

furnace operators may calculate the quality, economy, and rate of production of pig iron from the properties of the coke used. For these calculations pre-

liminary data, defined in the paper, must be collected on each specific blast furnace operation.

Science News Letter, March 1, 1941

ANTHROPOLOGY

Wool Measuring Device Now Used To Study Human Hair

Cross Sectioning Shows Differences Between Races; Negro's Most Elliptical, Dutch Smallest and Light

A GOVERNMENT scientist's device for measuring sheep's wool has given anthropologists a new idea for measuring tiny breadth of human hairs with such speed that in ten minutes they can gain facts about hair size that used to require two days' tedious work.

Speeding study of racial traits with the new technique, Dr. Morris Steggerda and Mrs. Ruth Eckhardt of the Carnegie Institution of Washington have already set tentative standards of hair sizes for races, they have reported.

Even varied sizes of hair on an individual's head can be charted to show his own limits of hair size in microns, or thousandths of a millimeter. Hair size variation in individuals and races is found to be very great.

First studies, made with hair of America's Mayan and Navajo Indians, Negroes, and Dutch, because adequate hair samples were available, have just been announced.

"It is evident," says Dr. Steggerda, "that the Maya have the largest hair in cross-section, and the Dutch the smallest, with the Navajo and the Negro approaching the Maya very closely."

For the first time, explains the anthropologist, it is possible to analyze also the hair shapes of different races statistically. Negro hair is the most elliptical in shape he has studied. Mayan hair is roundest.

The method adopted for investigating differences in hair was originated for wool research by Dr. J. I. Hardy of the U. S. Department of Agriculture.

Hairs are prepared for testing by washing in carbon tetrachloride and drying, and are made into tiny samples by inserting them in packs of 150 to 200 in a slot in metal, in which the hair tips can be coated with thin solution of celluloid. Once hardened, the tiny hair specimens are cut off with a razor blade, ready to be measured by aid of a microscope.

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GEOLOGY

Walls of Salt May Serve As Shelter for Detroit

PILLARS of salt may serve to protect the entire population of Detroit from aerial attack in case of war. Officials have recently been studying the great man-made caves of old salt mines under the far southwestern part of the city.

Eleven hundred feet deep, these caves were left where millions of tons of salt have been removed. Great salt pillars, left by the miners, support the ceilings. The caves cover 160 acres, of which about 112 are available floor space. With more than 25 miles of passageways 22 feet high and 50 feet wide, there is believed to be enough room to accommodate, if needed, all the 1,618,549 people which the 1940 census showed to be Detroit's population.

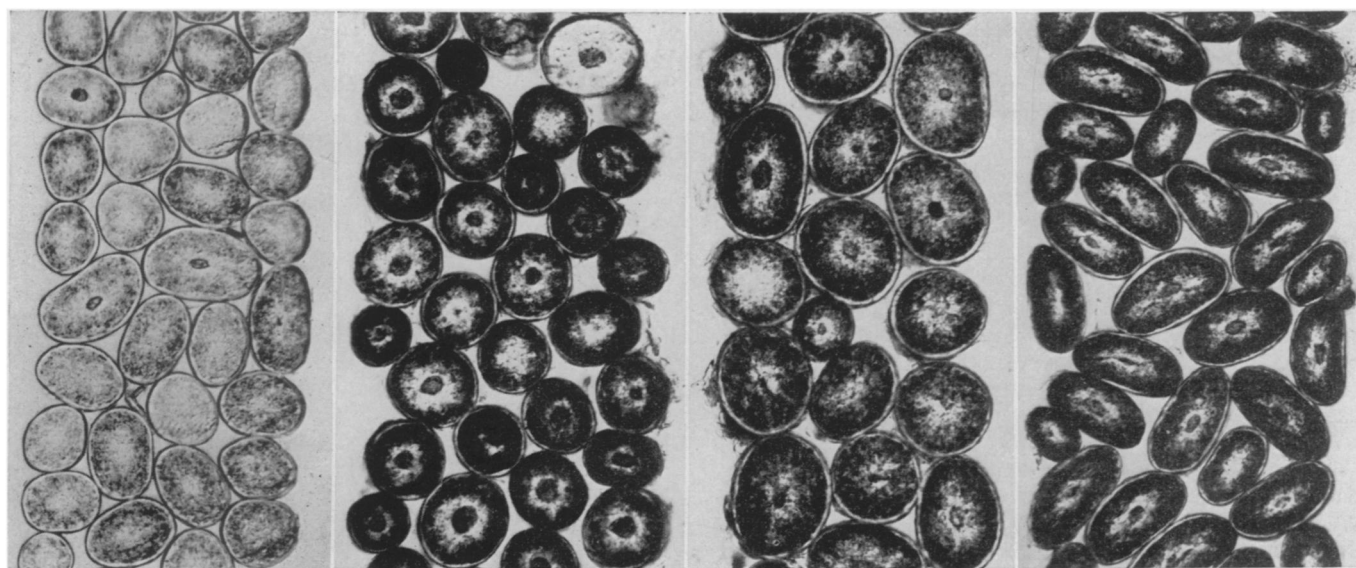
The mine is dry and healthful. It is completely air-conditioned by pumps which force fresh air from the surface. The temperature is constant at 58 degrees. So deep is it that those seeking air raid shelter there could not hear an intense bombing raid going on overhead. The heaviest bombs penetrate no more than 50 feet in ordinary soil.

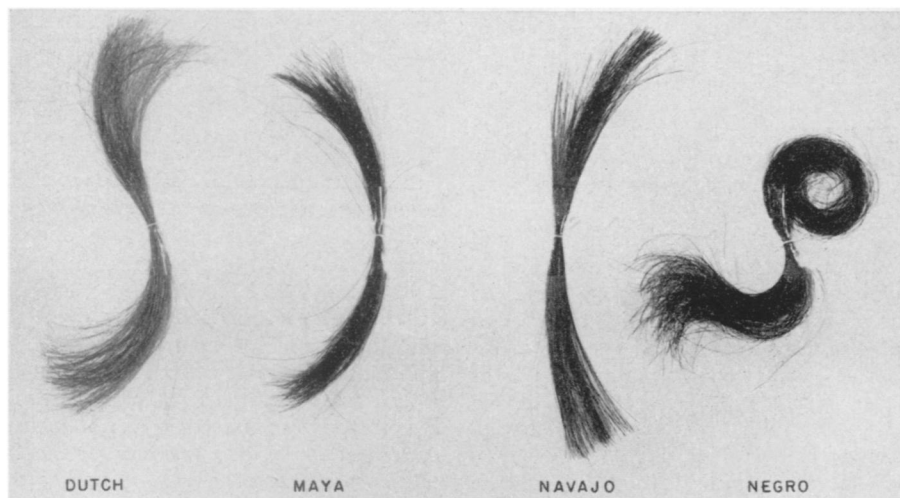
In addition to serving as a shelter, Army officials say the mines might be used for essential industries, as a hospital, or as an ammunition dump.

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HAIR ON END

Hair samples prepared by a method which quickly sets them in order for measuring. Shown here are magnified cross-sections of (left to right) Dutch, Maya, Navajo and Negro hair.





HAIR FOR MEASURING

Samples of European, Indian, and Negro hair ready to be prepared for the difficult task of quickly measuring breadth of single hairs. That hair of races differs in thickness, or breadth, has long been known, but difficulty of measuring breadth of enough single strands to obtain information of statistical importance has been so great that the subject has remained relatively obscure.

ARCHAEOLOGY

Enthusiastic Over Find Of Lost Incan Cities

Director of Peru's National Museum Declares Discovery Will Increase Understanding of Prehistoric Life

ENTHUSIASTICALLY hailing the importance of two lost Incan cities discovered 12,000 feet high among clouds in the Peruvian Andes, Dr. Luis E. Valcárcel, director of Peru's National Museum and authority on Incan archaeology, now visiting the United States, declares that the ruins greatly increase modern understanding of the prehistoric Incan Empire's mastery of life in high altitudes. He predicts more discoveries in this overgrown area.

The two cities discovered by Dr. Paul Fejos, leader of an expedition sponsored by Axel Wenner-Gren, reveal that a large population of the Incan Empire's Indians occupied a network of cities served by road systems and fed from irrigated farms in a forbidding region now looked upon as rank wilderness. So Dr. Valcárcel pointed out in exclusive comment to Science Service. The noted Peruvian archaeologist is conferring with Yale University scientists on problems of clarifying America's ancient past. Dr. Wendell Bennett, Yale archaeologist who is noted for discoveries in Peru, expressed

agreement with Dr. Valcárcel that the ruins add much to knowledge of Incan architecture.

Both of the new-found cities resemble the Incan city of Machu Picchu, discovered by a Yale University expedition led by Dr. Hiram Bingham in 1911, that Dr. Valcárcel concludes that the three cities were beyond doubt contemporary.

Machu Picchu has been thought of as a lonely and isolated retreat built in the dawn of the bold Incan adventure of conquering several million other Indians, and again occupied by women, fleeing the Spaniards in the last days of the Incan Empire. Now, Machu Picchu is blended into a more social picture. Dr. Valcárcel finds its plan, windows, wall niches, stone masonry and pottery goods all similar in type to those of the new-found cities. And among the many stone-paved roads leading out from the new-found cities one road runs to Machu Picchu. In fact, Dr. Bingham's map of the jungle and rock wilderness around Machu Picchu may show this same road, now traced at its farther end.

Excavations and photographs at the new cities contribute greatly to knowledge of the Incan road systems for runners and messengers, says Dr. Valcárcel. Already, the Incas are famous for their prehistoric efficiency in building smooth roads and organizing relay runners to carry messages and goods with impressive speed and service. Now, it appears that Incan efficiency functioned at high altitudes, despite mountain grades and breathing problems. That roads about ten feet wide, extending from the ruined cities are cut in some sections through bed rock impresses Dr. Valcárcel. Stone forts are planted at intervals along the way.

Also impressive to his expert eye are the many stone faced agricultural terraces and irrigation canals, which he pronounces "astonishing at that altitude."

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PHYSICS

Electrons in Glass Houses Get Privacy by Alloy

ELECTRONS that live and work in "glass houses," radio tubes, X-ray tubes and all the other such electronic devices used in science and industry, will have new privacy from invading air molecules with a new alloy.

Consisting of a mixture of iron, nickel, cobalt and manganese, it was devised by Howard Scott, Westinghouse research engineer, who has just been granted a U. S. Patent for his invention. It is known as "kovar."

Several of the tubes sealed by Mr. Scott more than seven years ago, during the early development work on kovar, were opened recently and found to be as free from air contamination as when they were sealed, investigators said.

"Glass and metals expand when heated and shrink when cooled," Mr. Scott explained. "But each kind of glass and each different metal expands at its own particular pace. This rate is called the coefficient of expansion."

"In kovar we found just the right combination of many metals to make an alloy with the same coefficient of expansion as the type of glass we were using. Therefore, when these two substances are fused together under heat and allowed to cool, there is no strain between metal and glass surfaces."

The alloy can also be readily machined and rolled to form parts of various shapes, it was said.

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