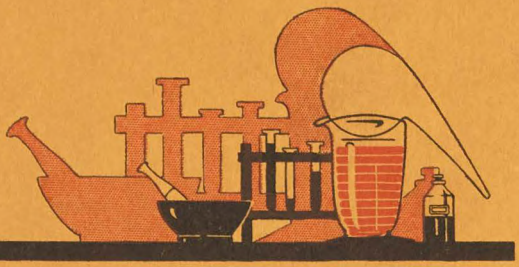
# GOLCONDA
## IN THE
# LABORATORY



L. HELLER & SON, New York-Paris

1928

# GOLCONDA
# *in the Laboratory*

MAN is the animal that makes things. He improves on nature. The eye saw but a mile or two. What matter—the telescope was made to extend it. And today we have television which will eventually put a view of the whole world in your parlor.

Is the muscle weak? Man makes machines that move mountains as easily as you move a chair. He hurls himself from continent to continent in airplanes leaving the eagles behind—he makes the night as light as day—produces pitless oranges — turns Nature's deserts into gardens—tells what giant stars are made of—and counts bacteria so small that a drop of water contains millions.

*Nature Has an Inning*

But one thing Nature guarded so jealously that Man aspired only to equal her effort. It is the perfect gem stone. Man may make better rubber, stone, alcohol and indigo than Nature—but the gem is Nature's masterpiece—the perfect product of her factory—and the goal of Man for untold centuries. This is the romantic story of one of the marvels of the 20th Century—the story of how Man brought Golconda to the laboratory and produced the indestructible beauty of the jewel.

*A Razor is "Soft"*

There are many stones in the world. They are the bricks from which this Earth is made. And each stone has its own character. Some crumble to the touch. Some split in smooth layers for billiard table tops. Some change color in sunlight — some can be carved into statues of breath-taking beauty—some give gold—some give lead. There are many stones.

But scattered throughout the world in excessively minute quantities are special groups of stones that fall into a class by themselves. They are the *hardest* products of nature—a razor is as soft as a pillow in comparison. They have beautiful color. When light passes through them they give an effect that men and women have loved for ages. Everybody wanted them—but they were so rare that only queens and kings of countries and pocketbooks could afford them.

*A Family Portrait*

The diamond, hardest known substance, heads the family. Then comes the group of corundum stones with sapphire and ruby. Then—the Emerald. There is the Zircon which has many of the optical properties of the diamond and is heavier. All were rare—all were valuable—and while Man conquered Nature on a thousand

battlefields—Nature stubbornly guarded the secrets of her perfect stones.

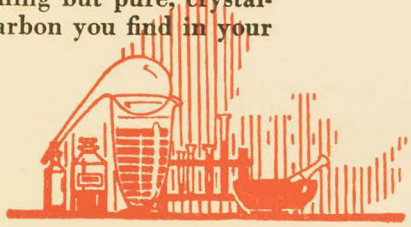
*Making Diamonds*

The diamond, King of the gem family, though the perfect sapphire and ruby often disputed his rulership in the markets of the world, naturally attracted the attention of Man who makes things. Numerous attempts were made to do in the laboratory what Nature took thousands of years to make in the earth.

Man could always make "something like" the diamond or any other gem. But an "artificial or synthetic gem" is not an "imitation"—it is an actual formation by artificial means of the real precious stone so that the product is identical chemically, physically and optically with the one found in Nature.

Henri Moissan alone of all the legion of scientists and pseudo scientists evolved a method of making diamonds identical with those found in the mines of Kimberly or Golconda.

So far as the material is concerned the diamond that has swayed the hearts and minds of man throughout history is nothing but pure, crystallized carbon—the same carbon you find in your



*Sugar in Your Diamond*

lead pencil. To get crystals of a substance you dissolve it and let the solvent evaporate. Melted iron would dissolve carbon—but when the iron was taken away there were no diamonds—the same old carbon came out.

Moissan decided that if enormous pressures were applied to the molten iron containing carbon—diamonds would result.

Of the years of research, the laborious days and nights in the laboratory, the hopes, trials and failures, nothing need be said. Moissan was finally successful. He took pure carbon obtained from calcining sugar and mixed it with pure iron. The mixture was put into an electric furnace and heated above 4000 degrees centigrade. The iron melts like butter and steams like boiling water. The lime furnace itself begins to melt. The fiery crucible shooting dazzling sparks is then lifted from the ruins of the furnace and—plunged into cold water.

*An Iron Squeeze*

The outer surface of the iron cools first and forms a shell that strangles the molten iron inside. Iron very peculiarly expands when it changes from a liquid to a solid. This created unheard-of pressure inside the outer skin of the solid iron.

*Diamonds Fired From Guns: Diamonds From the Skies: Shaving With Diamonds*

The dissolved carbon separates out in the form of diamonds. A long and tedious series of processes are gone through to get rid of the iron. But the largest diamond made by this process is one-fiftieth of an inch across. And no one will wear a diamond that needs a magnifying glass to show itself. Man (and his wife) has always wanted his diamonds big enough to see.

Sir Andrew Noble, the famous explosive specialist obtained similar diamonds by exploding a mixture with an excess of carbon in a "gun." Other diamonds have been found in steel made according to processes that resemble Moissan's experiment. It has been suggested that steel is hard because it contains minute diamonds—they might give your razor its edge. Dr. A. E. Foote, a minerologist, ruined an emery wheel and other tools while cutting a piece of a meteorite found in Canyon Diablo, Arizona. He eventually found diamonds in the strange visitor from the skies.

Moissan's diamonds added to the store of knowledge and to the supply for tipping drills—but added not a carat to the beauty of the world—and in gems man has always sought beauty.

In another field man has been more successful.

*Chromium is the Magician*

So far as the ruby and sapphire are concerned —man has penetrated Nature's jealous guardianship and today the beauty of those gems is as available to the gem loving teacher in a midwestern school room as the Nabobs of India. The corundum family, including the ruby and the sapphire rivalling and sometimes exceeding the diamond in value, is composed of aluminum and oxygen with a minute quality of the metal chromium as coloring matter. If there is very little chromium you have the white sapphire—probably the most expensive gem in the world. If there is a little chromium you have the blue sapphire. A little more gives you the ruby. Combine the chromium in a different way and you get the emerald.

These are of course the "Oriental" varieties of the gems—the "spinal" forms are softer and contain magnesia and silica. The full glory of the gems is to be found only in the Oriental forms.

*It Took a Century*

There is much Alumina, as the oxide of Aluminum is called, in the earth. But there are few specimens of it crystallized in the colored, transparent forms known as gems. Close to a century of effort was required before a single good ruby

*Verneuil Spends 25 Years*

could be produced in the laboratory. As early as 1837 M. A. A. Gaudin made true rubies but they couldn't be seen with the naked eye. Ten years later, J. J. Ebelman produced the white sapphire and the spinel ruby but again the stones were microscopic. Finally about 1877 E. Fremy and C. Feil produced small rubies and white sapphires that were large enough to cut. But the process was so complicated that the rare mined stones cost less. Edmond Fremy, L. Elsner, J. H. De Denarmont, Sainte Clair Deville, J. Caron and H. Debray are but a few of the soldiers who did not succeed in their prolonged assault on the fortress of Nature.

It took a giant in the field of chemistry to solve the problem—it took 25 years of painstaking effort—a small fortune provided by the House of Heller, spent in research—but the results opened wide the doors of beauty to the world—and the jewelry industry put rings on millions of fingers that had never known the feel of gems.

Verneuil was born in 1856 and as a boy showed a strong aptitude for chemistry. He achieved a

Verneuil

*The Ruby! What Next?*

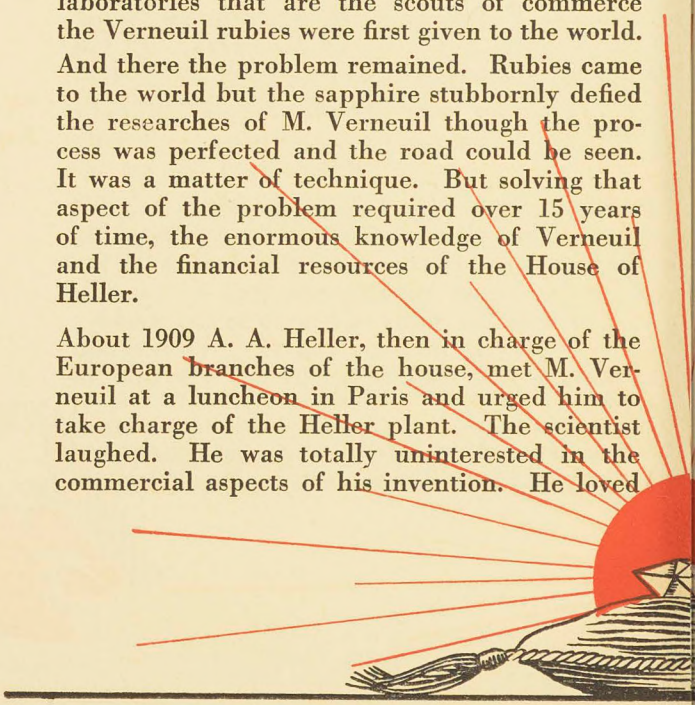
reputation and occupied a chair in one of the great universities of France. In 1894, after almost 10 years of unremitting effort, he achieved a partial success by producing a ruby in his laboratory that was the *same* as that found in Nature. The mines of India produced no better stone.

Just about that time the Paris offices of the House of Heller were established and in the laboratories that are the scouts of commerce the Verneuil rubies were first given to the world.

*Lots of Money*

And there the problem remained. Rubies came to the world but the sapphire stubbornly defied the researches of M. Verneuil though the process was perfected and the road could be seen. It was a matter of technique. But solving that aspect of the problem required over 15 years of time, the enormous knowledge of Verneuil and the financial resources of the House of Heller.

About 1909 A. A. Heller, then in charge of the European branches of the house, met M. Verneuil at a luncheon in Paris and urged him to take charge of the Heller plant. The scientist laughed. He was totally uninterested in the commercial aspects of his invention. He loved



his work as a professor of chemistry. "Mais non, monsieur, I could not do it."

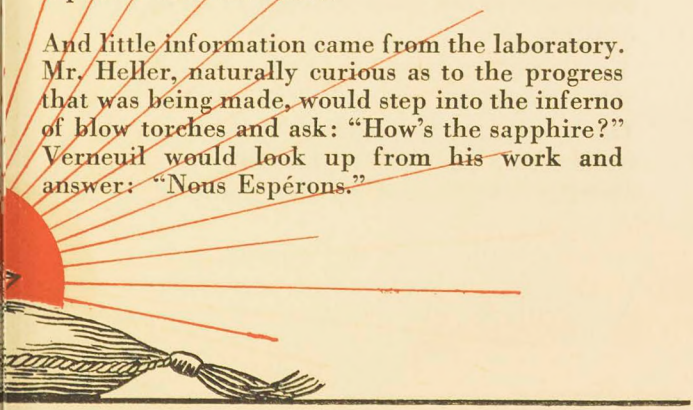
*Scientists are Like That*

But like many other scientists, Verneuil's blood was rich in the red corpuscles of research. He could not resist the lure of a perfectly equipped laboratory, willing assistants, unlimited funds and entire freedom to work 20 hours a day—scientists are like that.

I. H. Levin, the chemist in charge of the Heller laboratories in America, went to France to work with M. Verneuil. They lived in the laboratory and gradually perfected the process of making the ruby. Then came the sapphire. For twelve months the laboratory hummed. Giant torches hissed and heated the room to unbearable temperatures. Intricate calculations were made—thousands of experiments were done, checked, repeated and discarded.

*"Nous Espérons"*

And little information came from the laboratory. Mr. Heller, naturally curious as to the progress that was being made, would step into the inferno of blow torches and ask: "How's the sapphire?" Verneuil would look up from his work and answer: "Nous Espérons."



*Paris For Work*

**And the hope buoyed them up through the weary months of a Paris summer and winter.**

**Finally in 1910 after every bit of apparatus had to be invented, after special gauges to control the flow of gases had to be made, after intricate processes were evolved to purify the materials —the arduous work came to a glorious conclusion in a sapphire that could have taken its place in the collections of the world. It was a sapphire—an oriental sapphire—identical with the natural stone.**

**A hope it had been; and "HOPE" it remained. The House of Heller named its stones HOPE and spent millions advertising the name so that the people of the world could know that the Heller Hope Stones were perfection—were exact duplicates of the gems hitherto reserved for the wealthy.**

*A Recipe for Gems*

**This is a simple explanation of how the Heller Hope Stones are made in the Heller laboratories under patents owned by the House of Heller.**

*With Your Own Eyes*

Alumina is first purified by an extended and laborious process. A small quantity of chromic oxide measured in grains is mixed with it. This fine powder is blown onto a tiny table in an oxyhydrogen torch. The melted product must always be in the same part of the flame. The table must be as tiny as possible. The temperatures and gases must be exactly controlled. The support must be moved down at a steady fixed rate to move the fused mass from the area of intense heat.

In the Heller laboratories you can see through special lenses prepared to protect the eyes from intense heat the actual formation of a ruby or sapphire that would take Nature untold centuries to produce. A cone of material is formed. When it reaches the proper height the skilled operator snaps off the heating gases with twists of both wrists and the product is removed.

From that moment the Heller Hope Stones follow the course of all gems. Since they are identical with those found in Nature they must be treated by the same methods. The same precision and the same instruments are used in

*Scientists Agree*

cutting and polishing the Hope Stones as are used in cutting and polishing the diamond.

Great scientists have been unable to distinguish any difference between the Heller Hope Stones and the finest Oriental gems. Sir William Crooks after crediting Verneuil with the invention in his article in the Encyclopedia Britannica says the stones differ only in origin.

Professor Alfred J. Moses, the noted mineralogist, said: "Any two natural substances which were as nearly identical in chemical and crystallographic characters as the specimens submitted and the natural sapphires would be called identical. The difference is one of origin." Professor Bauer, the recognized authority on precious stones, said: "In specific weight, hardness as well as all optical properties, they (Heller Hope Stones) are identical with the natural stones; in color and brilliancy they vie with the best specimens of the Orient."

*Just the Same*

Color, specific gravity, hardness are all qualities that can easily be tested and the Heller Hope

*Mines in the Laboratory*

Stones are duplicates of the finest Oriental gems in these aspects. But the tests can go further. The Oriental gems are what the scientists call "Dichroscopic". They absorb light differently when it passes through it in different directions. By means of the Haidinger "dichroscope" two images of the stone can be seen through one eye piece. The genuine Oriental and Hope stones act the same. The images show different colors. Even the spinel ruby found in nature will not do this. It is "isochroscopic". Long words—but longer tests have failed to show even the minutest difference between the Heller Hope Stones and the mined gems.

Of the effect of the Heller processes on the jewelry business, the jeweler can be the judge. A new world of beauty was opened and the great hunger of the crowd for jewelry was satisfied. Kings may despise crowds; but business and history do not. Civilization is the product of crowds; the bigger groups in which man lived, the greater the civilization. The bigger the desire that can be satisfied the greater the profits in business. Heller created new markets.

*Rings on Her Fingers*

Where before there were two or at the most three styles of rings, today there are a hundred. Where there were two or three shapes of stones, today there are a legion. Where before the retail jeweler was confined by a limited list of customers, today his whole city is his market.

It has always been the policy of the House of Heller to broaden the markets of the retail jeweler thus placing the entire industry on the solid foundations of wide demand. This policy is well illustrated in the history of this house. Glance over a partial list of the business the House of Heller has created for the jewelers of this country: Hope Rubies, Hope Sapphires, Deltah Pearls, Hope Emeralds, Golden Sapphires, Syntholites, Cultured Pearls, Turquois Matrix, Hope Hyacinth, Hope Zircons, Ural Emeralds and others. . .they were placed in the stores of the country by the House of Heller, they contributed largely to the prosperity of the industry.

*"Hope" in Business*

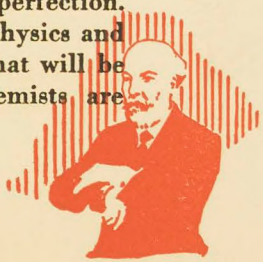
All Heller stones show steady popularity that places them in the standard class; but style and

*Picking the Good Ones*

fashion sometimes touch certain stones with the magic wand of universal desire. Two stones of surpassing beauty are at present riding the crest of the popular vogue—the Zircon both natural and Hope, and the Heller Ceylon Sapphire. They are putting peaks into sales curves.

The process for making the Zircon is not nearly so perfect as the Hope processes for making the sapphire and ruby. Selection is substituted for the imperfections of the process. Thousands of carats are discarded and only the perfect stones that approach the natural in color and optical properties are permitted to come under the name Hope.

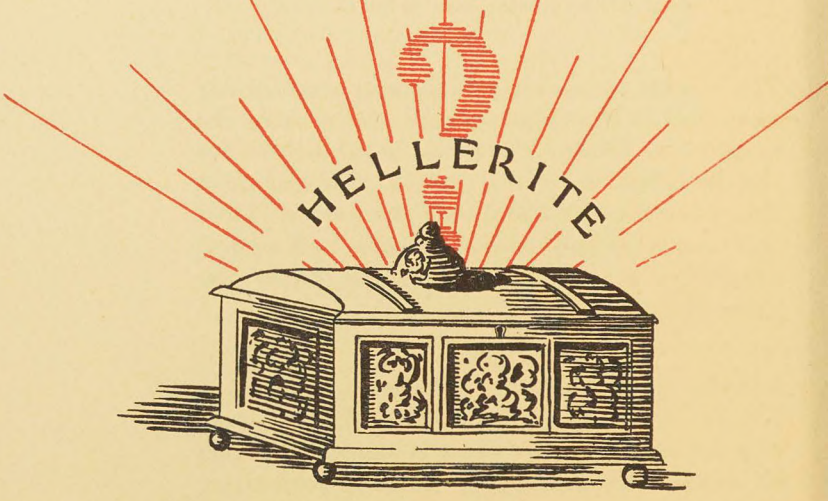
But the end is not yet. All the storehouses of Nature have not been plundered. In some crevasse of the earth's crust is concealed a gem of astonishing beauty, of flawless perfection. The intricate calculations of atomic physics and chemistry may give birth to a gem that will be the marvel of marvels. Heller chemists are



Verneuil

***. . and in the Future***

tireless; Heller explorers visit the distant places on the edges of the Earth as you visit your favorite restaurant. Laboratory or Nature—the perfect gem is yet to come—and for that stone the name Hellerite has been reserved in honor of the founder of the House of Heller.




The END

*THE "HOPE" TAG —*

*The House of Heller provides all manufacturers with "Hope" Tags so that retailers and their customers can identify genuine "Hope" gems. . . . .*