SCIENCE NEWS

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THE TRANSMUTATION OF GOLD

GOLD from mercury—was it really made by Professor A. Miethe in his electric tube?

This question, which has been agitating the scientific world for the past two years, was discussed at the recent meeting in Berlin of the German Chemical Society.

The opponents of the claims of Professor A. Miethe and Dr. Hantaro Nagaoka, who independently worked out the process by which they claim to have produced gold from a baser metal, massed an attack against the German and Japanese scientists, and were met by the stout defense of their supporters.

Professor E. Riensenfeld, of the University of Berlin, believes that distillation of mercury to absolute purity was impossible and that there would always be traces of gold present to vitiate the results of the experiment. Professor E. Tiede, also of Berlin, presented a flat counter-claim, stating that he had obtained pure mercury, gold-free, without difficulty; but he added that when he repeated Professor Miethe's experiment the results were wholly negative.

Professor Fritz Haber, famous for his contribution to the solution of the fixed-nitrogen problem, outlined the extreme difficulty of obtaining absolutely pure mercury, and of keeping it pure throughout the long course of an experiment. The presence of gold even at a distance, as in the operator's spectacle-frames or in metal compounds in an adjoining room, might spoil the experiment through being drawn in ultramicroscopic quantities into the electric current, by an effect like that of the cathode rays.

Professor E. Duhme stated that mercury always contains traces of gold, but that these may not be capable of detection, except after considerable ageing of the mercury by standing, or even by being subjected to an electric current.

Professor Miethe in an interview with a representative of *Science Service* stated he sees no present reason for changing his views. The process really active in changing mercury into gold, he said, is still unknown, and consequently success in a repetition of his experiments is possible only by chance. He intends to publish his work in full at an early date, and in the meantime he will exchange his apparatus with other experimenters, to eliminate possible sources of errors due to differences in construction.

Professor Miethe stated that in forty-two experiments the output of gold was constantly proportional to the amperage of the current and to the time of the process. When repeated with all conditions identical, but without turning on the current, the result was negative.

The purification of mercury for the experiment is a very difficult distillation, probably involving a complicated atomic process not yet well understood. Much further research on this detail alone is needed, according to Professor Miethe. He stressed also the dangers involved by the extremely poisonous nature of the mercury vapors.

THE MEASUREMENT OF LONGITUDE

A FREELY swinging pendulum, not connected with any clockwork, will probably be used as a timepiece to measure longitude next fall when the United States cooperates in a world-girdling longitude survey, according to Edwin J. Brown, of the U. S. Coast and Geodetic Survey, who spoke before the recent meeting at Washington of the American Geophysical Union. The ordinary chronometer, used in most such observations, is not accurate enough for this purpose, and Major William Bowie, of the survey, suggested the use of the pendulum, which is ordinarily used in determinations of the intensity of gravity.

The determination of a difference in longitude is the measure of the difference in time between two points, the longitude of one of the points being known. The modern method of making the determination is to find the time at the unknown point by star observations and compare it with a time signal sent by radio from the point of known longitude.

The accuracy obtained is dependent upon the quality of the timepiece used to carry the time from the epoch of the star observations to the time of reception of the radio signals. An ordinary ship's chronometer is fairly satisfactory if the time signals can be received during the star observations, but if it becomes necessary to carry time for several hours, as will be the case on the world longitude work, a more accurate timepiece is needed.

The period of oscillation of the gravity pendulum can be determined to the nearest millionth of a second and in carrying time over a three-hour period the error due to the pendulum would be of the order of 0.002 or 0.003 seconds. A chronometer may show an error of 0.05 seconds or more over a three-hour period.

How the same sort of pendulum is used in making gravity determinations at sea was described by C. H. Swick, also of the Coast and Geodetic Survey. The ordinary type of pendulum can not be used on a boat, because of the rolling and pitching, but in 1923 the Dutch Geodetic Commission, with the cooperation of the Dutch Navy, tried the experiment of swinging pendulums on a submerged submarine and recording the oscillations photographically. The submarine was found to have an appreciable roll and pitch, even when submerged 75 feet below the surface, but the effect was eliminated from the results by swinging four pendulums at the same time and combining the records of the individual pendulums.

The method was devised by Dr. F. A. Vening Meinesz, engineer to the Dutch Geodetic Commission.

ACTION CURRENT FROM A SINGLE-NERVE FIBER

THE electric current that shoots along a nerve fiber has been detected by means of radio apparatus, according to Dr. E. D. Adrian, of Cambridge University, who described before a meeting of the Physiological Society

his method of using a three-tube instrument to make his delicate measurements.

It had long been known, he said, that the passing of messages down a nerve caused an electrical disturbance. But it had only been possible to record the effects from a large number of fibers at once, for example, the thousands of fibers from an eye, or to a muscle. The results obtained were therefore as confused as would be the superimposed records from all the telegraph wires between London and Manchester. Dr. Adrian's new apparatus makes it possible for the first time to obtain records in a rapidly moving photographic plate of the impulses passing along a single fiber.

In conjunction with Dr. Zottermann, a Norwegian neurologist, Dr. Adrian recorded the results of stimulating a sense organ connected to the brain by a single fiber. The sense organs in the skin which give information as to touch, pain and temperature, are too near together for this to be easy. Those in the muscles subserving the so-called muscular sense are farther apart, and by stretching a frog's muscle, it was found possible to stimulate a single one. The impulses were all of the same size, but as the muscle was stretched, their frequency was increased from ten to fifty per second. Differences of intensity are in fact transmitted through the nerves as differences of rhythm.

This is the first occasion on which the message passing along a nerve has been decoded, and the experiment opens up a new field of neurology, in the opinion of physiologists. Within the next few years it should be possible to read the main types of messages entering and leaving the nervous system, and the time has been brought measurably nearer when it will be possible to record the actual events in the brain which are the physical correlate of consciousness.

GLAND TRANSPLANTATION

Two physicians of Florence have performed an operation which bolsters up the failing hope that gland grafting had put a new weapon in the hands of the medical profession for subduing hitherto unconquerable disease.

Drs. Cesare Frugoni and Vittorio Scimone have announced, through the *Presse Medicale,* the results of treating a case of tetany, a chronic disease resembling lockjaw, with a graft of human parathyroid, one of the small glands placed around the better known thyroid in the neck. The technique followed was that of Dr. Serge Voronoff, one of the original experimenters in transferring glands from apes to humans.

The results were almost instantaneous, according to the authors. The patient, released from the terrific pain suffered during six or seven long attacks every day, picked up amazingly. Tests made some time later still showed a slight parathyroid deficiency, but the ingrafted piece was still firmly attached under the skin five months after the operation.

The question of greatest concern to physicians with respect to the case is how long the gland will persist, for the laws that govern a graft's chance of survival comprise one of the subjects on which the medical profession is still in the dark.

Editorial comment apropos this aspect in the *Lancet* says: "Much of the interest of the case depends on how long the graft will survive, but it has served to prove the connection between chronic tetany and parathyroid deficiency and to demonstrate the advantage of Voronoff's innovation. Even if the hopes of the authors are destroyed by the ultimate disappearance of this, as of most grafts, they have at any rate made a substantial contribution to the resources of gland therapy."

RECENTLY DISCOVERED VOLCANOES

THREE more volcanoes have been added to the map of American territory, and two of the new craters rank with the giants among the fire-mountains of the world. How he explored these hitherto unknown mountains was told before the recent meeting of the Washington Chapter of the Society of the Sigma Xi by R. H. Sargent, topographic engineer of the U. S. Geological Survey.

The newly mapped volcanoes lie in the Aleutian Peninsula, the long tongue that juts out from the mainland of Alaska, between the Behring Sea and the Pacific Ocean. This strip of land, which contains more active and extinct volcanoes than all the rest of North America, has as yet been very little explored.

The first of the volcanoes mapped by Mr. Sargent was a peak that had been known at a distance for some years, but it had not been learned that it was a volcano. The Geological Survey party traveled by pack-train entirely around the base, a total distance of one hundred miles, mapping the slopes as they went. They ascended to the rim, the highest point of which has an altitude of 4,200 feet, and investigated the immense crater, six and a quarter miles in diameter. The volcano is apparently quite extinct, for at the bottom, in addition to one large secondary cone and several smaller ones, is a lake of considerable size. The waters of this lake break through a gap in the wall of the mountain and form the Aniakchak River, from which the mountain has been named Aniakchak Crater.

The second volcano discovered by Mr. Sargent lies to the west of Aniakchak Crater, and was named Purple Crater because of its peculiar color. It is the smallest volcano of the three, and is of interest chiefly for a great central mass or plug of basalt that chokes it up.

The third mountain is another giant, 6,000 feet high, with a crater five miles across. It shows signs of having been active in recent times, and a record dated 1892 states that a distant and then unvisited peak, which apparently is the same mountain, was seen smoking. If it should stage a really major eruption it would probably be a terrific one, for the whole vast bowl is filled with a mass of ice and snow, through which a black secondary cone projects at one place. This frozen sea inside the crater feeds at least nine large glaciers that creep down the sides of the mountain. The Russians had seen this mountain at a distance and had given it the name of Weniaminoff, which will probably be retained on the new maps.

Mr. Sargent stated that any one who likes to rough it in unexplored country, even if not interested in geology or any other science, would find the mountains of the Aleutian Peninsula a happy hunting ground. "It is

relatively easy to get into,'' he said, ''and fairly swarms with game. We saw fifty-two big brown bears and caribou innumerable, and the streams are alive with fish.''

PREHISTORIC FOOTPRINTS FROM THE GRAND CANYON

NEW finds of footprints of reptiles left in soft sand at least 25,000,000 years ago have just been made in sandstone 1,800 feet down from the rim of the Grand Canyon. This is the greatest depth in the canyon at which such prints have been found.

The prehistoric tracks were found by Charles W. Gilmore, curator of vertebrate paleontology of the National Museum, and will be added to the government's fine collection of footprints of the Permian Age. Mr. Gilmore, who recently returned to Washington, spent three weeks in Arizona, and obtained from the canyon a ton and a half of material containing fossil tracks of reptiles and prints of plants.

These ancient prints can be used as evidence to assist geologists in determining more exactly the age of the beds of rock in which they were found.

The fact that the prints were found 1,800 feet from the top of the canyon means that after these queer, long extinct reptiles impressed their feet in what was then moist sand, almost 2,000 feet of rock material was slowly piled up in successive strata above the prints. And this does not take into account many additional hundreds of feet of material that have been eroded off from the present top of the canyon wall. So the length of time required for the deep canyon to form was obviously stupendous.

The level at which the fossil plants and reptiles have been found belongs to the later part of the carboniferous period, or the time when the great coal beds of the world were being formed, and was a few million years before the famous reign of the dinosaurs.

One specimen brought back by Mr. Gilmore shows a row of tracks very much like mouse tracks impressed in a small slab of red stone, and in among the tiny footprints is a wavy line which represents the track of the animal's tail. Other exhibits show prints larger than a man's hand, indicating that some of the reptilian creatures of this age may have become as large as crocodiles. No bones of these creatures have been found in the Grand Canyon, though some bones of reptiles making similar tracks have been found elsewhere.

The plant specimens have not yet been studied by a museum specialist, but some of them are fern-like plants, the prints of which are several feet tall.

WEIGHTS AND MEASURES

SHOULD ice-cream be sold by the pound or by the quart? What is the best place on a taxicab for a taximeter? These are two of the subjects that will be brought up, and probably settled, when weights and measures experts from all over the United States gather at Washington on May 25 to 28.

The meeting, known as the National Conference on Weights and Measures, will consider a number of questions which are of direct importance to the consumer.

Advisability of selling eggs, fruit and vegetables by weight instead of by measure or by count will be discussed. Massachusetts and New Jersey have recently adopted the plan of having dry commodities sold by weight or in standard containers, and this system is widely used throughout the west.

The conference will also hear addresses on the desirability of compelling manufacturers to mark ''net weight'' on package goods such as twine, shoe polish and other articles not already so labeled under the provision of the food and drugs act. A number of states have enacted laws requiring the net weight of some commodities to be indicated on the package or bottle so that the purchaser may know how much he is getting. The conference will consider the question of a federal statute, which would require such labels on goods shipped in interstate commerce.

A number of automobile problems will be presented. One that is attracting special interest is the use of meters instead of pumps to measure gasoline at filling stations. The conference will also look into the use of bottles which are kept already filled with lubricating oil at service stations, so that an automobile oil tank can be quickly filled while the car is getting gasoline. Some of these bottles are not accurate as measuring devices, which means financial loss to motorists.

ITEMS

DISMAL SWAMP, the great fresh-water marsh south of Norfolk, Va., is to undergo a scientific investigation to determine its economic utility and resources. A party of experts in various branches have been making a survey of this 700-square-mile tract. Among those in the party were R. J. Horsley, chairman of the Waterpower and Development Commission of Virginia; Dr. W. A. Nelson, state geologist and professor at the University of Virginia; Chapin Jones, state forester; Professor Ivey F. Lewis, of the University of Virginia; Professor Charles E. Seitz, agricultural engineer of the Virginia Polytechnic Institute; J. J. Durzulaitus, waterpower expert. Although fresh water now, the Great Dismal Swamp was part of the Atlantic Ocean in a previous geologic era. In it is located Lake Drummond, more than two miles across.

THE real merits, if any, of voodooism as practiced in Africa may be brought to light by a unique research in progress at the University of Witwatersrand. Professor J. M. Watt, of the department of pharmacology, has undertaken to find out the actual medicinal value of all the herbs, plants and other charms used in the semi-barbaric religious rites of the natives. He has sent out several thousand questionnaires to all parts of the continent, asking all who are interested to send in material. The response has exceeded every expectation, and specimens have poured in from all over Africa, over a thousand coming from North Rhodesia alone. It will probably take years to go over the vast amount of material accumulated, but it is hoped that when results of the investigation are eventually published some drugs may be found whose virtues are at present unknown to the medical profession.