

MAKING DIAMONDS OUT OF SUGAR

BY ROBERT CUNNINGHAM.

America alone imports \$25,000,000 worth of diamonds every year, to supply the world's demand. No wonder modern science has sought for a generation to effect a transmutation before which the alchemist's stone would be mean and ineffectual. And science has succeeded at last. The great French chemist, Henri Moissan, has found in his sugar basin the potential gems men seek in Kimberley's mines. He received a Nobel prize when President Roosevelt was similarly honored, and is a true disciple of the venerable Berthollet, greatest of living chemists and biologists.

A fairy story of science indeed! Thus the poor rooster in the tenebrous pot, sitting down to weak coffee, should have in her cup the material of radiant necklaces and royal tiaras. Yet the sugar is carbon, as the diamond is, only the diamond is carbon subjected to vast cosmic processes in Nature's own laboratory. The stone's secret has long been known. And now Nature's method has been imitated by the chemist in his laboratory, who has at last produced her rarest gem in his electric furnace.

SOME EARLY EXPERIMENTS.
As far back as 1828 Gannal in Paris thought he had solved the problem. He treated carbide of sulfur with pure phosphorus, and tiny sparkling morsels fell into his trembling hands. Alas! they turned out to be mere glassy particles stripped from his own tubes. Chiquard de Latour, and later on Despretz, continued the fascinating experiments. Despretz used charcoal subjected to enormous heat by means of the electric arc and a blowpipe. He produced gemlike stones hard enough to cut rubies, and triumphantly told the French Academy he had succeeded in making real diamonds by artificial means. It was a great blow to him when Marcelin Berthollet, the venerable scientist and philosopher, proved that the gems could not be diamonds at all.

Next came two English chemists, Hanny and Marsden, illustrating the uncertainty of the chemist's work. Marsden did one day produce diamonds, but could never afterward repeat his success. His best efforts produced only a new crystal hard enough to scratch diamonds. This was called carbonium, and is now manufactured at Niagara for industrial purposes. The great Berthollet himself next took up diamond making in his laboratory, 90 feet high, but ceased experimenting the moment Moissan came into the field and announced humbly that he had found in his sugar basin the world's rarest gem. Never since Koh-i-Nur examined by keen dealers more eagerly than the tiny gems made in Moissan's laboratory were inspected by France's scientists. And they were diamonds—no doubt of it. They would cut ordinary specimens, which would vanish into thin air when subjected to great heat.

Moissan knew that all that was necessary to transmute worthless carbon into diamonds was vast heat and immense pressure. To inadequacy in both he attributed the failure of predecessors in the same line of research. Their best efforts in the line of heat went up to a mere two thousand degrees. Electricity, he knew, would give heat almost equal to that of the sun. And so he went to work and produced an electric oven, giving heat almost inconceivable—up to 3,400 degrees Fahrenheit. In such a temperature our bodies would vanish in a fraction of time, leaving not an atom behind. Moissan's oven is small, neat, and unpretentious. Two blocks of tungsten hollowed out fit one on top of the other, leaving a little cavity in the center. Two grooves leading to the lower half of the hollow cylinder are tunneled in the lower block. Both stones are incased in iron and fastened together by screw clamps when adjusted. Two electrodes, connected with a generator of enormous power, are pushed into the groove until they touch a crucible of charcoal, fitted into the cavity. In this crucible is the sugar or other substance to be submitted to the great heat.

The moment the current is turned on, blinding white flames burst out of the oven on either side and may not be looked upon save with dark glasses. And yet so poor a conductor is the limestone employed that one may rest his hand on top of the furnace while this terrific heat is generated.

AN AMAZING OPERATION.

This heat, however, is only one essential; unless both heat and pressure

in equal degree could be applied simultaneously, failure would result. It occurred to the chemist to communicate the pressure by means of molar iron, plunged instantly into ice cold water. And in this way Moissan turned the carbon of sugar into diamonds, to the amazement of the world's scientists. He filled his little charcoal crucible with broken bits of iron and carbon of sugar. Then he put it back in the lower half of his electric stove, adjusted the upper stones, and turned on the current. There came a roar and a hiss that might be heard a block away; the dazzling flames burst forth on either side with a glare like that of lightning, and

a cloud of strange white vapor veiled the anxious wizard as he hung over the formidable apparatus. It have been present more than once at Moissan's invitation, and each time the upper stone was removed three minutes later with a gigantic pair of tongs. It was not hard to realize the amazing heat developed by the dazzling white light that burst out, and even with smoked glasses sent one staggering back with averted eyes. The charcoal crucible was white hot, and in it was the hottest broth of molten metal ever brewed.

The chemist seized it with the little tongs used by jewelers and plunged it into a jar of ice water, which

bubbled and boiled instantly at the contact. In that instant the cooling metal exerted its gigantic pressure on the substance within, exactly as the vast heat in the earth's interior produces diamonds and forces them up in the volcanic pipes of blue ground in South Africa. No mechanical power yet devised can produce such pressure as that exerted on every particle of the last few drops of liquid metal, which, like the rest, contains a proportion of the powdered sugar. At last each molecule has found its place. The metal is cold and solid. Moissan attacks the charcoal with a hammer, and removes a shapeless lump of frosted iron, which contains in the form of real diamonds the powdered sugar put into the crucible five minutes previously. Surely no more wonderful fairy tale was ever told than this narrative of the laboratory of one of the greatest living scientists! But the process of winning the diamonds from their constricted matrix is

a long and costly one, such as would never pay shareholders in the De Beers' Corporation. Moissan "digs" for his diamonds, not with explosives, nor pick and shovel, but with erodent acids which destroy the iron, but cannot injure the precious stones within—a long and tedious process. In the end the last vestige of metal is eaten and dissolved, and the last test tube's residue contains the hard won gems. "I am not working for profit," the scientist told me smilingly. "I doubt whether we shall ever produce diamonds which will flood the market and close the South African mines. My best gems probably cost \$3,000 a carat. But I am content with establishing the fact that by artificial means man can vie with the rarest and richest products of Nature's laboratory. I confess I am not always successful. Sometimes the iron is not pure, and gases develop in the molten mass, producing air bubbles, used as emergency exits for the squeezed particles.

And so the necessary pressure is evaded and failure results. And remember that with my greatest success I can produce only tiny particles of diamonds, while Nature will force up stones great as your fist, like the Cullinan out of the Transvaal 'pipes'."

A City of Caravans.

The first of November is the official beginning of winter in Paris; then—no matter what the temperature be—fires are lit in the schools and public buildings, and the janitor turns on the heat for the sad race of flat-dwellers. Then all the smaller shows (which cannot pay for a "stand" in the streets or squares) go into winter quarters. Where? I found a city of them out in the waste lands by the great gate of Montrouge. In an empty lot were scores of caravans drawn up behind the wooden palisades—ranged so as to form variable streets, named after this showman or that. Dogs,

chickens, rabbits, children, swarmed everywhere. Corkscrews of smoked rose from the chimneys of the wagons. Gaudy rags were drying on the lines. Will you look in one of the vans? It has two rooms; in one are the beds; the other is for eating. On all sides the walls are lined with closets and drawers. A little stove glows near the door. Here they are born, here they live and die, the eternal dynasties of the voyagers.—*Outing Magazine.*

CASTORIA

For Infants and Children.
The Kind You Have Always Bought

Bears the Signature of *Dr. J. C. Ayer*

Easter flowers.

Beautiful assortment of potted Hiles, ranunculus, hyacinths, Marguerites and tulips—also the finest sweet peas, carnations and roses to be found in the city. Main street door, open Sunday.

Phones, Independent, 227. Bell, EXCHANGE 22, call all departments.

Walker's Store.

49c for newest spring dress goods worth 65c and 75c the yard—5,000 yards of these splendid goods in the assortment. All the new shades in over-plaids and plain mixtures.
A very attractive offer. Select your skirt or suit while the line is complete

Elegant silks for jumper suits and shirt waists. All the new conceits for spring 1907. Handsome blocks, checks and stripes. Very stunning. An offer we are proud to make. Strong values at \$1.00 the yard. Monday and week you pick at. **69c**

Stupendous clearance of curtains, rugs, portieres, couch covers and draperies, begins Monday.

A sale effecting thousands of dollars worth of fresh, seasonable house decorations and embellishments that are needed right now. House cleaning time is upon us and fortunate are the housekeepers of this city, to have access to such great offers as we make this week. Read on.

Couch covers and portieres

40 inch Roman stripe couch covers—very special this week **\$1.25**
Bagdad couch covers—60 by 108 inches—worth \$4.00 each—Special this week **\$2.22**

Beautiful couch covers—Oriental effects—Worth \$5.50 each—Choice this week **\$3.90**
Roman stripe portieres—3 yards long—Excellent bargains at the pair **\$1.25**

Mercerized duplex portieres—fringed or corded—worth \$3.50 to \$10.00 the pair. Special this week **\$5.95**

Entire stock of rope portieres at one-half off regular prices.

Door panels underprice.

Handsome Battenberg designs on fine net—very special price at each **25c**

Pretty ideas in corded novelties on white and Arabian nets—75c each—very special at **39c**

Tapestry rugs—size 9 by 12—worth \$17.50

All wool art squares—size 9 by 12—worth \$10.00 each **\$8.35**

All wool art squares—size 9 by 10-6—worth \$9.00 each **\$7.65**

All wool art squares—size 9 by 9—worth \$8.00 each **\$6.90**

Pro Brussels rugs—size 9 by 12—worth \$14.00 each **\$10.80**

Velvet rugs—size 9 by 12—worth \$25.00 each **\$16.85**

Body Brussels rugs—size 9 by 12—worth \$27.50 each **\$21.80**

Bigelow Imperial rugs—size 36 by 68—worth \$10.00 each **\$6.95**

Bigelow Dughestan rugs—10 to match large rugs—worth \$12.00 each **\$7.95**

Granite art squares—size 9 by 9—special, per yard **29c**

Granite art squares—size 9 by 10-6—special per yard

Bigelow Axminster rugs—size 9 by 12—worth \$30.00 each **\$23.75**

Bigelow Imperial rugs—size 9 by 12—worth \$35.00 each **\$33.75**

Bigelow Bagdad Wilton rugs—size 9 by 12—worth \$50.00 each **\$36.90**

Smith Axminster mats—size 13 by 36—special at **95c**

Smith Axminster rugs—size 27 by 54—worth \$2.75 each **\$1.79**

Smith Axminster rugs—size 36 by 72—worth \$5.00 each **\$3.55**

Velvet rugs—size 27 by 54—worth \$2.50 each **\$1.45**

Jute Smyrna rugs worth \$2.25 each—special **\$1.05**

All other Smyrna rugs reduced proportionally.

Cluny lace curtains—white or Arabian

The \$2.85 quality, per pair **\$1.98**
The \$4.75 quality, per pair **\$2.75**
The \$9.50 quality, per pair **\$5.85**

Ruffled muslin curtains 50c grade—two and a half yds. long—**25c**

The \$1.00 grade—3 yards long—**50c**

The \$1.50 grade—3 yards long—**97c**

White Nottingham lace curtains. Worth \$1.25 the pair, 75c.

Worth \$1.50 the pair, \$1.00.

Worth \$2.00 the pair, \$1.25.

Worth \$3.00 the pair, \$1.75.

Ruffled net curtains. The \$1.75 kind—per pair, \$1.25

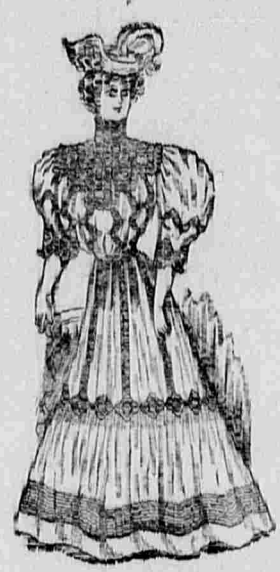
The \$2.50 kind, per pair, \$1.75

The \$2.75 kind, per pair, \$1.95

The \$3.50 kind, per pair, \$2.35

The \$4.20 kind, per pair, \$2.95

Pretty jumper and shirt waist suits.



Made of fine quality silks in plain colors, small checks, stripes and plaids—full pleated skirts with trimmings of ribbons, velvet laces, tucks and folds—prices begin at \$20.00—Superior values.

Handsome assortment of taffeta coats—three-quarter, seven-eighths and full lengths. Trimmings of lace, braid and velvet. Semi-fitted, circular and full models. Prices very reasonable at \$17.50 and up.

Pretty lace matinee jackets.

Lined and unlined. Made of Irish crochet and Battenberg laces—very stunning models at \$25.00 and up.

A very comprehensive line of the season's prettiest waists.

Handsome lace effects in the baby Irish, Valenciennes, Marquise and all over net—white, cream and butter shades—prices begin at \$5.75 and go up.

Plat val laces at 10c the yard.

Handsome new line of these placed on sale Monday at a great deal less than actual value. Lovely patterns in 3 to 6 inch widths, with insertions to match. Splendid bargains at the price.

Imitation torchon lace.

400 dozen yards of this including insertion to match—one to four inch widths. Very special this week at the **5c**

Persian belting special.

One dozen pieces of pretty Persian trimmings in all the new shades—very special this week at the yard **35c**

The newest in children's apparel.

Very comprehensive line of boys' suits in ages 2 1/2 to 16 years—all the newest fashions and models. The Knickerbocker style predominates this season—prices start at \$2.50 the suit and range upward.

Spring coats for misses and little girls from 3 to 16 years of age. The pretty new fancy mixtures, small checks and plaids are all represented. Also handsome blue and red serges and broadcloths. Prices start at \$2.75.

A very good line of boys' hats, caps, and blouses. Every good style for this season represented—50c and up.

Elegant corset models for '07.

Complete is the line—representing the best corset designers in the world. Perfect fit and satisfaction guaranteed in every instance—an expert corsetier always in attendance.

An elegant line of long negligees in fancy and dotted Swiss, black and white lawn. Very pretty models. Prices \$1.25 each and up.

Dressing sacques in the Dolly Varden patterns. Blue and white, pink and white, lavender and white. Prices range from \$3.50 to \$3.50 each.

Go-carts and baby buggies greatly reduced this week.

An extensive line of the newest styles—all constructed on the most approved lines and made to last. A few of the mark-downs quoted here:

Regular \$7 values **\$5.75**
Next week **\$5.00**
Regular \$6 values **\$5.00**
Next week **\$4.50**

Handsome berry dishes, made of the famous "Fostoria" cut glass—the nearest approach to the genuine. Special this week, 50c per dozen, or each **5c**

\$1.00 and \$1.50 values in men's four-in-hand ties at your choice 75c

Eight handsome patterns—every one strictly a new spring effect—values excellent at the regular prices—just see them—you'll appreciate what we say—they're beauties.

Pajamas special priced. Monday you select from a splendid line of \$1.25 pajamas at the suit **95c**

Good \$1.00 values—full regular made—special this week—any size **73c**

Kneipp Linen Underwear—Four weights, all sizes—shirts, drawers and union suits—Guaranteed to be pure linen.

Interesting knit underwear news.

We mention our Swiss underwear this week as being worthy of special attention. Our stock represents the largest and finest assortment of these goods ever brought to this city. The "Zimmerli" line made in Aargau, Switzerland, heads the list—recognized as the highest type of ribbed underwear manufactured. We import this line under our own name.

The line embraces every style and price of garment made. From pure silk suits at \$12.00 per, down to the high class, but inexpensive vests at 50c the garment. Discriminating women will investigate this line.

The first great linen and white goods sale this year

An aggregation of values in bed spreads, towels, sheets, pillow cases, white wash fabrics, battenberg scarfs, etc., that will bring every housewife hurrying to the Walker store Monday morning. We quote these as examples

White wash fabrics like this

40 inch lingerie cloth—worth 20c the yard **19c**
45 inch French lawn—worth 30c the yard **16 1/2c**
White pine dot Swiss—worth 35c the yard **15c**
Fine French nainsooks in boxes—worth \$2.25 the box **\$1.68**
Shirred Indian Head sailing—36 inches wide, special the yard **9c**

And all other dress linens in proportionate reductions.

India linens at these reductions

100 quality special **75c**
200 quality, special **14c**
300 quality, special **18c**
500 quality, special **22c**

Bleached muslin, 36 inches wide, very special per yard 63-4c

Persian lawns marked down

35c grade, this sale **17c**
40c grade, this sale **25c**
50c grade, this sale **31c**
60c grade, this sale **37c**

Bed spreads go like this

\$1.00 white spreads, this week **69c**
\$2.00 white fringed spreads with cut corners, this week **\$1.29**
\$1.50 Bates' spreads, this week **\$1.12**

These reductions on Barlow Jones' spreads.

\$5.50 fringed spreads with cut corners **\$3.49**
\$7.50 hemmed spreads, special **\$4.55**
\$9.50 hemmed spreads, special **\$5.90**
\$10.50 hemmed spreads, special **\$7.45**
\$15.00 hemmed spreads, special **\$9.29**

John S. Brown's pattern cloths

Regular \$4.90 value—size 8 by 8—special **\$2.45**
Regular \$6.00 value—size 8 by 10—special **\$3.90**

Regular \$11.50 value—size 10 by 10—special **\$6.90**
Regular \$13.50 value—size 10 by 12—special **\$8.45**

All napkins to match the above and all other cloths in stock, proportionately marked down.

One hundred odd pattern cloths—all three yards in length and two yards wide. Worth \$0.50 each. Excellent patterns—Beautiful finish and very high grade of linen. Special this week, your choice **\$2.40**

A half a hundred fine French linen pattern cloths with napkins to match to close at actual cost

John S. Brown's 72 inch damask, worth \$1.75 the yard **\$1.29**

All linen cream table damask, 60 inches wide, worth 95c yd. **63c**

Battenberg scarfs special priced

Regular \$1.49 quality, special **85c**
Regular \$3.00 quality, special **\$1.29**

Linen drawn work scarfs, worth \$2.00 each, special this week **\$1.29**

Entire stock of sheets, pillow cases, sheeting, casing and tubing at unusual markdowns this week



TO CONFER WITH THE PRESIDENT.

Alarmed at the result of state legislation against railroads and fearing national action looking toward the absorption of the trunk lines by the federal government, several presidents of great roads will soon and from time to time confer with President Roosevelt regarding a certain control of those conditions. This may result in another office being added to the cabinet, its head to have sole charge of railroad questions. James McHugh of the Pennsylvania and Marcellus Hight of the Chicago and Northwestern are two of the most prominent presidents in the country who will see President Roosevelt.