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THE HEREDITARY ORIGIN OF OTOSCLEROSIS

TWICE as many women as men are affected with the type of deafness known to physicians as otosclerosis. This and other facts point to an hereditary origin for this physical defect, Dr. Charles B. Davenport, of the department of genetics, Carnegie Institution of Washington, Cold Spring Harbor, Long Island, told a meeting of the Eugenics Research Association recently.

The hereditary mechanism by which this particular type of deafness is handed on from father to son, or more accurately from father to daughter, consists of two defective genes, one of which is in the sex-controlling chromosome. The sex-linked gene, it is thought, acts in some way to upset the body's use of the bone-forming food calcium, while the other works directly to produce the deafness. The disease may also be associated with a disturbance of the pituitary gland, a gland which in youth and middle life exercises considerable control over bony changes.

Otosclerosis is not the ordinary hardness of hearing which comes on in later years and which involves a destruction of the auditory nerve. It is a type of deafness caused by hardening of the membrane around the small chain of bones in the ear, causing the closing up of the oval window leading into the vestibule of the inner ear. It is usually first noticed at adolescence.

Although otosclerosis is thought to affect only about two or three per thousand of the white population of the United States, a much higher proportion is observed among the members of the family of any individual who is affected with it, Dr. Davenport reported. Often from one quarter to one half of such a family group are troubled with hardness of hearing. This strengthens the view that otosclerosis has a genetic basis.

It is believed that when a father is affected with this type of deafness, his daughters have a much greater chance of inheriting the defect than his sons have. On the other hand, if the mother has it, more of the sons will be affected. In other words, it is what geneticists called a sex-linked characteristic. Where both parents are affected an extraordinarily high percentage of the children will be affected, and the marriage of first cousins from a family having a history of this type of deafness is especially apt to give rise to deaf children.

In the effort to get at the origin of the trouble, Dr. Bess Lloyd Milles and Miss Lillian B. Frink, under the auspices of the Committee on Otosclerosis of the American Otological Society and with the cooperation of other physicians, took bodily measurements of more than a hundred families. It was found that the individual with otosclerosis does not differ markedly from his brothers and sisters. The one exception where a considerable difference was found was in the height of the jawbone. This is a dimension which is easily disturbed by hyperactivity of the pituitary gland.

THE COMMON COLD

THE common cold only lasts three or four days. People who tell you they have "had a cold all winter" have really not been suffering from a cold but from some secondary infection, Dr. Wilson G. Smillie, professor of public health administration at Harvard University, told the Conference of State and Provincial Health Authorities of North America meeting in Washington. Dr. Smillie's report covered studies of the common cold in four isolated communities: a "moonshine" village in southern Alabama, Labrador, Spitzbergen, the northernmost inhabited point, and the island of St. John in the Virgin Islands, which was the original of Stevenson's "Treasure Island."

In all these places contact with the outside world was very limited and Dr. Smillie and his associates were able to trace the course of cold epidemics from their very start. Colds are contagious and are spread by direct contact, they found. In Spitzbergen there were no colds from a period in November, soon after the last boat had left, until the day after the first boat arrived the following spring. The miners in this community of 500 persons lived in very hot, humid barracks, went out into extreme cold and wind every morning, worked all day in mines where the temperature was below freezing, and came back to the hot barracks at night. Such conditions would seem ideal for the development of colds, and the fact that none developed disproves the commonly held opinion that exposure to drafts, bad weather and similar environmental factors is a cause of colds. When the first boat arrived in May, the scientists went out to it and examined the people on it before they disembarked. One man was coming down with an acute cold. The same day the mailman from Spitzbergen went to the boat and he caught the first cold in the community. Within thirty-six to forty-eight hours the community was practically incapacitated by a severe outbreak of colds. The same sort of thing was observed in the other communities. In the tropics, however, colds were very mild and without complications such as sinus infections, bronchitis, ear infections and pneumonia. It is these complications which cause the prolonged periods of discomfort and actual illness in the temperate zones and which, except in the case of pneumonia, are generally considered the cold itself.

While colds proper last only three or four days, they seem to pave the way for these secondary infections. Likewise, one cold gives immunity for three months. If you have just recovered from a cold, you can not possibly get another for three months. You can, however, have recurrences of the secondary infections, which may make you think you are having one cold right after another. The average person only gets two real colds a year.

Dr. Smillie and associates in their investigations tried to find in the noses and throats of cold patients the organism causing the cold. They were unable to find,

during the first three or four days, any of the well-known germs. The agent causing colds, however, has been shown by two other groups of workers to be a filterable virus. Vaccines for colds are of course not made from this virus but from the germs of some of the secondary invaders. Consequently they can not prevent the development of a cold, but it is theoretically possible for them to prevent the development of some of the secondary and equally distressing infections.

THE CAUSES OF EPILEPSY

THE parts played by heredity, by glands and by chronic wasting diseases such as cancer, in the development of epilepsy were discussed before the opening meeting in Philadelphia of the American Psychiatric Association.

Epilepsy is not an inherited disorder, according to Dr. Calvert Stein, of the Monson State Hospital at Palmer, Massachusetts. Dr. Stein studied the records and family histories of over 600 epileptics admitted to this institution, and compared the data with similar facts about 190 normal, non-epileptic persons. He found nothing to justify the conclusion that epilepsy is inherited. Fits, convulsions or other seizures, migraine and other nervous or mental disorders did not occur with significantly greater frequency in the families of epileptics than in the families of the normal persons studied.

The acid or alkaline reaction of the body, on which some of the modern methods of treating epilepsy are based, is not as important a factor in the disease as the amount of fluid in the body, studies of Dr. Morgan B. Hodskins and Dr. Riley H. Guthrie, of Monson State Hospital showed. They followed the progress of 55 epileptic patients who developed cancer. In 32 of these patients there was a definite decrease in the frequency of epileptic fits after the onset of the cancer. In the latter disease the body reaction tends to be slightly alkaline, but there is a decrease in the amount of body fluids. In three other diseases in which body fluids are decreased, epilepsy is relatively rare. For these reasons they believe the acidity or alkalinity is of only secondary importance, in that it may indirectly influence the amount of fluid in the body. Their studies also suggested that the effect of oxygen on brain functions may make it an important factor in controlling convulsions.

The relation between epilepsy and certain endocrine glands may be both chemical and psychological, it appears from studies of Dr. Alfred Gordon, of Philadelphia. Convulsions, such as occur in epilepsy, may be brought about by injury or disease of the pituitary gland, but this gland is closely related to other glands of the body, among them the sex glands. This may explain the relationship which he observed between epileptic seizures and certain functions of the sex glands in women on a chemical basis. Dr. Gordon also suggested that the epileptic seizures which he observed in relation to certain physiological processes might represent the patient's retreat or flight from the unpleasant reality of conditions at certain periods of life, such as the "growing pains" of adolescence and the signs forecasting the onset of old age.

PITHECANTHROPUS ERECTUS

THE famous "ape man" of Java, *Pithecanthropus erectus*, whose fossil bones, found forty years ago in the gravel beds of the Solo River at Trinil, are still subjects of scientific debate, was a female and not a man at all. So declares Dr. Aleš Hrdlička, of the Smithsonian Institution, after an exhaustive study of the original specimens, now in Holland, and a trip to the site of the discovery.

The remains consist of a skull cap, a lower jaw, three teeth and a thighbone. The thighbone, which was found fifty feet from the skull fragment, may not have belonged to the same individual; and two of the teeth may also be from a different specimen. But on the assumption that all the bones did belong to the same *Pithecanthropus*, Dr. Hrdlička reconstructs a humanoid creature, female, about 5 feet 5 inches tall, and mature in years.

The skull cap tells the greater part of the tale. That it belonged to a full-grown individual is shown by the solid closing of the sutures or joints, which do not become fully fixed in any animal until the skull is mature. Of the shape and size of the brain cavity, Dr. Hrdlička says:

"The brain form of the *Pithecanthropus*, which because of the filling of the skull cavity with a hard mass did not become observable until very recently, is exceedingly important. Its size, form and gyration remove it at once from the brains of all known apes and bring it correspondingly closer to that of man. It is inconsistent with, and morphologically superior to, its own skull.

"The brain cavity measured in capacity at least 900 cubic centimeters, and this for a female. A corresponding male brain cavity would measure somewhere about 1,150 cubic centimeters. These dimensions connect already with the human. In the Smithsonian collection there are 32 American Indian skulls of small statured but otherwise apparently normal individuals, ranging in capacity from 910 to 1,020 cubic centimeters. In the hugest gorilla the cranial capacity does not exceed, so far as is known, 600 cubic centimeters. In the chimpanzee or orang it never even reaches quite this size.

"The frontal lobes of the *Pithecanthropus* brain, while still low, approach in their form the human. They lack the pointed, keel-shaped appearance they have in all the apes. The rest of the brain was of a higher type than that of the apes. Had this creature advanced in its brain size and form by as much again as it stood above that of the known apes it would be wholly impossible to exclude it from the human category, unless it were done by the establishment of a separate genus of creatures equivalent in brain mass and brain differentiation to man."

But despite this evidence, Dr. Hrdlička insists, it is not legitimate to assert that *Pithecanthropus* was either a form of early man or a type that eventually evolved into man. "The most that appears justifiable, until further and conclusive evidence appears, is to regard the *Pithecanthropus*, as represented by the skull cap, as a high primate of as yet uncertain ancestry and no known progeny, far advanced in what may be termed the

humanoid direction.'' The height of this female *Pithecanthropus* is based on the length of the thighbone, assuming that it belonged with the skull.

THE MEXICAN EARTHQUAKE

THE earthquake that shook Mexico City on Friday morning of last week had its epicenter, or point of greatest activity, off the Pacific coast of Mexico, at approximately thirteen degrees north latitude and one hundred and five degrees west longitude. The quake began at 5:36 A. M., eastern standard time. These definite data were ascertained by the U. S. Coast and Geodetic Survey, after examining reports from a number of seismological stations collected by *Science Service*.

In Mexico City itself, a *Science Service* correspondent reported, the quake was the most severe felt within a year. It was accompanied by a display of lightning and a dull red glow in the heavens. Town clocks were stopped. Its severity was five on the Mercalli scale, which has ten degrees of earthquake intensity. An intensity of five means a quake strong enough to be felt indoors, but not very much outside, to ring bells and stop clocks, to wake up sleepers, rattle doors and swing suspended objects pretty strongly.

At the U. S. Coast and Geodetic Survey it was stated that the quake seems to have been comparable in severity with the one off the coast of Newfoundland on November 18, 1929, which put most of the trans-Atlantic cables out of commission. The same earthquake caused a slight tidal wave, resulting in a small loss of life on the Newfoundland coast. Whether the present quake will result in any tidal wave action could not be foretold because the direction of the bottom movement, together with other factors in wave causation, was still unknown.

Stations reporting the earthquake were those of the Dominion Meteorological Observatory, Victoria, B. C.; the Seismological Laboratory, Pasadena; University of Michigan; University of California; University of Pittsburgh; University of Wisconsin; Georgetown University, D. C.; Canisius College, Buffalo; Fordham University, New York City; St. Louis University; the U. S. Coast and Geodectic Survey at Tucson, Arizona, and Chicago. The action of the quake, even at a distance, was so severe that it upset the instruments at Pittsburgh and Tucson.

ITEMS

LIGHT of the wrong kind hastens the spoiling of butter and lard, it appears from a report made by Mayne R. Coe and J. A. LeClerc, of the U. S. Bureau of Chemistry and Soils at Washington, to the American Association of Cereal Chemists. If oil-bearing foods are kept in a dark place or wrapped with black or the proper kind of green paper they will last much longer. For Mr. Coe and Mr. LeClerc have found that darkness and green light between 4,900 and 5,600 Ångstrom units delay the development of rancidity much more than normal light. But wave-lengths of light on each side of this narrow green band hasten the production of rancidity more than normal light. Oil-bearing materials in ultraviolet light rapidly spoil.

How far light will penetrate into water, and how far it will go through living tissue, is being studied at the Smithsonian Institution by Dr. F. S. Brackett, as part of his researches into the fundamental physical properties and reactions of living things. Among the facts that his study has developed is the wide difference in penetrating power of two wave-length bands of light that are next-door neighbors in the spectrum. The visible light rays of longest wave-length, at the extreme red end of the spectrum, will pass through nearly a foot of water with a loss of half their energy. Yet radiations in the infra-red, with wave-lengths only a little greater, have a penetrating power in water only about one ten-thousandth as great. In the practical realm, this signifies that most of the radiation from the dull-red lamps frequently used for therapeutic purposes merely warms the surface and does not penetrate into the flesh at all. The radiation that penetrates flesh most effectively lies in a very narrow band of wave-lengths just between the dullest visible red and the invisible infra-red.

DELAY in operation and promiscuous use of laxatives and purgatives were blamed for appendicitis deaths by two physicians, Dr. Frank K. Boland, of Atlanta, and Dr. John O. Bower, of Philadelphia, who addressed the recent meeting of the American Medical Association. The dangers of delay were brought out by Dr. Boland's investigation which showed that among 219 patients operated on within six hours after the first symptoms, none died; while among 578 operated on after more than 72 hours, 48 died. Dr. Bower explained that laxatives increase the movements of the intestines, thus spreading the inflammation and frequently producing perforation, peritonitis and death. In his study he found that of those patients who took one laxative, one in fourteen died, and of those who took more than one laxative, one in seven died; while of those who had no laxative, only one in eighty died. The moral seems to be, never give a laxative for abdominal pain. If the pain persists for more than six hours it is usually dangerous.

AN intensely hard surface is put on steel tools to increase their usefulness many times by a process of rapid chromium plating reported to members of the Electrochemical Society meeting at Baltimore by Lieutenant A. Willink, of Frankford Arsenal, Philadelphia. As an alloy, chromium made steel stainless, as an electroplate, it gave automobile parts an ever-shiny, non-rusting finish and it hardened tools and parts of machinery subject to great wear. Now, by a method of rapid plating at high temperatures described by Lieutenant Willink, it imparts to tool steel a coat of super-hardness. Lieutenant Willink said that a certain die, plated by the new method, would stand up for 85,000 impressions in the Frankford Arsenal. Protected by an ordinary chromium plate it had a life of about 25,000 impressions and without the chromium protection it was useless after a 4,000 run. The new method has the additional advantage of requiring much less time than the old. Plating is done in a bath at about 150 instead of 65 degrees Fahrenheit and the current density is at least 1,000 amperes per square foot of plating surface.