

QUEENSLAND GEMS.

By MAJOR J. R. SANKEY.

READ BEFORE THE ROYAL SOCIETY OF QUEENSLAND,
22nd DECEMBER, 1906.

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I FULLY appreciate the honour paid me when asked to read a paper before this Society, but I do not come here as a scientific man, I merely bring forward a general knowledge of the Precious Stones of Queensland, acquired during many years of working amongst them. I am convinced that Queensland contains a greater variety of gem stones than any other country in the world, the following being a list of those which have come to me from different parts of this State, all of which have been authenticated, and which leave a very small balance of the full catalogue of precious stones known to be accounted for :—

Actinolite (Cat's Eye)	Carbuncle (Garnet)
Adamantine Spar (Corundum)	Carnelian (Quartz)
Adularia (Moonstone)	Cassiterite
Agate (Quartz)—	Ceylanite (Spinel)
Eyed	Chalcedony (Quartz)
Fortification	Chrysoberyl
Banded	Chrysolite
Moss, etc.	Chrysoprase (Quartz)
Almandite (Garnet)	Cinnamon Stone (Garnet)
Amethyst	Citrine (Quartz)
Quartz	Corundum—
Sapphire	Ruby
Asteria—	Sapphire
Quartz	Oriental Emerald
Sapphire	Oriental Peridot
Avanturine (Quartz)	Oriental Amethyst
Azurite	Oriental Topaz
Balas Ruby (Spinel)	Asteria or Star Stone
Beryl—	White Sapphire
Aquamarine	Orange Sapphire
Emerald	Adamantine Spar
Bloodstone (Quartz)	Particoloured Sapphire, etc.
Cacholong (Quartz)†	Diamond
Callainite (Turquoise)	Emerald

Fluor	Quartz
Garnet	Bloodstone or Heliotrope
Grossularite	Cairngorm
Cinnamon Stone or Hyacinth	Cat's Eye
Pyrope (Ruby Garnet)	Chalcedony
Almandite (Carbuncle)	Chrysoprase
Gold	Citrine
Gypsum	Hyaline
Alabaster	Jasper
Satin Spar	Moss Agate
Selenite	Morion
Heliotrope—(Bloodstone)	Onyx
Hyacinth (Zircon, Garnet)	Plasma
Jacinth (Zircon)	Prase
Jargon (Zircon)	Rock Crystal
Jade	Rose Quartz
Jasper, various	Sagenitic
Lapis-Lazuli	Sard
Malachite	Sardonyx
Marble	Water Bubble
Mocha Stone (Quartz)	Rhodonite
Moonstone	Ruby
Morion (Smoky Quartz)	Serpentine
Obsidian	Spinel
Olivine	Almandine
Peridot	Balas Ruby
Onyx	Rubicelle
Opal	Sapphirine
Precious or Noble	Pleonast
Harlequin	Topaz—
Pin-Fire	Gouttes d'Eau
Flash-Fire	Blue
Black, etc.	Green
Cacholong	Yellow
Wood	Pycnite
Girasol	Tourmaline—
Hydrophane	Green
Semi-opal, etc.	Indicolite
Pearl	Schorl
Peridot (Olivine)	Turquoise—
Plasma (Quartz)	Blue
Pleonast (Spinel)	Green
Pyrope (Garnet)	Zircon—
Quartz	Hyacinth
Agate	Jacinth
Amethyst	Jargon
Asteriated	Green
Avanturine	Limpid [?]
Basanite (Lydian or Touchstone)	

DIAMONDS.—In considering the stones of the State, I will commence with the diamond, being the most popular of all gem stones.

Hardness, 10. Composition : Carbon.

Fracture, conchoidal.

Lustre, Adamantine.

Thirty-five years since, the firm of Flavelle Bros. purchased a rough diamond, found at Stanthorpe, for £30 ; from time to time other rough diamonds have been found

casually, but no systematic working appears to have taken place. The writer recently purchased a rough diamond, of four and a-half carats, which had been picked up by a washerwoman in the bed of Quart-Pot Creek.

Mr. Barton, M.L.A., representing Stanthorpe, has recently exhibited several good diamond crystals found at Stanthorpe, weighing from one up to about five carats.

A diamond matrix, such as that existing in South Africa and Brazil, has not yet been discovered in Queensland, but it must be borne in mind that beyond casual exploration, such as that carried out by Professor Skertchly, of the Queensland Geological Staff, no determined effort has been made to find where the stones, casually picked up, have come from.

One or two small diamond crystals have been found at Anakie.

The diamonds found in this State, so far, have not been of sufficient value to cause any excitement, and this, together with the fact that the European gem merchants, in repeating the tactics which their class had in turn applied to the diamonds of other Countries, that is, accusing them of inferiority, has probably hindered exploration.

In 1772, when diamonds were found in Brazil, the report was spread that they were very inferior, that, in fact, they were the refuse stones from India, which up to then had been the main source of supply; this was combated by the mine owners sending the stones to India and obtaining Indian values, after which Brazilian diamonds were admittedly the choicest stones. Then, with the discovery of diamonds in South Africa, a repetition of this treatment came and Cape stones were stated to be "no good," and the story was so well believed that every person buying a diamond of any size wanted a guarantee that it was a "Brazilian." The African miners then sent their stones to Brazil, to be forwarded to Europe, and so overcame the opposition. Now, in the same way, Australian diamonds are said to be "inferior" and unworthy, and the European merchants decline to manufacture the stones, to use their own term, while at the same time they offer to buy all one can send at their own price, which is about half what they pay for Cape stones. No

doubt, it is only a matter of a short time before the Australian diamonds will be admitted to be what they really are—that is, good stones, and this little encouragement will stimulate the search for diamonds.

So far the diamonds found have been of very good colour.

SAPPHIRES.—Next to the diamond, in hardness, comes the corundum, which includes the sapphire, the ruby, the oriental amethyst, the oriental topaz, the oriental peridot, etc., etc. Corundum crystallizes in the six-sided prisms belonging to the hexagonal system, but gem stones are chiefly found as rolled pebbles.

The specific gravity is 4, about. The lustre is vitreous, but the basal planes are occasionally pearly.

Composition.—Alumina. Hardness, 9.

The stone is strongly Dichroic.

Sapphires were first discovered in Queensland by Mr. A. J. Richardson, at Anakie, in 1873, since when they have been found at many other places, including Stanthorpe, Herberton, Nanango, Logan River, Kilkivan, Johnstone River, etc.

The only systematic mining for the gem is at Anakie, where over 400 miners are at present engaged in the industry.

The Sapphires of Anakie are of every shade of blue, of green and of yellow, many of the yellows and greens are equal in quality to anything the world produces, and, in my opinion, no finer gems exist than the brilliant limpid-yellow sapphires of Queensland. They combine the brilliancy of the diamond with most beautiful shades of rich golden-yellow, and occasionally appearing of true orange colour. The green sapphires are most remarkable for the great variety of their tints, ranging from very pale green through all the shades of bronze, olive, and russet to bright green, bordering closely on the emerald, and continuing into the deepest luscious greens, and all combined with brilliancy.

The blue sapphires are not equal to those of Siam, and they have received a bad name owing largely to defective cutting, but I have possessed royal velvety-blue Queensland sapphires, equal to any I have ever seen from other Countries.

Parti-coloured sapphires are frequently found, many blue stones having strange triangular markings of yellow, due to peculiarities of crystallisation.

On the whole it may be said that the sapphires of Queensland are now equal to those of any other part of the World.

Very large stones are found, and recently some of high value have been unearthed. It is reported that within the last three months £250 was refused for a rough yellow sapphire on the Anakie field, the miner sending it to London, with a reserve of £500.

Queensland also produces star sapphires. These have a silky structure which, by cutting *en cabochon*, develops a 6-rayed star of wavy light.

The Queensland sapphire has had a hard struggle (commercially) for existence; only a few years ago leading residents of Queensland declared openly that it had neither beauty nor value, and nearly the whole jewellery trade was against it, but fortunately, its claim to beauty is now recognised. Buyers from all parts of the World are visiting Anakie, and a great future awaits the gem.

"Finger-Ring Lore," by William Jones, F.S.A., referring to the sapphire as the ecclesiastical gem, says: "Cardinals, on their creation, receive a ring, in which is usually a sapphire." Amethyst, however, is more the favourite episcopal ring-stone.

Allied to, and in very many cases overlapping, the above description of Queensland sapphires are:—

Oriental Amethyst, which is frequently a combination crystal of ruby and sapphire, in alternate layers of red and blue, thus producing a rich purple.

Oriental Emerald, which is the green-sapphire, colour as near as possible to that of the Emerald.

Oriental Peridot, in like manner, is sapphire with the colour of peridot.

Yellow Sapphire is sometimes known as the oriental topaz. Other varieties of sapphires are also occasionally known as oriental jargoon, and oriental hyacinth.

Rev. C. W. King writes:—"Episcopal rings were usually set with sapphires, probably from a popular belief that this precious stone had the power of cooling love, owing perhaps to the coldness of its touch, due to its density." The real symbolic reason was the heavenly-blue colour, which denoted celestial purity.

Corundum (RUBY).—The true ruby has been found in this State at Anakie, Stanthorpe, and near Herberton; colours have been good, but stones not large; however, quite sufficient indication that the genuine gems are there.

The true pigeon's-blood ruby is at present the most valuable of gems, and it is to be hoped that miners and others will miss no opportunities of discovering them. Like all corundum, they are six-sided pyramidal crystals, and, owing to their beautiful bright pink colour, cannot well be mistaken. When last in London the writer was shewn a flawed ruby of $4\frac{1}{2}$ carats, valued at £250. The merchant stated that if free of flaws, £1,000 could be easily obtained for it.

At present Burma is practically the only source of the true ruby, those of Siam being far inferior in colour. Though even these surpass those of Montana.

Every assistance and inducement should be given to our miners to persevere in their search for this gem, as the discovery of fair-sized stones of good colour will probably do more towards the development of gem-stone mining within the State than the finding of large stones of any other gem.

ZIRCON.—Composition: Zirconia, 67%; silica, 33%.

Hardness, about 7.5.

Crystalline system, Tetragonal.

Colour ranges from pure limpidity, like the diamond, through all yellows, browns and reds.

Different varieties are known as jagoons, hyacinths, jacinths, cinnamon stones, etc.

Owing to their extraordinary lustre, small white zircons are frequently mistaken for diamonds, but the difference in hardness is sufficient to distinguish them.

Many very fine hyacinths have been found on the Anakie field, and stones have been cut up to 24 carats in weight.

Zircons are found at Anakie, Nanango, Toowoomba, Stanthorpe, Herberton, Eungella, Boonah, and many other places in this State.

Owing to the richness of colour, the great range of delicate hues, combined with its fire, which comes next to that of the diamond, the zircon is an exceedingly attractive gem, and will no doubt soon become very

popular. Owners of good zircons should be careful not to mix them with sapphires, rubies or diamonds, as, owing to their inferior hardness, they may be easily scratched.

So little is known of the distribution of gem stones in Queensland that it may be mentioned that zircons, sapphires, topaz, garnets, tourmaline, crystal and chalcidony may be picked up in the gravel of any railway platform between Brisbane and Ipswich at the present time.

OLIVINE.—Composition: Silica, 41; Magnesia, 50;
Ferrous Oxide, 9.

Hardness 6.5.

Spec. Gravity, about 3.4.

Crystallizes in the orthorhombic form.

Colour, rich leek green.

It is essentially the gem of basalt.

Found in Queensland on the Main and MacPherson Ranges, and also in the Logan District, and may be sought with fair probability in any basalt country.

This is a most lovely green gem, and is frequently mistaken for the emerald, the difference being that while the emerald is a bluish green, the olivine is a rich golden green.

This gem was very popular early in the 19th Century, but, owing to the turn of fashion's wheel, it fell into disfavour, but again became popular at the time of the Queen's Diamond Jubilee.

PERIDOT.—A variety of olivine of a delicate green yellow, sometimes spoken of as the "evening emerald."

The antiquity of this gem is proved by the following passage in an old book:—"Adam Sadbury, 53rd Abbot of Glastonbury, gave to the Abbey, among other precious gifts, a gold ring with a stone called peridot, which was on the finger of St. Thomas the Martyr, when he fell by the swords of wicked men."

PEARL.—Probably the pearl is the best known of all gems to Australians.

For many years Queensland has produced thousands of pounds' worth of pearls.

The oyster fisheries of Thursday Island have been the chief source of supply, but pearls are found practically right round the coast, many good pearls having been found even in Moreton Bay.

Prior to the Japanese War, pearls brought very high prices, running to hundreds of pounds, according to size, lustre and perfection of shape; good symmetrical lustrous whites of good orient are always in demand, and both black and white pearls of good colour, shape and lustre always command very high prices.

The most remarkable pearl the writer has seen was a pearl blister, exactly like a small crayfish. This was described to Mr. Saville Kent, the great expert, who also owns a similar one, and says that it undoubtedly is an embalmed crustacean, having been coated by the oyster with a nacreous shroud.

OPAL.—Composition; Hydrous silica.

Proportion of water, from 2 to 13%.

Hardness, 5.5 to 6.5.

Spec. Gravity, 1.9 to 2.3.

The opal is par excellence the Queensland gem, and is found throughout the Western Districts of the State, from Kynuna to the Southern border.

The value of the opal, so far found in Queensland, has in all probability reached the sum of a quarter of a million pounds. It is found in most picturesque country, the isolated flat-topped hills weathered into the appearance of ancient fortresses recall all one's recollection of the romantic history of feudal times.

The name of Herbert Bond is closely associated with opal mining, he having developed the industry by floating a company in London, and so getting capital to work the mines.

Mr. C. V. Jackson, in his official report on the opal mining industry says: "Precious opal occurs in Queensland in two geological formations, viz.: In sedimentary rocks of upper cretaceous age, known as the Desert Sandstone formation, [and also in vesicular basalt of later geological age." The geological conditions under which opal occurs in the former is wholly distinct from any previously known opal deposit in the world.

The latter mode of occurrence in a vesicular basalt is analagous of those of Hungary and Mexico, but, so far, Australian deposits of this kind have not been worked commercially.

The opal is found in matrix of ironstone, of sandstone, and occasionally in pipe-clay, and is roughly classed as boulder opal, sandstone opal, and pipe opal. Practically, every variety of opal is found in Queensland, including the noble opal, the harlequin opal, the fire opal, the pin-fire opal, etc., etc., the miners having many terms of their own indicative of quality and peculiarities, and there is no doubt that the opal of Queensland has excelled in beauty and abundance that of the whole world.

I remember well when very few people would look at Queensland opal, because Hungarian opal was the standard of that time, and now the Hungarian opal is hardly ever heard of, and in the trade is quoted at less than half the price for Queensland opal.

The opal is certainly the most beautiful stone the world has ever seen, and in Pagan times was said to be the residence of the Gods, for, being the most beautiful thing on earth, the Gods would naturally take it for a home. Then the modern novelist (Sir Walter Scott) came along and, reviving an old legend, wrote a little fiction which spoilt the old Pagan idea and the reputation of the opal at the same time, and the gorgeously beautiful opal was for a time relegated to the limbo of speckled hens, spilt salt, jackdaws, and other omens of ill luck, and this in spite of Royal patronage, as it was always a favourite with our late Queen, who invariably chose it for presents to her relatives.

BLACK OPAL.—A variety of opal recently discovered is the black opal which has aptly been described by a New Zealand journalist, who visited the Exhibition at Christchurch, and saw Messrs. Flavelle, Roberts and Sankey's exhibit of Queensland gems, as "it combines the iridescence of the dewdrop, with the colour of the rainbow, set in the blackness of night; it is a smothered mass of hidden fire."

QUARTZ.—The many varieties of Siliceous gem stones are all found in Queensland, and are very widely distributed.

Quartz crystallises in the hexagonal system, commonly as a six-sided prism, terminated with a six-sided pyramid and striated transversely. These crystals according to colour are termed amethyst, cairngorm, rock-crystal, smoky quartz, and are all found at Stanthorpe, Bowen, Anakie,

and many other places within the State. For other forms of siliceous gem stones found in Queensland, see list.

All the crystalline varieties of silica occur in Queensland, but unfortunately they are almost invariably ignored by miners in the search for gold, and so it is difficult to obtain good specimens; some of those obtained have been cut, and produced very fine gems.

CARNELIAN.—One of the forms of chalcedony. Carnelian in all its forms, white, red, carnelian-agate, etc., are found from Humpybong to Cunningham's Gap, from Mt. Lindsay to Cape York.

SARD is the very clear orange to vermilion carnelian, and is largely used for gentlemen's signet rings. When banded with white it is sardonyx, and is usually cut showing two strata of the stone.

AGATE.—In all its forms of banded agate, fortification-agate, carnelian agate, moss agate, eye agate, etc., etc., is found throughout the State, as indicated by the vast number of "Agate Creeks" in Queensland, and thousands of tons of the stones are obtainable.

They all consist of crypto-crystalline silica, with colouring oxides, and generally with centres of crystalline quartz.

THE CHALCEDONY of Jewellers is a pale variety, it is the "patra dura" which the Italians use for the stone cameos.

CHRYSOPRASE.—Of rich apple-green colour, is found in the Logan and Yaamba districts, also about Springsure. This stone, which until recently was only procured from one locality in Bohemia, is said to ensure good luck, and was formerly used for green and white cameos, it is far superior in richness and colour to the New Zealand greenstone.

It owes its peculiar soft hue to nickel oxide.

AMETHYST.—Crystals of amethyst are found in many districts in this State, including Stanthorpe, Kilkivan, the Burnett, Bowen, Anakie and Herberton; they are simply quartz crystals coloured purple; they are very beautiful, and those of good rich color, clear and free of flaws, have considerable value.

The amethyst is another of the ecclesiastical gem stones, and is even now worn by nearly all bishops.

In ancient times it was valued on account of its mystical properties and as an antidote to drunkenness.

THE CAIRNGORM is another of the varieties of quartz crystal, it ranges from yellow to deep brown, and is found practically throughout the State.

JASPER.—Is found on the Gympie Goldfield, Stanthorpe, Oxley, and other districts.

MOSS AGATE.—Found on the Burnett Water-shed, at Stanthorpe, and many other places; in appearance it is as though moss had been imprisoned in the clear stone.

MORION.—A variety of banded smoky quartz crystal; is very handsome, and found on many of our gold and tin fields.

ROSE QUARTZ.—Quartz of rosy hue is frequently found in the State.

SAGENITE.—Sagenitic quartz, sometimes called grass stone by the miners on account of its appearance, which is peculiar owing to the inclusion of asbestos fibres in the crystals; on some of the fields these grass-stones have considerable local value.

This stone was formerly known as the Venus' hair stone, and also as Cupid's arrows, Marmor's hair, etc.

All the other varieties of quartz stones, including aventurine, bloodstone, cat's eye, citrine, hyacinth, plasma, prase, rock crystal, sardonyx, etc., are found widely distributed throughout Queensland.

EMERALD.—Composition: Silica.

Alumina.

Glucina.

Hardness, between 7.5 and 8.

S.G., 2.7, about.

Form, regular six-sided prism.

The prism is often striated both internally and externally, parallel with its sides. Emeralds have been found near Herberton, and a further find has been reported in the far North West, exact locality unknown. The crystals shown in the collection are from Emmaville.

BERYL.—Is found in several places in this State. The crystals exhibited are from near Texas. It is often found in the tin wash about Stanthorpe, and near Herberton.

TURQUOISE.—Has been found at Keppel Bay, and also in one or two other places in the State. Stones exhibited are green turquoise in matrix, color being a very pleasant-rich green. No deep sinking has been done on this find of turquoise, and it is fully anticipated that the quality will improve as they go down.

TOPAZ.—Crystals are prisms usually having one end regularly terminated.

Basal cleavage highly perfect. Refraction strong. The topaz occurs in many different districts in Queensland, has been found close to Brisbane, Toowoomba, Stanthorpe, Boonah, Mount Lindsay, Kilkivan, Nanango, Herberton, and many other places. It is found of pure limpidity, both as crystals and pebbles, also of different shades of yellow and many shades of light blue. Some of the blues found have been almost like pale blue sapphires. My firm has cut a magnificent and flawless stone, of 78 carats, for Mrs. Skertchly, which is probably the largest blue topaz found since the beginning of the last century.

The white topaz, when brilliant cut, can easily be mistaken for the diamond, the only difference being that the diamond is iridescent.

LAPIS LAZULI.—Has been found near Herberton. It will be well-known as the chief constituent of the genuine ultramarine, once so much used by artists.

MOONSTONE.—The moonstone is invariably associated in the minds of Australians with Ceylon, as the whole of the moonstones sent here are from Ceylon.

Moonstones have been found in Queensland, near Nanango. Moonstones are the milky and transparent varieties of several species of felspar, remarkable for the pearly reflection of light. They are generally looked upon as lucky stones by the natives of India.

The hardness is about 6, specific gravity about 2.6; composition is silicates of alumina with silicates of alkali and silicates of lime.

The colours of gem stones in Queensland are quite a revelation to the popular mind, and in order to show the wonderful range of colour which our gem stones possess, I attach the following list of stones arranged under different colour headings. By these it will be seen that the sapphire, which popularly is a blue stone, is in this State found of every hue of blue, green, yellow and orange.

I also exhibit a colour star diagram of Queensland gems, which proves that practically every colour and every shade and tone of colour is represented by the gems of this State.

I gratefully acknowledge the great assistance received from Professor S. B. J. Skertchly, whose general scientific knowledge has always been so kindly placed at my disposal.

COLOURS OF GEMS

LIMPID or COLOURLESS

Zircon (*Jargoon*). Sapphire. Spinel. Diamond.
Tourmaline. Beryl. Quartz (*Rock Crystal*).

YELLOW

Zircon (*Jacinth*). Sapphire (*Oriental Topaz*). Garnet
(*Essoinite or Cinnamon Stone, Topazolite or Grossularite*),
Chrysoberyl (*Oriental Chrysolite*). Spinel. Topaz. Diamond.
Olivine (*Chrysolite*). Tourmaline. Beryl. Quartz (*Citrine or
Scotch, Spanish, Saxon or False Topaz*).

BROWN

Zircon (*Jacinth*). Sapphire (*Adamantine Spar*).
Garnet (*Essoinite or Cinnamon Stone*). Diamond.
Tourmaline. Quartz (*Carngorm*).

GREEN

Zircon. Sapphire (*Oriental Emerald & Peridot*).
 Garnet (*Demantoid, Ouvarovite*). Chrysoberyl.
 (*Alexandrite*). Spinel. Topaz. Diamond.
 Olivine (*Peridot*). Tourmaline (*Brazilian Emerald*).
 Beryl (*Emerald, Aquamarine*). Quartz (*Chrysoprase*.
Plasma, Frase, Jasper). Turquoise.

BLUE

Sapphire. Spinel. Topaz. Diamond.
 Tourmaline (*Indicolite*). Beryl (*Aquamarine*).
 Iolite (*Water Sapphire, Dichroite*).

VIOLET

Sapphire (*Oriental Amethyst*). Garnet. Spinel.
 Diamond. Tourmaline. Quartz (*Amethyst*).

RED

Zircon (*Hyacinth*). Ruby. Garnet (*Pyrope*,
Rhodolite, *Almandite*, *Essonite*, [*Carbuncle*]). Spinel
 (*Balas Ruby*, *Rubicelle*, *Spinel Ruby*). Diamond.
 Tourmaline (*Rubellite*).

PINK

Sapphire (*Ruby*). Garnet (*Grossularite*).
 Chrysoberyl. Spinel (*Rubicelle*). Topaz.
 Diamond. Tourmaline (*Rubellite*). Beryl.

ORANGE

Zircon (*Jacinth*). Sapphire (*Oriental Topaz*).
 Garnet (*Spessarite*, *Essonite*). Chrysoberyl.
 Spinel (*Rubicelle*). Topaz. Diamond. Tourmaline.



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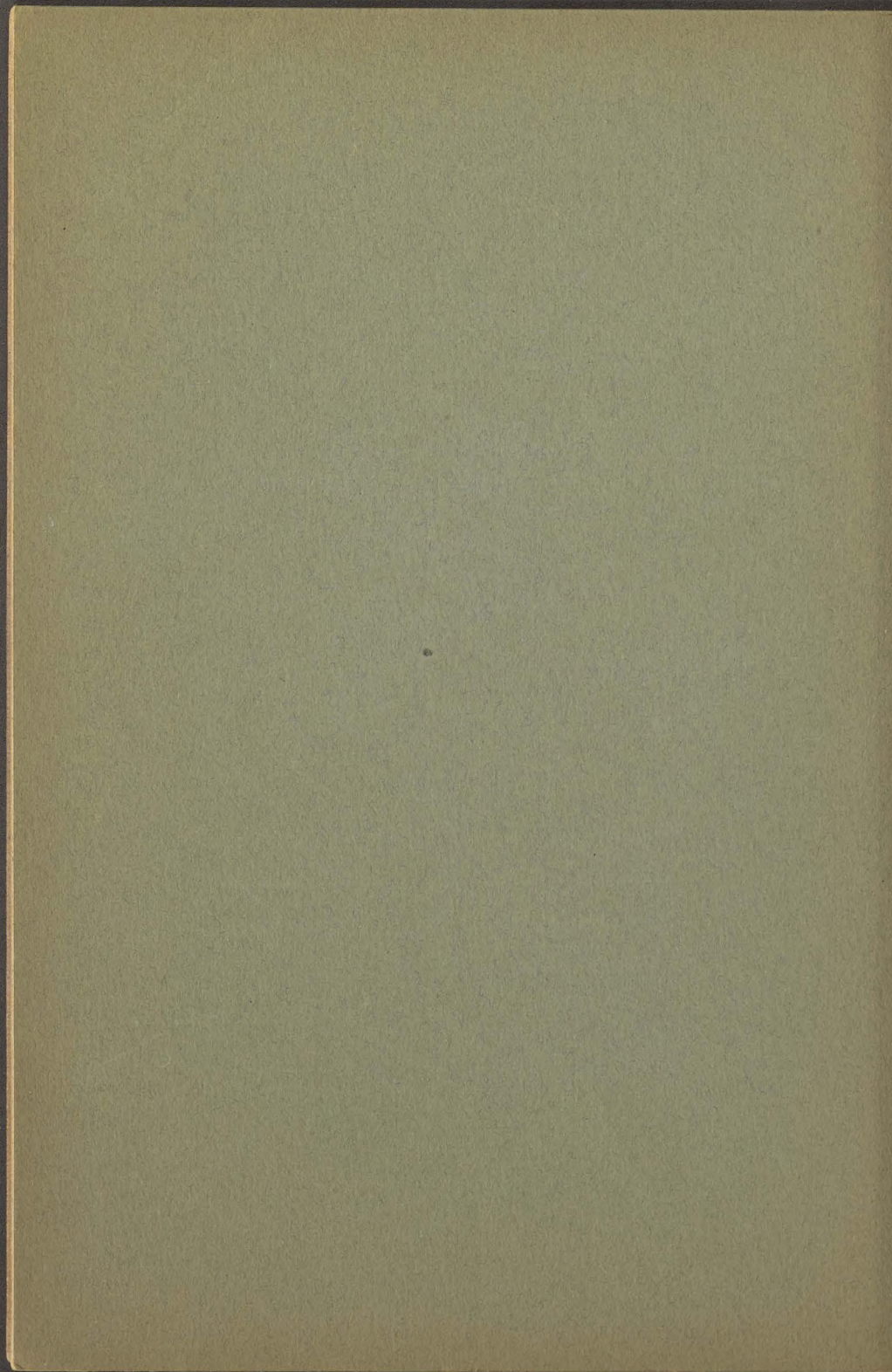
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