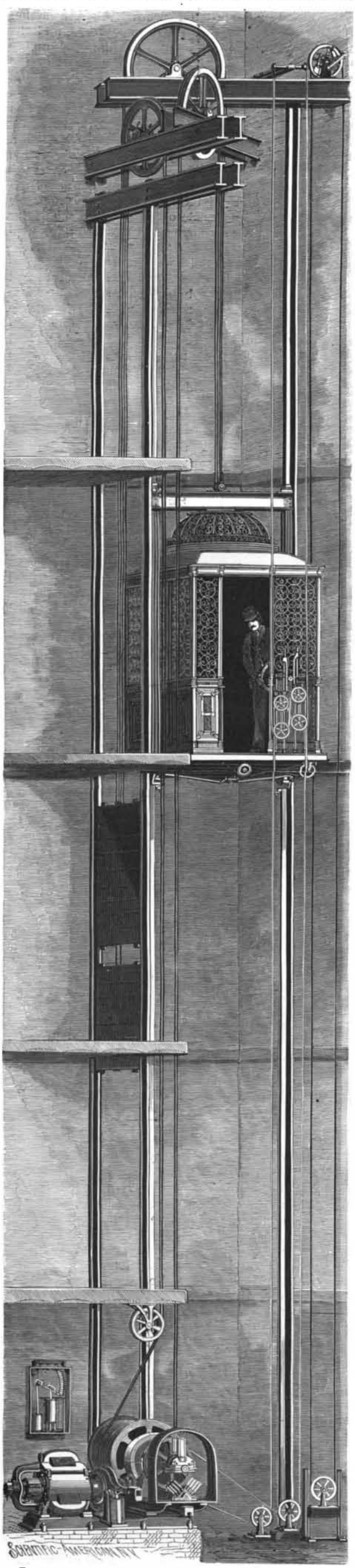


ELECTRIC ELEVATOR FOR FIREPROOF BUILDINGS.

THE LATEST IMPROVEMENTS IN ELECTRIC ELEVATORS.

The adaptation of electricity to the working of elevators in buildings has been watched with great interest, and the fact that electric elevators are now achieving a marked degree of success, and coming largely into use, is looked upon with great favor by the public. The large illustration on this page shows a high grade electric passenger elevator for fireproof buildings, the only combustible material used in it being the floor of the car. The motor is anchored to a brick foundation in the basement, and takes up but little space. This class of machine is built by the Elektron Manufacturing Company in sizes ranging from 5 horse power to 20 horse power, for speeds ranging from 40 feet per minute to 200 feet per minute and for capacities from 2,000 pounds to 5,000 pounds. In the small illustration is shown a machine for speeds ranging from 10 feet per minute to 100 feet per minute and capacities from 10 pounds to 500 pounds, while still smaller and larger machines are made.

These elevator machines are of the "worm gear" class, by perfecting the design and workmanship of which high efficiency and smooth running have been secured, the efficiency of the passenger gears being proved to be over 75 per cent. The drum, gearing, motor and switch are all mounted on one heavy cast iron bed plate. The gear is of gun metal, with teeth accurately hobbed from the solid, and the worm and worm shaft are made from one steel forging accurately turned in the lathe. Both gear and worm run in an oiltight case or housing, which also contains the bearings. The electric motor is coupled direct to the worm shaft by a heavy insulated coupling, which also serves as a brake wheel. The motors are constructed especially for elevator work, having great starting power, high efficiency and durability. They are heavily insulated from all other parts of the machine, thus obviating all danger of a shock to the operator in the car.

The plant illustrated is what is known as a "six cable job," there being two wire cables from the winding machine to the car; two from the car to the car counterweight and two from the machine to the machine counterweight. By this means it is possible to "overbalance the car," and it is found that the best practice is to overbalance equal to the average load. The sheaves over which the cables run at the head of hoistway are of cast iron, with steel shafts running in babbitted self-oiling bearings. These bearings are supported by heavy steel beams, which are in turn supported on the walls of the building. The guides for the car and counterweight are of planed tee iron, with fish plates at the joints, making a perfectly smooth and straight track for the car. The frame of the car is composed wholly of steel channel beams. The cables and safety devices are all attached to this frame, relieving the car of all strain. The car itself sets upon the two bottom beams of the frame and is strongly braced to the side beams. The car, as will be seen, is of highly ornamental iron work, and is usually provided with electric light chandelier and with electric annunciator connected to call buttons at each landing.

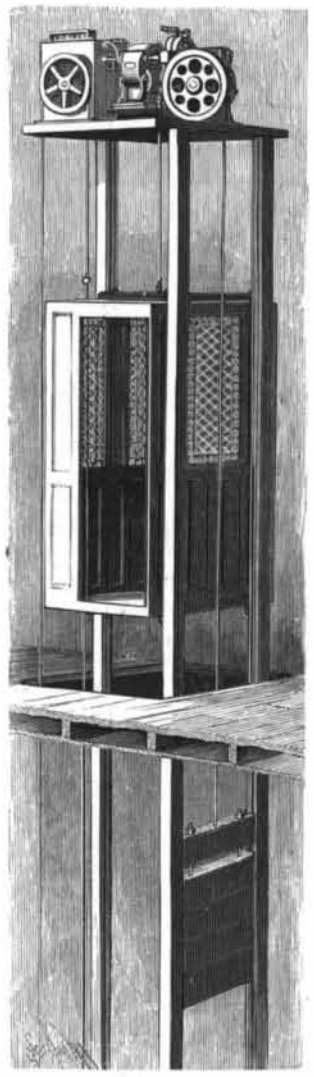
As shown in the illustration, the control of the car is by hand wheel, but where preferred on moderate speed elevators the straight hand rope is used. The starting, stopping and reversing is accomplished with the greatest ease and smoothness. The switch, which is shown mounted on the operating sheave at one end of the drum, is very substantial, and, being mounted on a large radius, moves very rapidly as compared with the movement of the operator's hand; it also breaks contact with a pronounced snap. Troubles with the burning of switch contacts have in this apparatus been entirely avoided. The automatic rheostat is shown attached to the wall back of the machine and insures a smooth start and prevents blowing fuses, no matter how suddenly the operator may throw in the switch.

In the construction of the passenger elevator, the question of safety has justly received the first consideration. What may be styled the "car safeties" are shown in the large illustration, and also in detail at the bottom of car. An endless rope passes over the governor wheel, which is located on the overhead beams, around an idler wheel at the bottom of the hoistway and several times around the safety drum on the car. This rope is, by a spring pressure, caused to move normally with the car. In case of the breakage of the lifting ropes, or in case of excessive speed due to any cause, the centrifugal governor operates a clutch which stops the movement of the rope. As the car continues to descend, the safety drum is caused to revolve, applying a gradually increasing vise grip to the steel guide rails on either side and bringing the car to a gradual stop. The machine also has a complete line of safety devices, as shown in the illustration of the switch and brake mechanism, where may be seen the attachment of the two switch knives directly to the operating sheave. This sheave is loose on the drum shaft and is rotated by the wire rope from the car at the will of the operator. The inner hub of the sheave carries a cam which moves the bell crank lever, raising and lowering the lever of the brake, and the instant the switch knives break contact with the clips the brake is applied.

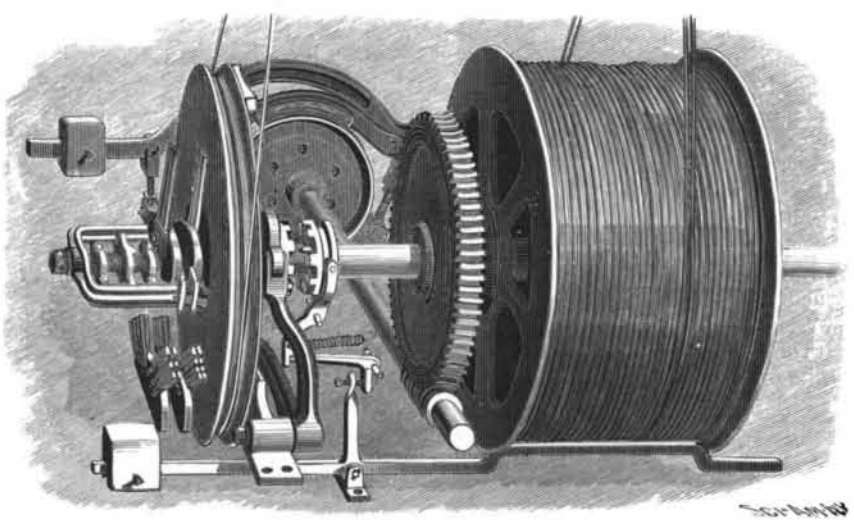
THE AUTOMATIC SAFETY CAR STOP.

One of the most important "safeties" is what is called the slack cable safety, also shown in the same view. A bar is located just below the drum and so close to it that there is barely room for the cables to run between when they are taut. If for any reason the cables should become slack, the bar is tipped downward, tripping a catch and allowing the coil spring to slide forward a clutch on the drum shaft into connection with the operating sheave. A slight additional rotation of drum will carry the sheave sufficiently to open switch and apply brake and stop the machine.

The automatic terminal stop consists of a screw threaded extension of the drum shaft outside of the operating sheave and of a frame or yoke connected with the operating sheave which surrounds the same. On this screw are two stationary nuts and one traveling nut so adjusted that when the car reaches either terminal the nuts will engage, and the operating sheave will be caused to rotate with the drum, when a slight rotation is all that is necessary to open the switch, apply the brake and bring the apparatus to a stop. The elevators are manufactured by the Elektron Manufacturing Company, of Springfield, Mass, with branch offices at New York City, Boston, and Rochester, N. Y. This company were among the first to adapt electricity to elevators, and they make direct elevators for both freight and passenger service, ranging in speed from 10 feet per minute to 300 feet per minute, and in capacities from ten pounds to ten tons.



A PRIVATE RESIDENCE ELEVATOR.



THE BRAKE SWITCH AND AUTOMATIC STOPS ON THE MACHINE.

Science Notes.

Mr. Igi, of the College of Science, says the Japan Weekly Mail, of Yokohama, is assured from data that he collected during a recent tour of investigation in the Sanriku district, that the seismic wave of June was due to a submarine volcanic explosion. He places the center of the disturbance about 200 leagues east off the coast of Yoshihama, Kisen district, corresponding to 39° lat. N., 149° long. E. He thinks that the phenomenon was similar to the Krakatoa disaster, save that instead of the volcano being on land, as in the East Indian catastrophe, in this instance it was far beneath the surface of the sea. He says that the temperature of the sea in the neighborhood has been raised 3° above that prevailing in ordinary years.

The number of students in German universities last summer is reported, says Science, to have been 29,802; in 1895 it was 28,709, so that the numerical increase for the present year is 993, or 3·5 per cent. The distribution of the students among the various universities was as follows: 4,649 in Berlin, 3,777 in Munich, 2,876 in Leipzig, 1,863 in Bonn, 1,425 in Breslau, 1,415 in Halle, 1,379 in Freiburg, 1,339 in Wurzburg, 1,172 in Tübingen, 1,164 in Heidelberg, 1,138 in Erlangen, 1,007 in Göttingen, 965 in Marburg, 948 in Greifswald, 938 in Strassburg, 761 in Jena, 708 in Kiel, 700 in Königsberg, 630 in Giessen, 500 in Rostock, and 420 in Münster. The number of students at Vienna was 2,228, but only 1,370 of these were regular students.

M. Moissan has recently carried on certain new experiments relating to the preparation of the diamond. He says: "A new combustion was made of diamonds prepared in part by means of small cylinders filled with charcoal of sugar, and partly by means of metallic blocks of iron and copper. These two procedures furnished the purest diamonds. They sank in methylene iodide, scratched rubies with ease, and contained no black diamonds. The weight of the diamonds was 5·7 mgrm.; when burnt, they left a trace of ash, the weight of which could not be appreciated with the balance. We collected 20·5 mm. of carbonic acid. Theory requires for 5·7 mgrm. 20·9 mm. This substance responds to the fundamental property of carbon, yielding for 1 grm. of substance 3·666 grm. of carbonic acid."

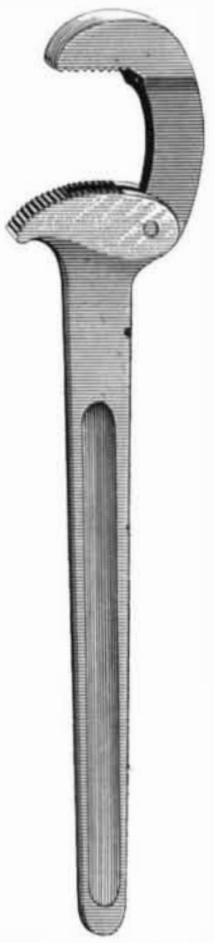
Lieut. De Gerlache, the leader of the projected Belgian Antarctic expedition, says that it will start from Antwerp about July 15 next. The steamer Belgica will carry a three years' supply of provisions, and will probably be absent about two years. During the first year the expedition will go to the east of Graham Land in George IV Sea, and then winter in Australia. The second year they will probably go in the direction of Victoria Land. "We intend," the lieutenant says, "more especially to devote ourselves to geological and zoological research, taking for this purpose specimens from the various sea depths and the submarine deposits. We shall also estimate the sea temperature at different depths, and, in short, make researches similar to those by the Challenger and other Antarctic expeditions."

The ordinary pictures and diagrams of icebergs—even those that occur in standard text books—are impossible and absurd, according to Mr. Goode. He says, in a letter to Science: "When we stop to think that an iceberg is merely a floating piece of ice, free to move in the mobile liquid water, we shall see at a glance that, to be in stable equilibrium, the shortest dimension must be vertical. A berg as large as shown in some of these amusing cuts could not be kept in position by a whole fleet of great ships with grappling hooks and cables. It is true that in some cases the artist has fitted blocks of stone into the ice near the bottom. But this has been done, very probably, to show the ice as an agent in transportation, and not in any case has he put ballast enough there to hold the berg down." The writer gives a list of some standard works that contain these false and misleading pictures.

The republic of Venezuela has granted a concession to the National Association of American Manufacturers, whereby the latter, on behalf of the manufacturers of this country, are authorized to erect in the cities of Caracas, Valencia, Maracaibo, and Ciudad Bolivar, buildings or museums for the permanent exposition of all goods from American manufacturers. The purpose of these expositions is to give the Venezuelans an opportunity of formally inspecting and comparing our goods with those of the old world. Consul Plumacher, United States consul at Maracaibo, says that England, France, and Germany overrun South America with commercial traveling agents, mostly energetic young men, well versed in the Spanish language and customs of South American people, but that a commercial traveler for an American house is seldom seen in the country. The American association very properly argued that permanent expositions are far cheaper than employing traveling agents, and it is expected that the arrangement which has just been consummated will be of great benefit to manufacturers of this country. In order to facilitate these expositions, the Venezuelan government has agreed that all goods from this country for either of said expositions shall be admitted free through the custom houses, the regular duties upon importations to be paid only upon the sale of the goods imported.

AN IMPROVED PIPE WRENCH.

The simple, strong, self-adjustable tool shown in the illustration forms the subject of a design patent recently issued to W. T. Johnston, and manufactured by W. T. Johnston & Company, of No. 32 Cortlandt Street, New York City. It is a strictly high-grade tool, made of the best drop forged steel. There are only three pieces or parts in the tool, all strong and well proportioned, and the facility with which, from the special formation of the jaws, it may be made to engage and firmly grasp any size of pipe within its capacity is apparent at a glance. There are two sizes of teeth in the fixed jaw, the coarser outer and the finer inner teeth of which also aid in enlarging the usefulness of the tool. The wrench is made in various sizes, and size No. 16 takes from one-quarter inch pipe to one and a quarter inch pipe, a wide range of duty for a tool so readily applied.



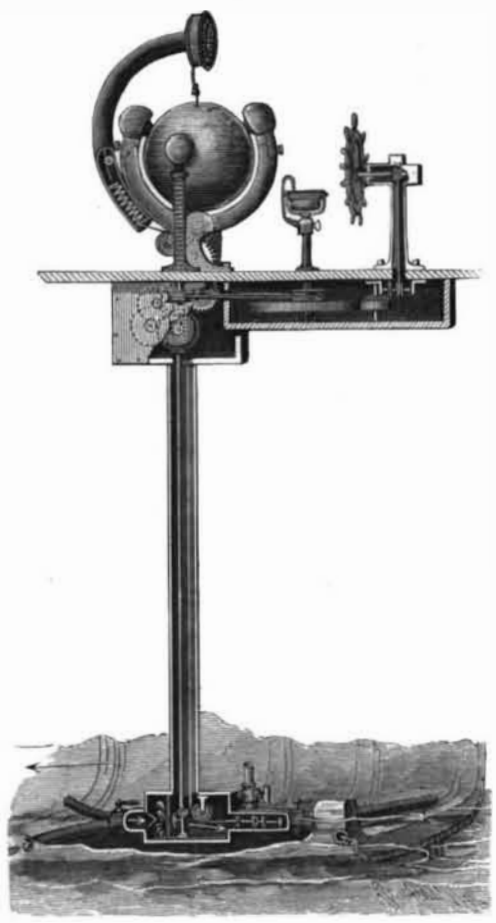
THE JOHNSTON PIPE WRENCH.

Neglected Drugs.

On the analysis of 27,000 prescriptions recently made by Prof. Patch, President of the American Pharmaceutical Association, it was shown that the pharmacopœia was sadly neglected by physicians. Only seventeen vegetable drugs were prescribed, and more than 100 drugs of vegetable origin neglected. Ten metals were honored, but more than ten were left out in the cold. In the study of 217,000 prescriptions from nineteen drug stores distributed in Chicago, Philadelphia, Bayonne, New York, Boston, Washington, Baltimore, Denver, San Francisco, New Orleans, Cincinnati, and St. Louis, 11·25 per cent were proprietary articles, not including many elixirs, pills, tablets, fluid extracts, etc. which were of specified manufacture.

A NOVEL NAUTICAL REGISTERING APPARATUS.

For registering the course of a vessel on a globe or map, and also indicating its course, the apparatus shown herewith has been devised and patented by Pedro Samohod, of Lima, Peru (Nazarenus 145). Tubes with outwardly projecting branches extend toward the bow and stern, at the bottom of the vessel, and in the main rear tube slides a rod carrying a small piston, which does not engage the walls of the tube. The two tubes are connected with a central casing from which a pipe runs upward in the vessel, and a cord attached to the inner end of the rod carrying the piston extends over pulleys and up through this pipe to a connection with the hand of a speed indicator on a dial. The cord passes through and is connected with a spring-held disk in a semicircular sleeve, the spring drawing the piston forward against the action of the water flowing through the apparatus, and the piston and the indicator hand, accordingly, assuming different positions according to the speed of the vessel. Where the main forward or inlet tube enters the casing is journaled a small turbine wheel which, by means of bevel gears, drives a shaft which extends up through the pipe and operates a transmission gear connected to a ball adapted to rotate about a horizontal axis, and which supports a globe, other balls in sockets at the sides holding the globe steady.



SAMOHOD'S NAUTICAL REGISTERING APPARATUS.

By this means the globe is rotated as the vessel advances, and the course is indicated by a pencil or marker attached to the under side of the speed dial, but for other than a straight course the globe must be correspondingly rotated about a vertical axis, which is effected by balls engaging its sides and secured to vertical shafts adapted to be turned through a cord and pulley connection with a hand wheel, a portion of this mechanism being also connected with an adjustable pointer adjacent to the ship's compass. As an attendant turns the hand wheel, so that the pointer will remain in registry with the needle of the compass, the globe is also turned about its vertical axis, and a correct record is thus made of the voyage. To clean the casing and tubes at the bottom of the vessel, end valves in the tubes are closed and the casing is connected to a pump by which its contents are discharged. The position of the globe in relation to the marker is adjusted at the beginning of each voyage, and the record on the globe is always in view.

Speeding a Locomotive.

At sixty miles an hour the resistance of a train is four times as great as it is at thirty miles—that is, the fuel must be four times as great in the one case as it is in the other. But at sixty miles an hour this fuel must be exerted for a given distance in half the time that it is at thirty miles, so that the amount of power exerted and steam generated in a given period of time must be eight times as great at the faster speed. This means, says a contemporary, that the capacity of the boiler, cylinders, and the other parts must be greater with a corresponding addition to the weight of the machine. Obviously, therefore, if the weight per wheel, on account of the limit of weight that the rails will carry, is limited, we soon reach a point when the driving wheels and other parts cannot be further enlarged, and then we reach the maximum of speed. The nice adjustment necessary of the various parts of these immense engines may be indicated by some figures as to the work performed by these parts when the locomotive is working at high speed. Take a passenger engine on any of the big railroads. At sixty miles an hour a driving wheel five and one-half feet in diameter revolves five times every second; now, the reciprocating parts of each cylinder, including one piston rod, crosshead and connecting rod, weighing about 650 pounds, must move back and forth a distance equal to the stroke, usually two feet, every time the wheel revolves, or in a fifth of a second. It starts from a state of rest at the end of each stroke of the piston, and must acquire a velocity of thirty-two feet per second in one-twentieth of a second, and must be brought to a state of rest in the same period of time. A piston eighteen inches in diameter has an area of 254½ square inches. Steam of 150 pounds pressure per square inch would, therefore, exert a force on the piston equal to 38,175 pounds. This force is applied alternately on each side of the piston ten times in a second.—Boston Journal of Commerce.

Recent Archæological News.

Recent excavations made by the trustees of the British Museum in Cyprus give an acquaintance with what was the site of Curium, which was built on the summit of a rocky elevation "some 300 feet above the sea, and was almost inaccessible on three sides." The special feature has been the discovery of a necropolis dating from what is called the Mycenean period. In the Mycenean tombs were found primitive races of the pre-Phenician time. But other and more valuable objects have been discovered, as a sard scarab bearing the name of Khonsu—which would make its date somewhere between the years 660 and 527 B. C.; also, there was a Phenician cylinder, the date of which cannot be earlier than 600 B. C. The choicest object was a steatite scaraboid of masterly execution. Finger rings, earrings, bronze bracelets, plated with gold, a necklace of delicate workmanship, have also come to light. Some of the vases are believed to be of Grecian make.

An explorer recently found in Egypt a bronze bowl and a series of iron tools of forms quite unlike any known in Egypt, and they are thought to belong to an Assyrian armorer about 670 B. C. These tools, comprising three saws made for pulling, not pushing, one rasp, one file, several chisels and ferrules, a scoop-edged drill, two center bits, and others, are of the greatest value in the history of tools, as showing several forms of an earlier date than was thought possible. They are probably of Assyrian origin.