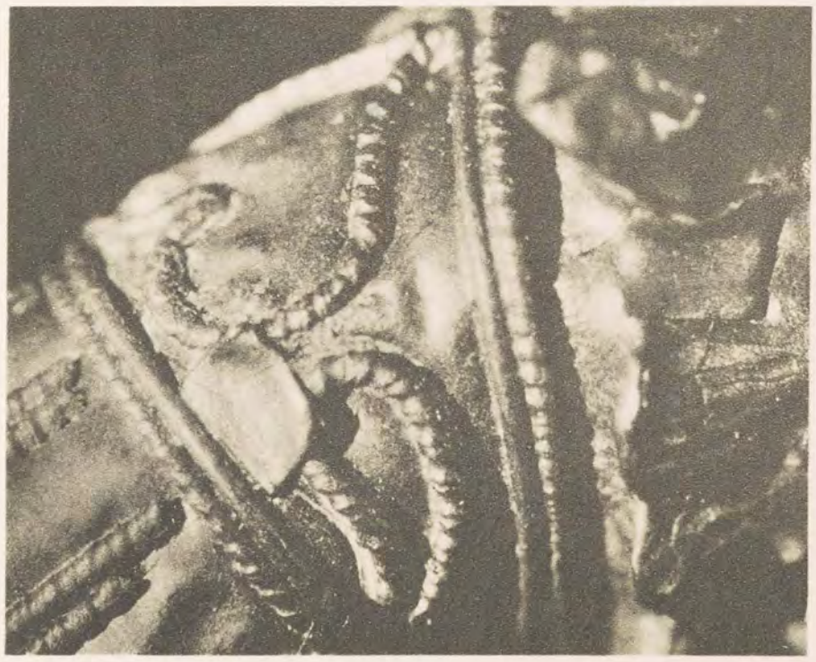
3 c

3 d

86 b

89 c

9 c



89 d

Jewels Showing Ancient Mishaps and Repairs

15 diameters, except 86 b, 6½, and 89 c, 2½, diameters

The "Menes Necklace and Earrings"
Probably modern forgeries of the decade 1833–1843
Actual size

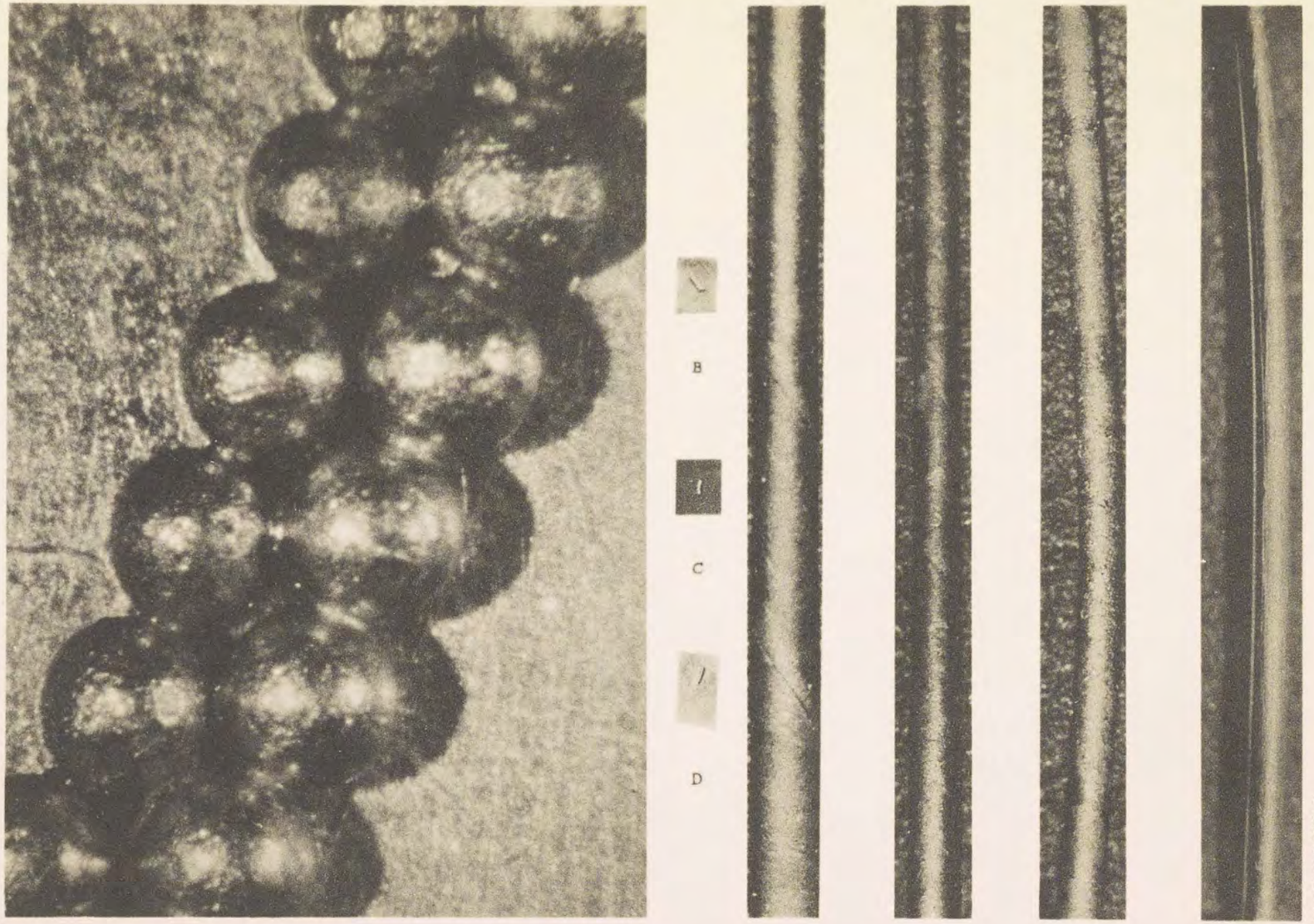
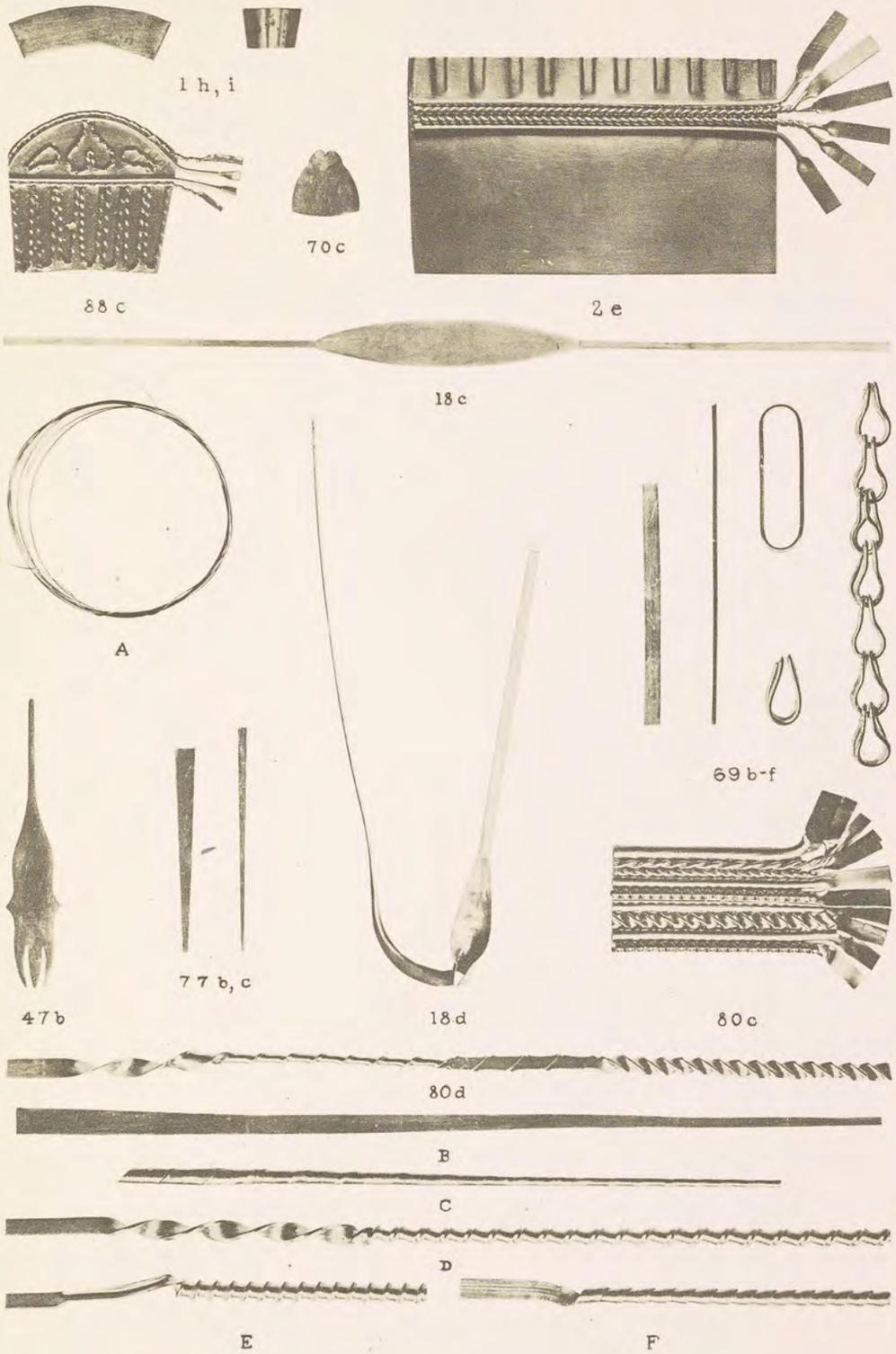


Plate XXXVII

A–G, Modern Experimental Pieces—Granulations, Wires of Coiled Strips; H, Modern Commercial Drawn Wire

A, 68 diameters; B–D, actual size; E–H, 15 diameters



Modern Sampler in Brass

1, 18, 47, 70, 77, size of originals copied; others, larger than originals