

GIANTS OF THE INSECT WORLD.

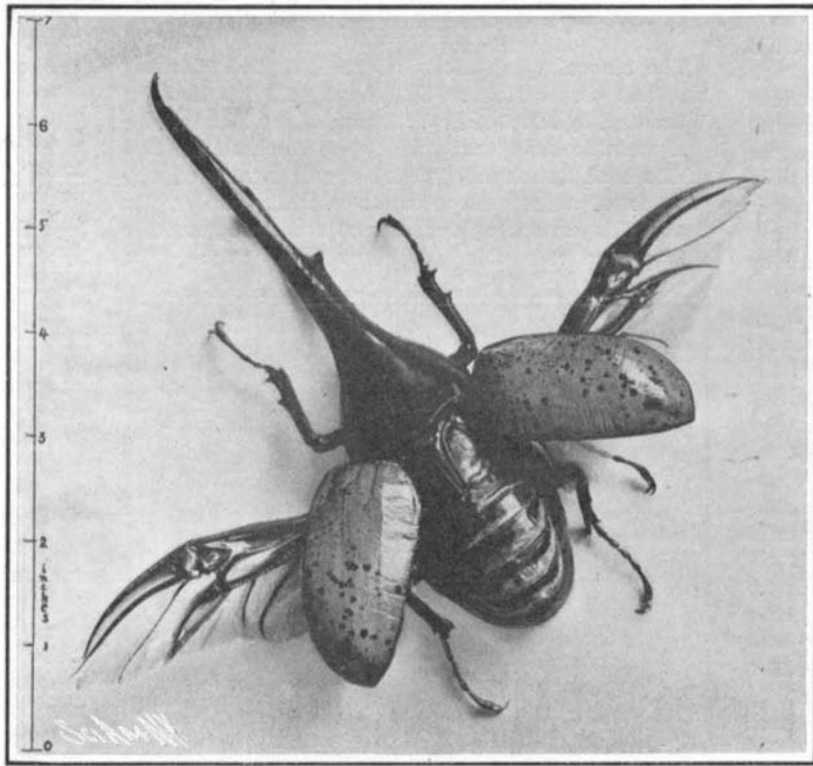
The interesting insects shown in the accompanying illustrations are among the largest known kinds. In fact, the well-known Hercules beetle, shown in the first photograph, is believed to be the greatest existing insect. This is of the *Dynastes*, a genus of lamellicorn beetles of the family *Scarabidae*, or typical of a family *Dynastidae*. It is restricted to forms having the external maxillar lobe with three or four small median teeth, no lateral prothoracic projections and the last tarsal joint arcuate and clubbed. The true type is the *Dynastes Hercules* of the illustration. The length of the specimen is nearly seven inches, of which the curved prothoracic horn is nearly one-half. The spread from tip to tip of the wings is over eight inches. The coloring is a glossy black on the head and jaws, dull green with dark mottlings on the wing-sheaths, and reddish brown on the body. The specimen shown came from the island of Dominica, though it also exists elsewhere in that region.

The third photograph is of a male and female *Megasoma elephas*, of a genus of large eetonian coleopters. They are also of the family *Scarabidae*. They are typical of the sub-family *Megasominae*, having the prosternal process glabrous. This insect is among the largest coleopters known. The male, the larger of the two, is a grayish black, while the female is darker in color. The former is nearly five inches long and two inches broad. The female is smaller, being about three inches in length and an inch and a half broad. They are found in a number of South American countries.

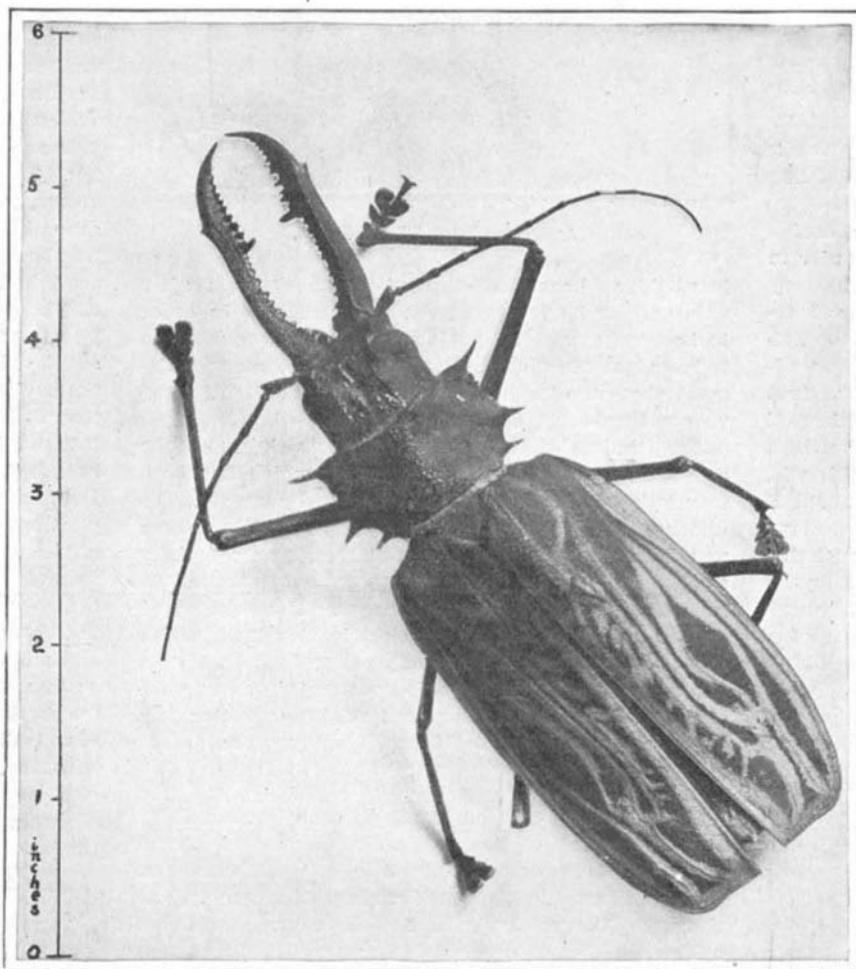
The second insect is a long-horned beetle, the *Macrodonia cervicornis* of the family *Cerambycidae*. Its length, of which the powerful claws form a considerable part, is nearly six inches. Its coloring is a light cream with reddish brown markings on the wing-sheaths, while the color of the head is a velvety brown. The insect is found in South America, this particular specimen coming from Brazil.

Recent Archaeological Discoveries.

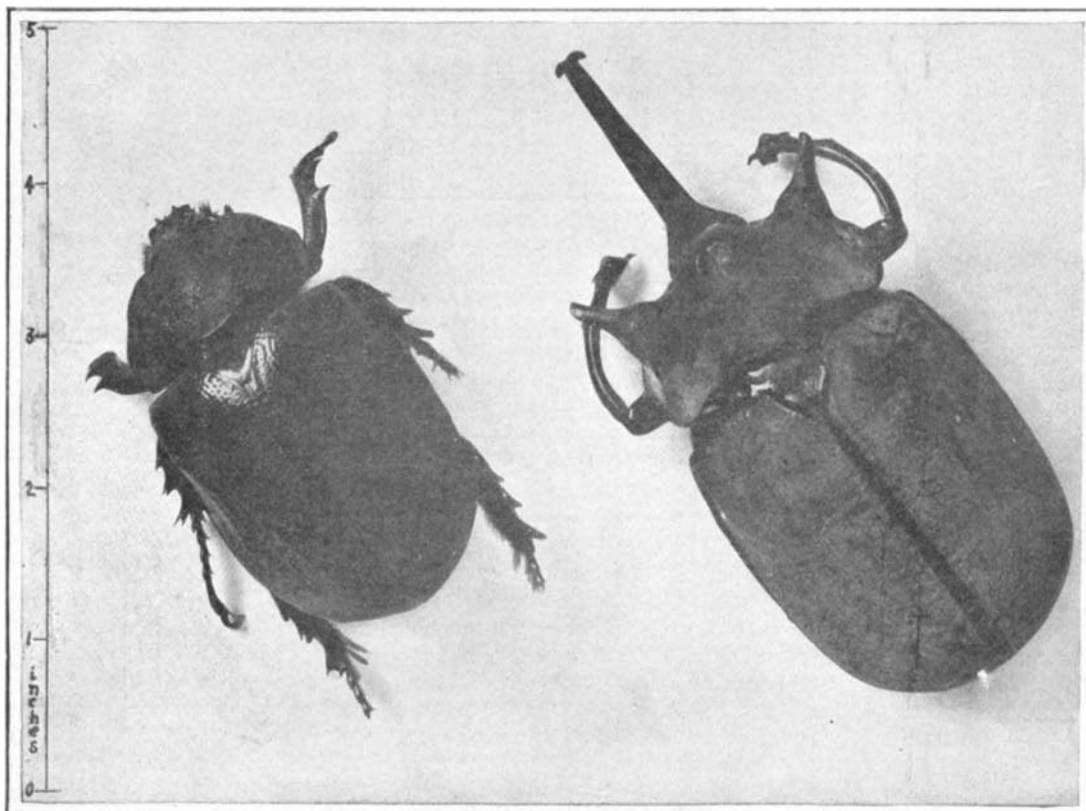
A short time ago a company, entitled the Union Electrique, purchased the right to lower the level of the Lac de Chalain (in the Jura, Switzerland) to the extent of about thirty feet. Hardly had the water been drained off to a depth of nine feet when blackened piles began to appear amid the water-weeds. Closer examination showed that these piles formed the plan of a large village, with streets, houses, etc., all complete. Further research brought to light among other things teeth and bones of animals, vegetable and other residue, barley, nuts, needles, apples, pears, flax, coal, half-burnt hearthstones, pottery, wooden pots, tools, weapons, and numerous articles made of horn, bone, wood, and stone. The more interesting finds have been collected and presented to the museum at Lons le Saunier, where they are kept in glass cases. The objects which have attracted the greatest amount of interest, however, are three primitive boats shaped like canoes. The largest one was made from the trunk of a large chestnut tree, and measures 27 feet long by 2½ feet beam and 2 feet draft. The bow of the boat terminates in a kind of spur, while the stern is very similar to that of the modern boat. An opening is also provided in a suitable part of the little vessel, evidently for the reception of a mast. Among the wooden articles found, the following are most worthy of mention: A kind of double-bottomed plate; three small vases, one having a beautifully fashioned handle; soup ladles with carved handles; a bow of yew, and a splendidly pre-



THE HERCULES BEETLE, PROBABLY THE LARGEST KNOWN INSECT



A GREAT BEETLE FROM BRAZIL, THE MACRODONIA CERVICORNIS.



MALE AND FEMALE MEGASOMA ELEPHAS, GIANT SOUTH AMERICAN INSECTS.

served yoke for a span of oxen. Among other relics which were discovered we may mention a bear's skull, articles of flint, bones of deer, dogs, horses, beavers, oxen, etc., and portions of human skeletons, the racial characteristics of which have so far not been determined.

To come to a more distant part of the globe, we have a still more interesting discovery to report, a most extraordinary piece of mosaic work having been found in the ruins of the old Roman city of Althiburus, situated in the interior of Tunisia. This city was still inhabited in the seventh century, but was then abandoned, due to Arab invasions, and gradually fell into decay. It was here that two French lieutenants (M. Ordioni and M. Oniam) discovered a beautiful bathing compartment in the ruins of what must at one time have been a fine mansion, and signs of some mosaic work were observed. Excavation was at once commenced, and a considerable amount of fine work was brought to light. The discovery was then examined by M. Gauckler, the famous French archaeologist, who has just published a full report regarding the find in the last number of Les Monuments Piot. The mosaic is of a very extraordinary type, representing vessels of all kinds (warships excepted); so far the whole has not been uncovered, but it is believed that the design will be the same in all cases. Each vessel bears its name in Greek and Latin characters, and in some cases an inscription is added from the works of Ennius and Lucilius. In one of the vessels horses are to be seen still marked with their names (Ferox, Icarus, and Cupido); at the side there is written the word "hippago," and a Greek word meaning "horse transport ship"—a type of vessel which was very common in the Attic fleets. Yet another ship is marked "catascopicus," or the "observation ship," and a man is seen standing and shading his eyes and gazing ahead from the prow. Another boat, entitled "cydarum," contains two fishermen who are seen pulling in their nets. The mosaic also shows a cargo boat loaded with jars containing either wine or oil, and a hunting vessel propelled by rows of oarsmen. It is hoped that the French government will be induced to vote a sum of money for purposes of further excavation, and thus enable one of the most remarkable finds of mosaic work ever known to be more fully brought to light.

Substitute for Caoutchouc.

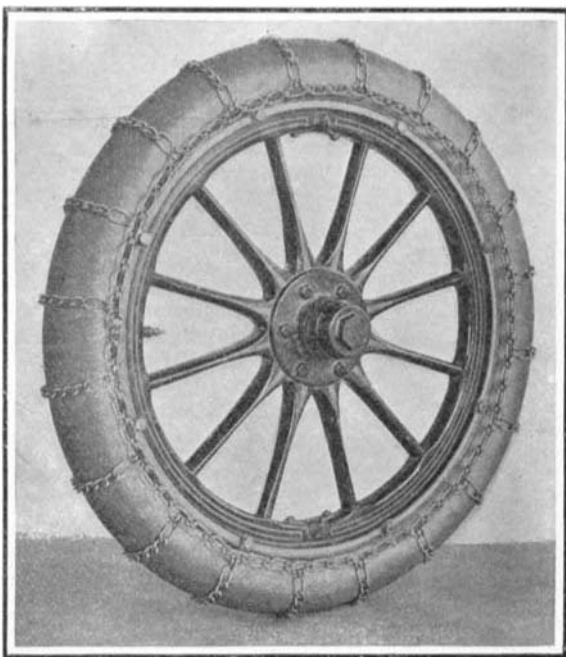
Replying to an article of Witt which appeared in Prometheus, condemning the abuse of substitutes, especially in the caoutchouc industry, in which it is said that the additions of organic and mineral substances are only a method of lowering the price at the expense of the quality, Herr Weber, in the Gummi Zeitung, states that certain additions, as zinc oxide, lime, and magnesia, and sulphides of zinc and of antimony, have a well-determined technical purpose, which it is not possible to supply otherwise. The opinions of Witt on the regeneration of old caoutchouc are inaccurate, both with reference to the product and the method of work. It cannot be applied to restoration of old rubber of good quality, especially to the enormous quantity of old rubber shoes. The regenerated caoutchouc of commerce is considered as an excellent product, permitting of results which cannot be obtained with pure caoutchouc. For the loading, properly so called, Herr Weber considers only the sulphate of baryta and chalk, and will not admit that their employment is an adulteration, since they are added, not to cheapen, but to improve the substance.

Cellulose and Artificial Cotton.

An artificial cotton is now produced in Italy from a cellulose extracted from the fir freed from its bark and knots. The Bulletin of the Chamber of Commerce of Milan describes the apparatus employed. A special machine reduces the fibers to thin pieces of a few millimeters; the wood thus reduced is placed in a large horizontal cylinder capable of containing about 100 cubic meters. The apparatus is of copper lined with lead, and when charged, steam is introduced by means of a pipe at the lower part. This operation continues for ten hours. Then 60 cubic meters of a lye of bisulphate of soda is poured in, and heated under a pressure of three atmospheres for 36 hours. By the boiling the wood becomes white; it is then submitted to a first washing, and grinding by means of a series of strong metallic plates, moved mechanically. After grinding, the matter is submitted to a very free washing, and is bleached with chloride of lime by the electro-chemical method, then pressed between powerful rollers for desiccation. Thus a pure cellulose is obtained, which is reheated in an autoclave containing a mixture of zinc chloride, chlorhydric acid, and nitric acid. A little castor oil, casein, and gelatin are added, in order to give more resistance to the fiber. The pasty mass thus obtained is finally introduced into the receiver, where it is compressed and passed through a drawplate, which reduces it to thread. The thread is passed over gummed canvas, then into a light solution of carbonate of soda, and finally over drying rollers.

A USEFUL CHAIN GRIP FOR AUTOMOBILES.

The photograph reproduced herewith shows a chain device which can be quickly attached to the wheel of an automobile, and which will effectually prevent its slipping or skidding on muddy, greasy, or icy roads, or in deep snow. The chain grip is made up of two circular chains—one on each side of the wheel—connected together by a number of transverse chains which are laid over the tread of the tire. In order to attach one of the grips to a wheel, it is only necessary to lay it carefully upon the tire, and connect together the two ends of each circular chain at the bottom. Suitable protected double hooks giving two adjustments are provided for this purpose. When first put on, the chains should be shortened by cutting off a link or two, if this is found necessary to make them fit tightly. Should they stretch when in use, this will in no wise detract from their effectiveness, nor will it cause them to come off. It is best, however, to have them fit tightly. Even then the transverse chains constantly change their position with respect to the tread of the tire, and so do not tend to wear it in any one place. With these grips there is no danger of a chain breaking and becoming entangled in the driving chains or other parts of a machine. So securely do they hold, that a machine equipped with them was able to ascend a short grass-covered incline of over 45 per cent. They are a necessity for every tourist who wishes to travel with the certainty that he will



WEED DETACHABLE CHAIN GRIP APPLIED TO A PNEUMATIC-TIRED AUTOMOBILE WHEEL.

not be stopped by his wheels slipping around in moist clay, mud, or snow; while for city use they are equally valuable to prevent skidding on greasy asphalt. Their easy attachability makes them all the more useful, as they can be quickly put on when needed and removed when not. The wear on the tires is consequently much less than when non-skidding tires proper are used. The grips are the invention of Mr. H. D. Weed, and are made by the Weed Chain Tire Grip Company, of this city.

A BINOCULAR HEAD LENS.

BY DR. ALFRED GRADENWITZ.

The binocular head lens described in the following has been constructed on the design of Prof. Hess, of Würzburg, by Mr. George V. Schott, of the same city.

A metallic band surrounding the forehead is fixed to the head by means of a thin spring steel band susceptible of adjustment according to the size of the head; this carries a hinged tube containing another thinner and extensible aluminium tube, which is the



A BINOCULAR HEAD LENS.

lens-holder. Lenses of various thickness are readily adjusted for by loosening the upper screw. In order to keep off any side light there has been provided an independent aluminium diaphragm, while a spring located above the lenses serves to receive the lighting device and to keep the same in position.

The freedom of the field of vision is claimed to be an especial advantage of this outfit, which has been especially designed for ophthalmological purposes. The distance of the lenses from the eye is readily altered and the exchangeability of the glasses is an especially good point. As all the parts are made of aluminium, the whole is of an extreme lightness. The object fixed by the eye is lighted by an electric glow-lamp which can be removed at a moment's notice by means of a simple handle. This lamp is constructed for any desired tension and both for accumulator operation and for direct connection to 110 or 220 volt mains.

Discovery of Nova Aquilæ No. 2.

Miss Fleming, who has made a name for herself by her discoveries of new stars, has located a second nova in the constellation Aquila. It was first found August 31 by Miss Fleming, assistant in the Harvard Observatory, who has discovered eight out of the last eleven found in ten years. She was studying the regular list of photographs, including the whole sky and taken every night, when she found a new spectrum. Photographs of August 10 did not show it, but those of August 18 did. At that time it had a magnitude of 6.5, only a little below the light which can be seen with the naked eye. Since then the section of the sky has been followed every night, and it is found that the light is diminishing steadily. This is proof that the star is a new one. It is now of the 11.5 magnitude.

Another Electric High-speed Railway.

The construction of an electrical high-speed railway between Cassel-Cologne is suggested by Mr. Fränkel, a Breslau engineer, with a view to testing on a large scale the possibilities of electrical long-distance railways.

This line, which would shorten the way from Cologne to Berlin by 40 kilometers, would assume a high strategical importance, while serving on the other hand to relieve other lines of part of the passenger traffic.

Assuming a maximum speed of 160 kilometers (99.4 miles) per hour, corresponding with a commercial speed of about 125 kilometers (77.6 miles) per hour, the electrified line, Cologne-Cassel (180 kilometers, or 111.8 miles), would be covered in one hour and twenty-seven minutes, while five hours are required to cover the present line of 275 kilometers (170.8 miles) passing through Elberfeld. These short and light trains would have to be carried on to Berlin by locomotives, with a maximum speed of 100 kilometers (62.1 miles) per hour when the distance from Cassel-Berlin would be covered in four hours and thirty-eight minutes and

the total distance, Cologne-Berlin, in about six hours, as against nine hours, which is at present the duration of the journey.

Von Behring and Tuberculosis.

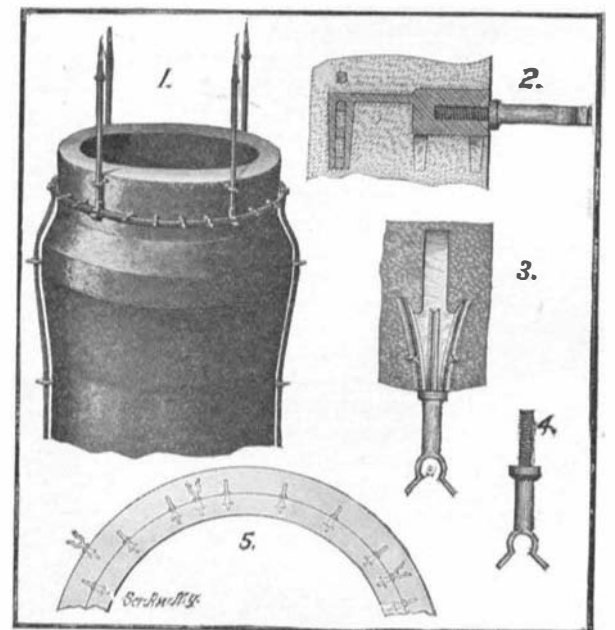
At the closing session of the International Tuberculosis Congress on October 7 Prof. Von Behring made a statement relative to his new curative principle for tuberculosis, which attracted much attention. The professor said:

"In the course of the last two years I recognized with certainty the existence of a curative principle completely different from the anti-toxic principle. This new curative principle plays an essential rôle in the operation of the immunity derived from my bovovaccine, which has proved effective against animal tuberculosis during the last four years. This curative principle reposes upon the impregnation of the living cells of the organism with a substance originating from tuberculous virus, which substance I designate T. C."

Prof. Behring then gave a long technical description of how "T. C." was introduced into the cellular organism, and said it had already given marked results in the treatment of animals. The professor expressed the belief that his researches would show similar curative results in humans. He added that he was unable to say how soon positive results would be shown, but he felt as certain of these results as when he announced his discovery of a new method for treating diphtheria.

ANCHOR AND FASTENER FOR LIGHTNING CONDUCTORS.

Anchor fastening devices for lightning rods have been designed for use on walls built of brick, stone, or concrete blocks, but for structures built of concrete molded at the place into a solid wall, no such provision has heretofore been made, and it has been necessary to drill or break an opening into the wall in order to provide an anchorage for the lightning conductor fastening. This process, aside from the extra labor it involves, not only weakens the wall, but also spoils its general appearance. In the accompanying engraving we show an improved anchor, which is designed to be set into the wall while it is being molded and which will support the fasteners for the lightning conductors. The improved anchor is illustrated clearly in Figs. 2 and 3, which are respectively a side and plan view of the device. In these views the fastener is also shown, threaded into the anchorage. A detail view of the fastener is illustrated in Fig. 4. The anchor, it will be noted, is formed with a number of ribs and projections which will afford intimate contact with the plastic material. Several feet project from the bottom of the anchor, and on these it can rest while the concrete is being poured into the mold around it. At the rear there is an extension, provided with downwardly-projecting flanges which may be brought into contact with the steel reinforcing of the structure, so as to assist the lightning rod by dissipating the electricity through the metallic framework of the building. Fig. 1 shows a side elevation of a chimney provided with the improved anchor and fastener, and a partial plan view of the same is indicated at Fig. 5. A series of anchors are set in a row about the chimney, and the fasteners which are screwed into them support a



ANCHOR AND FASTENER FOR LIGHTNING CONDUCTORS.

wire cable ring which encircles the chimney. At intervals on this cable, the lightning rods are secured and supported by fasteners screwed into anchors at the top of the chimney. Fastened to opposite sides of the cable ring are the conductors which lead to the ground. These conductors are also supported at intervals by the improved fasteners. A patent on this improved anchor and fastening has recently been granted to Mr. Carl Bajohr, 4051 Keokuk Street, St. Louis, Missouri.