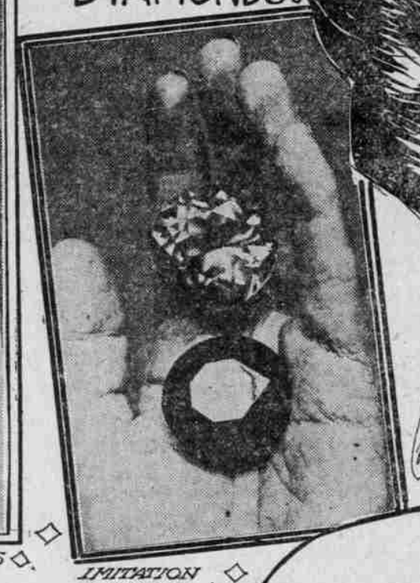
Making Artificial "Precious" Stones

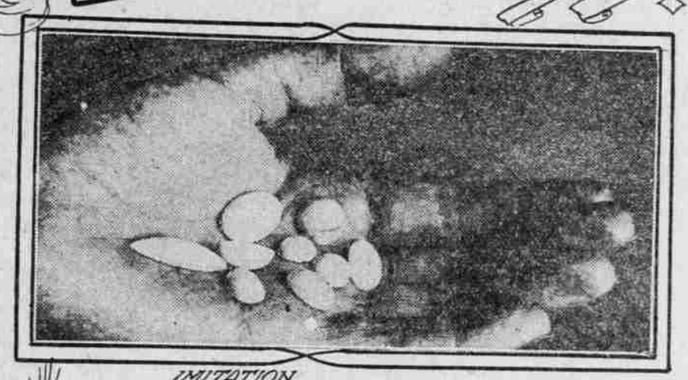
METHODS THAT ARE STRICTLY SCIENTIFIC AND OTHERS STRICTLY FRAUDULENT ---- CARBON FROM BURNING SUGAR THE BASIS OF MAN-MADE DIAMONDS.

1000 ARTIFICIAL DIAMONDS



IMITATION RUBY AND TOPAZ

IMITATION PEARLS



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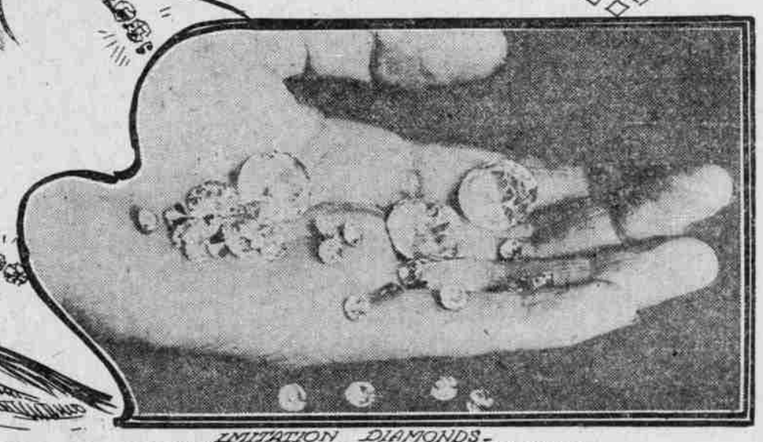
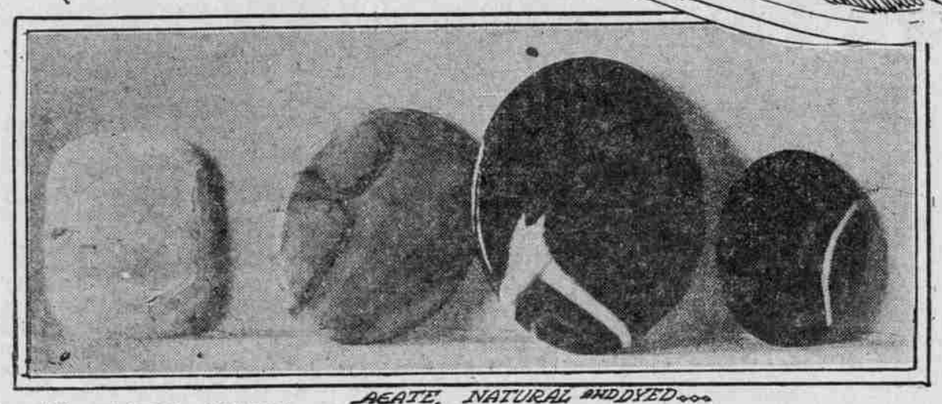


IMITATION DIAMONDS. WE IMPORT A MILLION GROSS PER YEAR



AGATE, NATURAL AND DYED

BY JOHN ELFRETH WATKINS.

"THE man who learns to manufacture diamonds fit for the trade will take advantage of the De Beers proposition and hold them in reserve, letting them out gradually," said Mr. Wirt Tassin, gem expert of the United States National Museum, in answer to my question yesterday as to whether a full realization of the alleged scheme of Henry Lemoine, now in the Paris limelight—would reduce the cost of diamonds to a few dollars a carat, as has been predicted.

"Do you believe that Lemoine's proposition to artificially manufacture a cylindrical diamonds, six centimeters long by three centimeters in diameter and above the average density, can ever be realized by the most skillful scientists?" I further asked Mr. Tassin.

"I am not disputing a single assertion in this particular line of research," said he. "Diamonds are now being manufactured artificially, their chemical and physical properties being the same as those of mined stones. As to the size which such artificial diamonds can attain, I will only say that today all things are possible."

"How are diamonds now manufactured?"

Two Ways of Making Diamonds.

"There are several methods. Moisson of Paris dissolves carbon in molten steel at an enormous temperature and pressure, and then suddenly chills the mass, which reveals microscopic diamonds, also diamond dust in more or less abundance.

"Artificial diamonds are not infrequently formed by accident in ordinary cast iron, and it is more than likely that an examination of the residue of ordinary iron castings would result in the discovery of many of these gems.

"I lately discovered some artificial diamonds in a peculiar manner. I was machining the fragment of an old sugar kettle, which developed exceptional hardness, and when I dissolved a fragment it yielded two minute diamonds. Rossel of Germany has treated ordinary steel for diamonds and has secured several transparent crystal fragments, together with quite a number of minute, well formed, eight-faced crystals—the characteristic form of the diamond crystal. These have been indisputably proved to be diamonds. He has carried on a number of investigations along this line, and has found that hard steels produced under high temperatures and cooled under great pressures usually yield diamonds; also that unhammered and unrolled mild steels yield well-formed, eight-faced crystals of this class. The higher the temperature at which the steel is made the greater is the quantity of the diamonds formed.

"Another German method yielding even better results is to melt olivin, or chrysolite, and to stir it with a graphite rod, after which it is allowed to cool. The mass is then dissolved and the residue is found to contain diamonds. In all of these cases the diamonds thus far manufactured are very minute. As yet there is no published account from reliable sources of the manufacture of such a gem which by any stretch of the imagination would be regarded as a commercial proposition. Here is a phial containing 1000 of such artificial diamonds as have been obtained to date. They look like fine powder and scarcely cover the bottom of the phial.

"The public has not fully awakened to the fact that man has already learned to manufacture the world's most costly gem of all—the ruby. The best Oriental rubies were worth twice to six times the price of big diamonds of equal weight before the artificial ruby was discovered. The manufacture of artificial rubies has gone beyond the experimental stage, and many hundreds of carats of these stones are now on the market under the name of 'manufactured,' 'scientific,' 'artificial' and 'reconstructed' rubies.

"In France they are manufactured in this way: Powder rich in alumina (oxid of aluminum) is dropped upon platinum wire suspended in the center of an oxyacetaline or oxhydrogen flame. The fine powder fuses and the fused globule is gradually built up, by addition of more powder and a little coloring oxide, into a button or head of good color, which, like a mined ruby, is finally cut for the trade.

"These artificial rubies are selling for varying prices, and to the untrained eye are like the mined ruby in both color and brilliancy. But when put under a magnifying glass even of low power they are found to have numerous 'striae,' or lines, and minute bubbles, which at once distinguish them from the mined stones.

"Another method of manufacturing rubies is to fuse chemically prepared alumina mixed with a flux containing coloring oxides, chiefly chromic oxide, in an electric furnace. The mixture is slowly brought to the melting point, kept there for a time and then quickly cooled on the outside, the interior being cooled as slowly as possible. When properly cooled the mass, on being broken open, is found to contain clear, glassy, red nodules (knots or lumps) standing out in sharp contrast against a dull red brick-colored ground mass.

"These glassy lumps are then cut for the market and generally have a richer color than the artificial rubies produced by the French method. The invention is that of an American who is as yet withholding his name. Here is one of his artificial rubies weighing 16 carats. Its color and luster is as great as that of the mined ruby, and its chemical and physical properties are the same. It will scratch glass with ease. It is worth about $240. If a mined stone of the same color, it would be priceless. In both of these methods it is possible to carry the color, and the best pigeonblood red is fixed by the amount of chromic oxide added to the original melts.

Artificial Emeralds, Sapphires and Topazes.

"A blue color is produced by the addition of cobalt, and thus are obtained artificial sapphires, while green is obtained by adding another metallic oxide, and thus are produced emeralds. But with the exception of rubies practically nothing is as yet being done in the manufacture of artificial gems. What as yet are hardly more than scientific curiosities are the spinels and chrysoberyls lately produced by a German, who has similarly produced topazes of a fairly good size.

"But when it comes down to the diamond, those who now are really making any progress are keeping quiet. If they succeed they are not going to knock the bottom out of the diamond market."

"What raw material do they use?"

"Chiefly sugar carbon—carbon made from burning sugar."

"Sophisticated Gems."

"Great progress is also being made in turning out 'sophisticated gems.' This enterprise, largely fraudulent, consists of the substitution of cheaper colorless stones for diamonds, green garnets for emeralds, and so on. Certain stones are treated with chemicals or with heat to heighten or change their colors and increase their brilliancy. The wine yellow topaz is changed to pink, and a white one rendered whiter or more brilliant by treating becomes a sophisticated diamond. A hole is drilled in an off-color stone, which is then improved by filling the cavity with a transparent enamel; or the inside of a setting may be backed, painted or enameled. These sophisticated gems are of far less value than the artificial gems, whose substance is identical or nearly identical with that of the natural.

"A lot of trade secrets have been opened up by investigations of these sophisticated gems, many of which I have reproduced in the laboratory. For example, I have taken a wine-yellow Brazilian topaz and by properly packing it in magnesia and then carefully heating it have changed its color to a very beautiful rose pink. I thus increased its value about twenty times. Similarly a banded agate, with poor contrast of color, when treated with dyes and chemicals shows marked contrasts and becomes beautiful. I have soaked such agates in olive oil until this has penetrated the more porous parts, and then have boiled it in sulphuric acid, which, in combination with the oil, has turned the porous parts to a rich velvety brown or black, the non-porous portions becoming whiter by contrast. This is done in the manufacture of onyx cameos. Indeed, the porous portions of many agates are, for the trade, artificially dyed red, brown, blue and other colors, as desired.

"A new stone now on the market as 'harlequin,' the luster of whose blues and reds changes like a cat's eye in the dark, is merely crocidolite, or 'blue asbestos,' whose fibers have been treated with aniline dyes. Most of the common chalcedony seals worn as watch charms have been artificially colored, and a large amount of the so-called jade in our market is merely chalcedony dyed green. Most agate is counterfeited by painting the natural, colorless chalcedony with moss-like patterns. I have done this for experimental purposes, and have found that they fade in two or three years. Indeed, this same chalcedony—a clouded, milk-colored variety of quartz—is used in making sophisticated turquoises and carnelians.

Enormous Trade in Imitation Gems.

"Over a million gross of imitation diamonds are being imported by this country per year. By 'imitation' I mean an article which must not be confused with the 'artificial' gem which, as I have said, is identical or nearly identical with the gem of nature.

The cheapest form of the imitation diamond is of glass, simply pressed into the 'brilliant' form and having none of its facets polished. The next higher product is backed with 'pinchbeck,' a gilt made of copper, which increases the brilliancy about five fold. The next grade is the backed brilliant, with every other facet of the top polished, and a still higher product has alternate facets, both top and bottom, polished, the back then being coated with full silver foil. A better grade still has all facets polished, top and bottom, and the highest type of all is of selected glass, free from coloring matter, and whose inherent brilliancy is such that no backing is necessary. All of the facets of these are carefully polished.

"These imitation gems are given a wide range of hue by adding coloring matter to the original melt of the glass. In the better imitations the glass is made of powdered quartz, red lead and potassium carbonate, or metallic oxide, etc., in varying proportions according to the desired color.

Some Imitations Cost More Than Orignals.

"A new imitation emerald now on the market displays flaws such as commonly characterize the mined emerald. Indeed, some imitation gems cost more than do originals, two good examples being the imitation rose quartz and moonstone, and so far as beauty is concerned they are often more attractive than the natural, exhibiting a very wide range of color. But they are more easily scratched than the natural stones, and exposure to foul air usually dims their brilliancy. In fact, nearly all of the finest grades of imitation gems can be readily detected by their yielding to the file and their inability to scratch glass.

"Quite the newest and most interesting thing in this line, however, is a very high-grade imitation gem which actually does scratch glass readily and does not yield to the file. I have obtained four of these thus far, one green and the others a delicate pink. I have not yet obtained a sufficient quantity of this material to determine its character, but I suspect that it is largely powdered quartz mixed with a small amount of alkali in the flux. These are very durable, having the hardness sufficient for ordinary wear, besides a fire and brilliancy far superior to those of other imitation stones.

"Beautiful and expensive imitation pearls are made by coating glass beads with a product made from the scales of the 'bleak,' a fish of the Baltic Sea, the desired color being finally imparted by the delicate use of dyes.

"The very latest product is the Teckla pearl, made by a secret process which I have not yet fathomed, and which reproduces the twirls and bumps of the baroque pearl."

Washington, D. C., June 13.

MERITS OF CABBAGES AND ONIONS

MY cabbage patch is the pride of my garden. A cabbage head is such a comfortable thing, just the right color, not the raw, vivid hue of the lettuce, nor the fussy mottle of the potato, but a clear, soft, green, lightly veiled with silver network or blanched to ivory whiteness in the center. And the shape, so perfectly rounded, resting upon a rosette of curled leaves, upborne by strong, firm stem. We call the cabbage "a common plant," but it belongs to a noble family; it is a cousin of the aristocratic palm and one of the great cruciferae, or cross-bearing family, that has no poisonous or hurtful members. It is found wild on the rocks by the seashore, in the Island of Laland, in Denmark, the Island of Heligoland, the south of England and Ireland and in the Channel Isles and on the shores of the Mediterranean. It was a food-plant and carefully cultivated before the dawn of history, and we read that the intellectual Greeks ate it to make them strong in mind as well as body.

This is a day for pleasant thoughts and vagrant fancies, and as I look at my cabbage patch I am once more in the little French village on the gray Breton coast. It is a land of gardens, of fruits and vegetables, enough to feed all the great cities, and every man you meet is a gardener. And as we walk along the white road we see tall palm trees and little children playing in their shade. And far on the bright sea glitters between the tapering stems and the sunlight changes the foam into countless little rainbows, rising and falling all the while. It is a scene from fairyland, a memory of the Arabian Nights, with their beautiful but impossible pictures. For these graceful palm trees are but cabbages, and their waving tufts merely the exaggerated cabbage heads of our everyday gardens. In this paradise of vegetables, the cabbage, for once, becomes a thing of beauty. Tall and slender, with their loose gray-green leaves springing in tufts a-top of six-foot stems, the sea breeze tossing them, the sunlight dancing in checkers along the alleys, the songs and calls of the sunburnt children flitting in and out—what a picturesque scene for a cabbage patch?

Land of Kitchen Gardens.

Everywhere we find unexpected beauties in this land of kitchen gardens. We forget flowers, for the time, when we see the scarlet carrots and the red beets, the smooth golden rind and warmer flesh of the pumpkins; the cauliflowers, creamy and globular, in their encircling fringe of tender green, the purple turnips, the mottled radish. We linger in the field or before the market corners, full of wonder at the loveliness of these useful foods and at their perfection of form and color. But the cabbages are too fine and beautiful for market or shop. They are a part of the great outdoor picture—as they toss their plumed heads in the green groves of the hillsides, with the sun of the south full on their loose, frilled leaves, and the sea glittering between and beyond their long, pale stems.

If the cabbage patch is the pride of my garden, the long, straight rows of onions are its ornament. Some one has said that the onion is one of those strenuous vegetables about which one cannot be indifferent. One either loves it with a passionate devotion or else utterly repudiates it, and everybody who has any trafficking with it. So long as victuals and drink continue to be the chief of our diet, the onion will keep on being glorified by some and despised by others. In a clever book, Mrs. Pennell recently glorifies the onion as "the rose among roots, without which there would be no gastronomic art. Its presence lends color and enchantment to the most modest dish; its absence reduces the rarest dainty to hopeless insipidity and the diner to despair." In this book she employs all the aid of adjectives and "apt alliteration" to set forth her favorite dainties.

She writes about the magnificent mushroom, the triumphant tomato, the simple sole, the subtle sandwich, and in like fashion until she comes to "the incomparable onion," and calls it "the climax of the feast." Its fragrance abounds in associations glad and picturesque. All of glorious Italy is in the fine, penetrating smell, and all Provence and all Spain. It is in the atmosphere breathed by the Latin people, so that, ever it must suggest blue skies and endless sunshine, cypress groves and olive orchards. It is interwoven with memories of the golden canvases of Titian, the songs of Dante, the music of Mascagni.

Spanish Onions the Best.

According to Mrs. Pennell some rank the onion as a root sacred to Venus, a food for lovers. The ancient Greeks and Romans had several varieties, and in Egypt it received divine honors. In the Far South the onion is more opulent, like the beauty of its women. It gains in flavor by losing in strength. Our onion is strong to the point of rankness; therefore the Spanish onion is the best, and in India the onion is but a pale parody of the English one. As for the garlic, which is a sort of cousin of the onion, the verses of all Southern poets smell sweet of its piquant delights. The rhymes of Mistral recall it. It is the essence of bullfights and farandoles. All through the adventures of Don Quixote it floats, a real perfume, and in the salads of the Old Testament it holds first place. The earliest people of Europe and Western Asia cultivated garlic from Tartary to Spain, and it has always been a part of Chinese diet. The shallot is to the onion as the sketch to the finished picture. It never attains to the untempered voluptuousness of the onion, and does not assert itself with the fury of garlic. Shallots for Summer use, olives and garlic for Spring. In all the gardens of colonial days there were quaint borders of chives, with fine grass-like leaves and purple blossoms. We seldom see them nowadays, for they are a delicate little second cousin of the onion and cannot live through our cold Winters.

All of these high-flavored plants have rare medicinal value. And one critic declares "the secret of good cooking lies in the discreet and sympathetic treatment of the onion. It gives vivacity to soups, it is the poetic soul of the salad bowl, the touch of romance in the well-cooked vegetable. All of the old-time salad-makers had some secrets of their own as to how much or how little onion should be mingled with the other herbs. Many of our well-known diners out were prouder of their salad-making than of their wit or wisdom. We read of Dumas that he pinned his hopes for fame on his recipe for onion soup rather than on his many novels, and of Sydney Smith, called in his day "the wittiest man in England," it was said that he gloried in the fact that he alone of all the literary circle knew just how much onion to mix in a bowl of salad. A witty writer has had much to say about people who are Bromides and people who are Sulphides. Perhaps we may call the cabbage a bromide among plants and the onion a sulphide. The one so comfortable looking, stolid and tasteless, the other so straight, so spikey, so fiery.—E. A. Matthews in the St. Louis Globe-Democrat.

TO NATIONALIZE ENGLISH RAILWAYS

RAILWAY nationalization is fast becoming one of the questions of practical politics in England. Within a very short time it probably will become part of the recognized programme of the Liberal party.

Two of the most influential ministers already have declared for it. They are Lloyd George, the new chancellor of the exchequer and the man who has the undisputed reversion of the premiership after Mr. Asquith, and Winston Churchill, the brilliant son of an American mother and the rising young man of the Liberal party, who recently has been promoted to the important cabinet office of president of the Board of Trade. The latest recruit to the policy is Sir John Brunner, a great Liberal business man, who told the party plainly at its first meeting after Mr. Asquith's appointment as prime minister that it was doomed unless it adopted a "construction trade policy" and abandoned the historic doctrine of laisse faire in trade matters. At first this declaration was hailed by the Unionist press as a warning by Sir John in the cause of free trade, but he since has explained that what he means is not the adoption of protection against foreign imports, but nationalization of railways and canals and their management in the interest of the traders and the country.

Strange to say there is little difference of opinion among the people at large on the subject. Even those who are afraid of the very name of Socialism are in favor of state railways. The railway shareholders themselves, who have seen their profits dwindling and disappearing year after year, would be delighted to have government bonds bearing 4 per cent interest as a substitute for their stock, which now pays an average of only 3½ per cent. The fact is that the English railways are amazingly overcapitalized. Accustomed as the American is to the watering of railway stock he would be astonished at comparing the real value of some of the leading English railways with their capital value. The total capitalization of the railways of the United Kingdom is about $6,500,000,000, and it is estimated that at least 1,000,000,000 of this is water. The water has been put in with no fraudulent intention, but is the natural result of the slipshod methods of management which grew up with the English railway system and never have been altered.

England was the pioneer in railway building and the railways had to pay heavily at the beginning to acquire the necessary land for their lines and to overcome the opposition and the prejudices of the landowners. Furthermore, it never has been the custom of the English railway to set aside a part of the profits for upkeep and improvements. When improvements have had to be made they have been paid for by new stock issues.

It is estimated that, taking into account the extra sum which would be demanded by investors for "disturbance," and the natural premium that is to be expected in such a transaction, the railways would cost the government about $10,000,000,000, and the advocates declare that they not only could be made helpful to the trade of the country, but a valuable government asset at that price.

A demand for immediate railway reform is made by every class of trader in the community. The question of rates is a great scandal, and the preference given by railways to foreigners has aroused the traders. For instance, it costs $10 to ship a ton of British meat from Liverpool to London, but on account of the rate agreements between the railways and the steamship lines it costs $6.25 to ship a ton of foreign meat between the same two points. A case quoted extensively in the British press recently was that of a manufacturer in Sheffield who was asked to bid on an order for a large quantity of goods delivered in London in competition with a German firm. He found that the freight rate between Sheffield and London would prevent him from obtaining the contract, and he had almost decided to give up the attempt to gain it, when he learned that if he sent his goods by rail to Hull, shipped them to Germany and brought them back to Hull and then sent them by train to London the cost would be so much lower that he could compete with the German manufacturers. He based his price on these rates and obtained the contract.

It is estimated that if the government took over the railways and ran them for the benefit of the whole people, money enough could be saved on management to reduce the freight and passenger rates substantially, and at the same time insure a better service. A railway manager has declared that 100,000 of the 600,000 men employed on the British railways are totally unnecessary and are only employed because of the useless duplication of facilities caused by competition. The expense of 250 separate boards of directors and of a host of higher officials also could be saved.

Ribbons and passementeries to the value of $16,000,000 were produced in 1904 at St. Etienne, France.