

TWO INTERESTING USES OF INSECTS BY NATIVES IN NATAL.

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An entertaining volume could be written on the uses of insects by savage races. The writer has published some account of the uses of insects as food, in previous numbers of this journal, and the use of the wing-covers of certain large Buprestid beetles to decorate articles of clothing with South American Indians, the use of the structures made by termites as tinder in South Africa and other parts of the world, and many other uses, all well known to anthropologists.

The writer recently received from Mr. Claude Fuller, the Government Entomologist of Natal, two interesting anklets formed of the cocoons of a large Bombycid moth, somewhat resembling the Luna moth of this country and which bears the scientific name of *Argema mimosae* of Boisduval, known to the English residents as the Queen moth. The natives collect the cocoons after the moth has issued, put one or more small stones into each cocoon and sew them onto a broad strip of monkey skin, side by side, so as to cover the surface of the skin. They are sewn to the raw side of the hide, the fur being on the opposite side. The anklets received are 10 inches long by 4 inches wide and are attached to the strips by means of thongs of the same hide. The cocoons are tough and dry, and the stones within them rattle in a most delightful way. We give rattles to our children to amuse them, and the savage man has the same infantile characteristic in that he is amused by rattles. The use of these ankle rattles has become quite general in Natal since the introduction of the ricksha from China and India. The ricksha bearers wear the anklets very generally, and their rattle on the streets is almost as familiar as sleigh-bells in a New England town in winter.

This invention is not confined to southeast Africa. Dr. Walter Hough, of the United States National Museum, has shown me rattling anklets from Mexico which are made in a somewhat similar way, of the cocoons of another large Bombycid moth. In this case, very many cocoons are strung together on a string and several rows are tied around the ankle. Each cocoon has been opened for the purpose of inserting the stones. Dr. Hough also tells me of a much larger cocoon from India, which is mounted singly at the end of a stick to be carried in the hand. This cocoon also is made into a rattle.

The other use of the insect, or rather of the insect's product, is the rather well known one of the manufacture of the head-rings of the Zulus and Kaffirs. It is shown in the accompanying excellent picture, reproduced from a photograph for which the writer is also indebted to Mr. Fuller. This head-ring was early noticed by African explorers, and it was said to have been made of sinews surrounded with wax, massed on with the help of oil. The head is shaven, and some of the hair is worked up into the ring to hold it. As the hair grows, the ring is pushed up and must occasionally be reformed to some extent. This wax is said by Mr. Fuller to be the secretion of a scale insect of the genus *Ceroplastes*. I believe this fact has been recorded before, but I am unable to find the reference. These scale insects are extensive wax producers. The old Chinese white wax of commerce, for example, is secreted by *Ceroplastes ceriferus*. The exact species of *Ceroplastes* from which the Zulus get their wax is, I believe, not known. Prof. T. D. A. Cockerell, however, in *The Entomologist* for May, 1899, describes a new wax scale from West Africa as *Ceroplastes egbarum*, stating that this is a fine wax-producing species, equal in this respect to the *Ceroplastes ceriferus*, which produces the Indian white wax. It occurs upon the mimosa, near Abeokuta, the great city of Egbas, and was collected by Dr. H. Strachan.

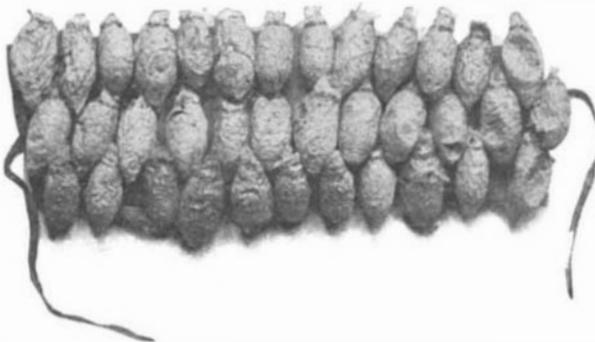
The Viagraph, an Instrument Devised for Measuring the Surfaces of Roads.

A few weeks ago we described in the *SCIENTIFIC AMERICAN* the "orograph," a device which measures and records the surface conditions of the road over which it travels. At the annual meeting of the British Association for the Advancement of Science recently held at Bradford, Mr. J. Brown, of Belfast (Ireland), gave a description of the "viagraph," an instrument designed for fulfilling the same purposes as the orograph. But though both apparatus perform the same work, their construction and principles of working are widely divergent. The viagraph consists essentially of a straight edge which is drawn over the road surface. To this straight edge a lever is attached working on a pivot, while on its free end it carries a serrated road wheel. As the straight edge is drawn along the road, it maintains a fairly even line, and the road wheel rises and falls over the slightest unevennesses of the surface of the road. These varying risings and fallings of the road wheel are recorded by means of a pencil, which

works contemporaneously by means of a link and lever attachment, upon a roll of paper passing over a small drum. This drum is rotated by a worm and wheel fixed beneath it, and connected by means of a shaft and bevel gear with the road wheel, so that as the latter revolves it also serves to turn the drum. As the paper unwinds from the drum it passes under the pencil and is wound up on another drum. The pencil record upon the paper, which is somewhat similar to those made by the pencils of the barograph, is to full scale vertically and 1/8 to 1 foot longitudinally. Another



ZULU WITH WAX HEAD-RING



COCOON ANKLETS FROM NATAL.



USE OF COCOON ANKLETS BY RICKSHA BOYS IN NATAL.

pencil also draws upon this paper record, simultaneously with the profile pencil, another straight line which the indicating pencil would have drawn had the road over which the apparatus is at that moment traveling been perfectly level. By this means it is possible to obtain the exact characters and measurements of the unevennesses in the road's surface.

If the depths of all these unevennesses as recorded upon the diagram are totaled, the result is the numerical index of unevenness, and this is indicated upon a decimal counter. This latter instrument is actuated in the following manner: A cord is fastened to the free end of the lever attached to the straight edge, and is passed once round a double-grooved pulley and connected to a stretched rubber band. When the road wheel falls into a rut, the lever is depressed, causing

the cord to rotate the pulley, the rubber band being stretched to permit the necessary movement to the cord. Directly the road wheel issues from the rut, the cord slips back into its former position on the pulley, the rubber band in contracting taking up the slack. The pulley is also braked by a rubber-tightened cord which is secured to a rigid part of the frame and passes round a separate groove on the pulley. By this means it will be recognized that the pulley only revolves at intervals in one direction—every time the road wheel drops—to an amount equal to the depths of all the unevennesses the machine has passed added together, and this sum indicated in inches on the decimal counter is the index of unevenness. If the road is a tolerably good one this machine will only record an unevenness corresponding to about 12 feet in the mile, while upon a bad road it will indicate an unevenness of 100 feet or more in the same distance.

A Recent Theory of Electricity.

An important development of the electron theory has been carried out by Robert Lang in his article on atomic magnetism in the *Annalen der Physik* (No. 7). It may now be said that the phenomena of magnetism have at last been successfully reduced to those of electricity. We know from the work of Thomson and of Drude that an electric current in a wire consists of a stream of very small particles called electrons. These electrons are formed by the splitting up of the metallic atoms into a larger positive and a smaller negative portion. The positive electrons, under the influence of an electromotive force, travel in one direction along the wire, with a velocity of one centimeter per second. The negative electrons travel in the opposite direction with the same charge, but with a smaller velocity. The masses are in the ratio of about 9 to 1. Now, according to Lang, the negative electrons revolve around the heavier positive electrons in a magnetized metal, like a planet around the sun, and the electric convection-currents thus produced are nothing more nor less than Ampère's "elementary molecular currents." Lang calculates the speed of the electrons and the diameter of their orbits. The speed is that of light, and the figures obtained lead to conclusions in close agreement with known facts.—*Nature*.

Annual Production of Rubber.

It has been estimated that the approximate total production of rubber annually is 57,500 tons. Of this amount, 21,000 tons are taken by the United States and Canada; 21,000 by the United Kingdom; and 15,500 by the rest of Europe. The Amazon district produces 25,000 tons, and East and West Africa 24,000 tons; parts of South America other than the Amazon district, 3,500 tons.

The Current Supplement.

The current SUPPLEMENT, No. 1295, has, among other articles, "Recent Street Railway Extension in Glasgow," by J. A. Stewart, and shows an excellent example of the good work which is being done in Great Britain toward furthering rapid transit. Prof. Chandler's exhaustive paper, "Chemical and Technical Education in the United States," is continued. "The First Two Trial Trips of Von Zeppelin's Airship" is illustrated from actual photographs showing the ship in its housing and its ascent. "Special Report on the Galveston Hurricane of September 8, 1900," is by Isaac M. Cline, Local Forecast Official and Section Director. "The Transportation Exhibit of the Paris Exposition" is accompanied by a number of illustrations showing parts of the centennial exhibit. "Curiosities in Clockwork" are also described. "The Age of the Earth," by Prof. W. J. Sollas, is continued. "French Cultivation with Chemical Manures" is an important technical article. "Morals and Manners of Japanese as Viewed by a Native" is an abridgment of an address delivered by Dr. Inazo Nitobe, of Sapporo, in Philadelphia and specially reported for the *SCIENTIFIC AMERICAN*

SUPPLEMENT.

Contents.	
(Illustrated articles are marked with an asterisk.)	
Airship, Von Zeppelin's.....	258
Alternating machines, extend- ing applications of.....	266
Armor-plate makers.....	258
Automobiles, determining speed of.....	262
Automobiles, fire*.....	264
Books, new.....	267
Buddha, tomb of.....	260
Chinese, unscientific.....	261
Clothes washing machine*.....	260
Copper sheathing, galvanic ac- tion of.....	266
Cup contest.....	258
Electrical notes.....	263
Electricity, theory of.....	267
Engineering notes*.....	261
Galveston hurricane, local fore- caster on.....	258
Gas generating plant*.....	261
Indigo.....	259
Insects, use of, in Natal*.....	267
Inventions, index of.....	268
Inventions recently patented....	267
Japan, statistics of.....	266
Kinga viaduct, reconstruction of.....	257
"La Lorraine".....	258
Mail service, office building.....	265
Naval maneuvers, report on.....	259
Osmium compounds.....	262
Paris, old*.....	260
Progress of invention in the nineteenth century.....	259
Rail breaker*.....	265
Railroads in Italy.....	260
Rubber, production of.....	267
School gardens of Europe.....	259
Science notes.....	263
Sheathing, wood.....	266
Sneeze wood.....	262
Street cars, exportation of.....	265
Supplement, current.....	267
Torpedoes, interesting experi- ments with.....	264
Viagraph.....	267