

## SCIENCE NEWS

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### MECHANISM IN BRAIN WHICH SETS OFF CONVULSIONS

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MEDICINE has discovered the part of the brain believed to cause convulsions like those occurring in epilepsy. The convulsion-causing brain center acts like a "trigger" which, when stimulated, sets off a neurological "explosion" throughout the whole brain. Drs. F. A. and E. L. Gibbs, of the Harvard Medical School, described before the meeting of the International Neurological Congress in London experiments leading to the discovery of the brain trigger.

The trigger is a short fiber system running between the frontal cortex basal ganglion and the thalamus. Parallel research on brain tumors of cats and in man indicate that the same part of the brain is responsible for convulsions in each. Studies on four hundred cats in which the trigger mechanism was stimulated by means of an electrode inserted through a small hole in the skull served to determine finally the location of the convulsion-causing brain fibers.

It is not believed that the trigger is a pathological mechanism. Dr. Gibbs believes it is present in all brains, normal or otherwise, but that in epilepsy the mechanism is disordered. The position of the mechanism, the scientist said, is now located as well as are the brain fibers controlling the dilation of the eye's pupil.

The Harvard experiments provide strong evidence that former ideas about the cause of convulsions were wrong. It had been suggested that convulsions came about because of stimulation of the blood vessels or of certain other parts of the brain. The new discovery may change the diagnosis of epileptic convulsions. Dr. Gibbs explained that physicians formerly sought a diseased condition responsible for epilepsy, but that as a result of his research they will now have to seek a disorder in the neurological mechanism which he believes is present normally as a safety valve in the brain.

### EXPERIMENTAL HEADACHES

SEVERE headaches and pulsations of the brain fluid were linked at the congress by the American physicians Drs. Dean Clarke, Heloise Hough and H. G. Wolff, of Cornell University Medical School, New York City. When a headache is most severe the brain fluid pulsations are the largest, according to experiments in which subjects were given temporary laboratory headaches.

The chemical known as histamine was injected into the veins to bring on these experimental headaches. Histamine is created by the body tissues, especially those of the lungs and the gastro-intestinal tract. Brain fluid pulsations were measured by inserting a hollow needle into the spinal cord and connecting it to an instrument known as a Frank capsule. Pulsation changes within the brain, pulsations in the arteries and the blood pressure were all recorded automatically and simultaneously on photographic film for permanent record.

When histamine was injected the physicians found the arterial pressure increased and the cerebrospinal fluid pressure diminished, while at the same time the intracranial pulsations increased and the headache became more severe.

In experimentally produced headache, pain is associated with dilatation and distortion of the intracranial vessels. The sites of origin of the nervous impulses experienced as pain are probably the walls of the intracranial blood vessels and the perivascular tissues. This is further evidence that deformation of the intracranial blood vessels is an important factor in the production of headache as manifested clinically.

### VEGETABLE FATS FOUND NUTRITIOUS

VEGETABLE fats are completely digestible and they satisfactorily fulfil the needs of the body for fat, according to Dr. Harry Steenbock, of the University of Wisconsin, who is known for his studies on vitamins.

Dr. Steenbock and his associates at the Wisconsin Experiment Station have confirmed the finding made at other experiment stations that lack of fat in the diet of experimental animals results in abnormal symptoms, including the stopping of growth. They found that white rats suffering from want of fat could be completely cured in from five to seven weeks by feeding them daily five drops of corn oil, 15 drops of lard, or 20 drops of a widely known vegetable fat purchased at a local grocery store.

The Wisconsin investigators found that all edible fats, animal or vegetable, are completely absorbed by the body if they will melt below body temperature. Hydrogenation of vegetable fats does not make them indigestible, therefore, unless it is carried so far as to give them a melting point of 100 degrees Fahrenheit or more. And this is not done with ordinary commercial vegetable fat.

Some fats are digested much more rapidly than others. It has not been proved, however, that quick digestion is desirable, although it is popularly associated with "easy" digestion. Slowly digested foods have a certain value in that they tend to keep one from growing hungry before the next meal.

"We found that cod-liver oil, halibut-liver oil, and butter oil were digested more rapidly than any of the other fats we tested," said Dr. Steenbock. "About 70 per cent. was absorbed in four hours. Of butter itself 60 per cent. was digested in the same length of time. Most of the other fats used for human food, such as lard, corn oil, soybean oil and cottonseed oil, were 50 to 60 per cent. absorbed in four hours."

It was found that certain compounds tend to slow up the digestion of fats, when consumed along with them. Sodium benzoate, a food preservative, reduced the amount absorbed in four hours from 54 per cent. to 14. Alcohol also markedly reduced the rate, and even cane sugar had some effect. Water made no difference.

Lack of vitamins in the diet, and abnormal body con-

ditions such as anemia also slowed down the rate at which fats could be digested.

### RUBBER PLATES MAY BRING ABOUT NEW TECHNIQUE IN PRINTING

A PROCESS for printing from rubber plates has been developed at Akron, by the B. F. Goodrich Company, which may alter traditional methods of printing. Printing from rubber type is not new. Every one is familiar with the "rubber stamp," which has long been used to stamp out short notices or designs. Until recently, however, rubber as a substitute for metal in jobs requiring thousands of copies was thought to be impractical.

The new "elastotypes," or rubber plates, overcome many of the former objections to rubber as a printing material, and have several advantages over ordinary metal in certain types of work. They are particularly well adapted to printing on fragile or brittle materials such as tissue paper, Cellophane, celluloid, wood, metal, fiber and glass, which might be injured by metal type. Bond and other hard-surfaced papers print better from rubber because it conforms to the irregularities of the paper and is less affected by pressure change. Tests indicate that because rubber spreads a thinner film of ink than metal the saving of ink runs as high as 30-40 per cent. For the same reason, printing from rubber dries more quickly.

On the other hand, rubber swells when oil inks are used, and certain special inks are required to reduce the swelling to a minimum. As yet, halftones, except very coarse screen, can not be printed successfully in long press runs.

It is in the field of book printing that rubber plates offer the greatest promise for the present. Books have never been printed from the speedy rotary presses such as large newspapers have. They are usually run off on flat bed presses. Because rubber plates can be curved without distorting the type faces, they may make book printing on rotary presses practical. Scribner's Press recently printed the first book from rubber plates in the United States, "The Emerald Murder Trap."

### SITE FOR THE NEXT STRATOSPHERE ASCENT

SCOTT FIELD, the former site of the Army Air Corps training school for balloonists near Belleville, Ill., may be the scene of the next stratosphere flight of the National Geographic Society-Army Air Corps.

If it is decided to attempt another hop to the upper regions of the earth's atmosphere late this fall in the balloon *Explorer II*, Scott Field would be admirably suited to the take-off.

Its central location would make it more easily possible to reorganize the stratosphere expedition than at distant Rapid City, S. D. Moreover, facilities for handling balloon flight plus a highly trained ground personnel are additional advantages.

Captain Randolph P. Williams, third Army Air Corps officer in the recent ill-fated disaster of the *Explorer II*, has just been at Scott Field studying the flying records

for the last five years from the field to determine what chance there is of obtaining good flying weather in September and October. Preliminary surveys indicate that October is a favorable month. Further checks against the records of the U. S. Weather Bureau for the region are now being made.

While the definite decision to hold another stratosphere ascension this fall has not been made, and will not be made until the cause of the rip in the balloon fabric in the recent accident has been determined, Scott Field offers one of the best locations, equipment and personnel if the affirmative decision is reached. It is one of two places in the country where the Army maintains troops trained in handling lighter-than-air craft. The other is Langley Field, Va. Scott Field is the lighter-than-air depot for the nation and handles all supplies and equipment. It was formerly the headquarters of the balloon school of the Army which has been inactive for a number of years. Its staff consists of 16 officers and 375 enlisted men.

Stationed at Scott Field is the twenty-first airship group; the ninth airship squadron; the twenty-first photographic section trained in aerial photography, and the fifteenth observation squadron.

### NEW WIRELESS STATIONS IN AFGHANISTAN

THE most powerful of five new wireless stations for communication within Afghanistan and with the capitals of the world will be erected at Kabul shortly. The other four will be situated in important positions throughout the country.

Outfitted with a short-wave transmitter suitable for telegraphy and telephony, and two receivers, the Kabul station will reach all the capitals of Western Europe with ease. Regular communication with New York, Shanghai, Tokyo and Moscow will be established, as well as with Rio de Janeiro, Cape Town and Melbourne.

A central telegraph office for control of the wireless stations will be set up ten miles from Kabul, where the transmitting and receiving sites will be located. The latter will be separated, for more efficient operation, and equipment to reduce atmospheric interference will be used in the receiving station.

The Kabul transmitter will operate on 5,000 to 6,000 watts of power, and will have a wave range of 15 to 18 meters. A variable frequency oscillator with a frequency stability of 1 in 20,000 will be used; not a particularly high or constant stability, according to American engineers.

In contrast, the other four transmitters will use general short-wave long-distance quartz crystal controlled transmitters. These have very high frequency stability, but are inferior in other ways to the Kabul transmitter.

For communication with New York, Shanghai, Moscow and Tokyo, as well as the Western European capitals, directional or fixed aerals will be used. On the other hand, an omni-directional aerial or one movable in any direction will be used for communicating with Rio de Janeiro, Cape Town and Melbourne.

## LABORATORY ON PIKE'S PEAK OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

THE laboratory of Dr. Carl Anderson, of the California Institute of Technology, in which he discovered one of the fundamental units of matter, the positive electron, is now on wheels on its way to the top of Pike's Peak, Colorado, which has an elevation of 14,000 feet.

The giant electro-magnet, the expansion cloud chamber in which the débris of atoms smashed by cosmic rays are photographed and a 50,000-watt generator for energizing the magnet, are all mounted on a truck and trailer now plodding toward Colorado. The outfit is a complete laboratory and power plant for the cosmic ray studies to be undertaken.

Working with Dr. Anderson in the Pike's Peak research will be Dr. Seth Neddemeyer, also of the California Institute of Technology. They will investigate how cosmic rays at high altitudes decrease as they come down through the earth's atmosphere. The high altitude rays differ markedly from those much rarer ones which come all the way through the air surrounding the earth to reach sea level or even below.

It will take until August 17 to reach the top of Pike's Peak and set up the equipment. Then there will be about a month before the snow begins and the work must cease.

However, because of the much greater intensity of cosmic rays at the altitude of Pike's Peak tip, more experimental measurements can be taken in the month than can be obtained in a year in Dr. Anderson's Pasadena laboratory. That's why Mohammed is going to the mountain, as the saying goes.

If everything goes well Anderson and Neddemeyer hope to take 10,000 photographs in their cloud chamber apparatus and most of these will show cosmic rays.

No one knows just what to expect from the experiments. A research program of this type has never before been undertaken.

### ITEMS

A CURIOUS and still-unexplained relation between hay fever and the common cold which may provide a new method of attack on the latter disease is announced in the *New York State Journal of Medicine*. Dr. Louis Sternberg, of Beth Israel Hospital of New York City, has completed a six-year study of the subject and arrives at the following conclusion: Sufferers from hay fever in the summer are more susceptible than other people to common colds in winter, but when hay fever victims are treated with pollen extract for the affliction they show a greater immunity to colds later on. "The reason," states Dr. Sternberg, "for this apparent immunity to the infection known as the common cold is not now known."

SHORT radio waves can now be used in medical treatment of selected regions of the body, by a technique developed by Dr. Franz Nagelschmidt, of St. Bartholomew's Hospital in London. Dr. Nagelschmidt interposes a cylinder of wax and ebonite between the radio generator and the patient, localizing the heating

effects of the radiations, which have wave-lengths of from three to twenty meters. Use of short-wave radio in medicine is no new thing; it has been successfully employed for several years in the treatment of certain diseases requiring a rise in temperature. Hitherto, however, the whole patient has been put into a state of "artificial fever." Dr. Nagelschmidt's advance consists in finding a method for localizing their effect.

A PLEA that other peoples, especially those more primitive than ourselves, should not be judged and condemned on the basis of our kind of mental tests is made by Dr. Florence L. Goodenough, of the University of Minnesota. Mental tests of civilized white men may tell whether the individual tested is able to compete successfully under American conditions, but Dr. Goodenough urged that psychologists and anthropologists, if they desire to compare civilized and primitive man, should test sight, smell, running ability, manual dexterity, ability to learn and other such traits.

MAKE a loud enough noise at milk and the baby will digest it more easily. That, in effect, is the discovery reported by Dr. Leslie A. Chambers, of the University of Pennsylvania, who spoke before the American Dairy Science Association, meeting jointly with the American Association for the Advancement of Science. The apparatus used in the experiments consisted of a heavy steel diaphragm, driven by an oscillating electric current. Similar devices are used for submarine signalling. Over the diaphragm Dr. Chambers flowed a thin stream of milk, while he caused it to vibrate very strongly at various rates. The lowest vibration rate he used was 360 cycles a second, which is the pitch of F-sharp in the middle of the piano keyboard. The highest rate was 3,000 cycles a second, about three octaves higher than middle F-sharp. The effect was to alter the curd-forming character of the milk. Whereas the milk used normally formed a hard curd, difficult to digest, when acted upon by the pepsin of the stomach, after treatment it formed a soft, easily digested curd. Soft-curd milk is especially desirable for feeding babies, as well as older persons with "weak stomachs." Some cows naturally produce soft-curd milk, but many do not.

THE old saying about fleas having lesser fleas *ad infinitum* has had a recent confirmation in the researches of Theodore T. Ayres, botanical investigator at Harvard University. Dealing with a rare, mold-like fungus which had hitherto been seen but four times, Mr. Ayres discovered that it was parasitic and that it chose as victims only fungi of the same general kind as itself. When he tested it against a long list of fungi distantly related to it in the system of fungus classification, it was unable to attack them. It showed no preference as to the sex of its victims, but parasitized male and female strains with equal avidity. A remarkable alteration in the susceptibility of its hosts was found to take place, however, when they were grown on different nutrient materials.