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ALTITUDE MEASUREMENTS FOR THE STRATOSPHERE BALLOON FLIGHT

THE nation's system of topographical surveying will help check the altitude of *The Explorer II*, the giant stratosphere balloon of the National Geographic Society-U. S. Army Air Corps, when it takes the air next month.

In unprecedented degree the altitude of the flight will be accurately checked from a multitude of ground stations along the path of the aerial trip by a corps of volunteer surveyors who will take up stations at the federal "bench marks." These bench marks are bronze markers, spaced thirty miles apart throughout the Plains region which are the key points in the nation's system of topographical survey. The exact positions of the markers are known with great accuracy and from them the surveyors, with transit telescope, will be able to make, every fifteen minutes, measurements on the altitude of the balloon while it is in view.

Equipped with automobiles having radios, special code signals will be broadcast every fifteen minutes, at which time all the surveyors in sight of the balloon will take readings on its stratospheric positions. By trigonometry these readings can be translated into elevation above the surface of the earth. These observed altitudes can be checked with the sealed barographs aboard *The Explorer II* and thus check the accuracy of these instruments at high altitudes.

A third check on altitude at every instant will be the great aerial camera taking photographs of the ground below the balloon at frequent intervals which worked so well on the last flight. The one hitch in this valuable scheme was that the distance between points on the ground (hill tops, valleys, etc.) must be accurately known to calculate the balloon's height from the photographs. This is not always possible, since some of the regions over which the balloon flies have not yet been surveyed with the desired accuracy. Using the three systems in combination, however, a correct height determination is expected.

INFECTION THE CAUSE OF THE COMMON COLD

No matter how much cold and rainy weather a person is exposed to, the individual will not catch a cold unless he is infected by a cold germ caught from another individual, according to Professor Wilson G. Smillie, of the Harvard University School of Public Health. Speaking at the annual meeting of the Associated Harvard Clubs, Professor Smillie described four Harvard expeditions to isolated communities for the purpose of studying the common cold. The investigations were conducted at Stevenson's "Treasure Island," which is St. John's in the Virgin Islands, at a Hudson Bay trading post on the Northwest River in Labrador, at Spitsbergen, the northernmost permanent settlement in the world, and at Happy Hollow on the Patsiliga River in southern Alabama.

Professor Smillie also believes that a person with a cold is only infectious for three days, even though he may be coughing and have a temperature after that time. Summarizing the conclusions of the expeditions in his address, Professor Smillie said: "Common colds are an infection and are not due to cold weather. Many people think that colds are due to cold weather, but this is not so. In Spitsbergen we found that the people were subjected to intensely cold weather and terrific winds all winter without catching cold; but as soon as the boats came in in the spring and carriers of cold germs arrived, most of the people in Spitsbergen caught colds. On Stevenson's 'Treasure Island' in the tropics, which had a population of 746 when we were there, we found an almost perfect paradise as far as weather and environmental conditions were concerned. The people there also caught colds, but not as long as they were isolated from contact with carriers of cold germs. At the trading post in Labrador we found that the people did not have any colds all winter until a mailman arrived and brought the cold germs in. Then colds spread to the whole community. So we proved that colds are infectious. A person with a cold is infectious, however, only for the first three days. The person may be coughing and have a temperature after three days, but he is not infectious any more."

Explaining the conduct of the investigations in field laboratories, Professor Smillie said that a study of the causes and spread of colds in modern community life would have been unsatisfactory, since our life is so complex, our contacts so frequent and our environmental influences so varied.

"We attempted to simplify our studies by the establishment of field laboratories in these various isolated communities where human contacts are infrequent, life is simple and environmental factors measurable," he said.

Professor Smillie led all Harvard's cold-studying expeditions except the one to Spitsbergen, which was led by Dr. Harland Paul, who has since joined the Rockefeller Foundation. The expeditions have been conducted at intervals since 1927.

PITUITARY GLAND AND THE BLOOD-FORMING ORGANS

THE pituitary gland, already recognized as "dictator" of most of the other glands in the body and largely the controlling factor in growth and reproduction, may have still another rôle. It may control the way new blood replaces old blood in the body.

New experiments just reported indicate that pituitary extract injections produce anemia in animals and two days later new blood cells start to appear to replace the old, depleted ones.

The pituitary gland's new rôle is suggested in a letter from Professor E. C. Dodds, director of the Courtauld Institute of Biochemistry in London, and Dr. R. L. Noble, to the editor of *Nature*. Dr. Noble is working at the Courtauld Institute with the Ellen Mickle Fellowship

from the University of Toronto. Last year they reported the discovery that stomach ulcers can be produced experimentally by a specially prepared pituitary extract.

Now, they have found that this extract, when given to rabbits, has the additional effect of creating anemia. Marked poverty of the blood appears suddenly four or five days after the injection is given. About two days later there appear cells of a certain type which show that active blood regeneration is taking place. Moreover they consider a series of experiments to have proved that the anemia can not be caused merely by loss of blood from the stomach ulcerations.

There is, therefore, a possibility that what doctors call the "reticulo-endothelial system"—the system concerned with the production of new blood-cells and with the destruction of the old ones—may be to some extent controlled by the pituitary gland.

"So far as we are aware, this is the first time these changes have been produced by an extract of a normal gland," they add, in referring also to changes in the bone-marrow and in the secretion of bile which accompany the great change in the number of red blood-cells.

The action of the pituitary upon the blood-renewing system may not be direct. One explanation might be that the possible hormone which stimulates the flow of acid in the stomach may also stimulate the production of an enzyme that in turn acts upon the blood-renewing bone-marrow.

SELENIUM AS A POISON IN PLANTS

PLANTS are chemically tricked into becoming poisonous to livestock in some parts of the West because a toxic element in the soil, selenium, is chemically a very near relative to the beneficial and necessary element sulphur. So close is their kinship that the absorbing mechanism of the plants can not tell them apart, and so takes in the bad with the good. The remedy for this situation is to add so much sulphur to the seleniferous soils that the undiscriminating plants will get a great deal more of it than they do of the selenium. This, in brief summary, is the plant-physiological picture arrived at by Dr. Annie M. Hurd-Karrer, of the U. S. Department of Agriculture.

The problem of "selenized" plants is one of the most serious which the department has been called upon to solve in recent years. Some time ago, reports began to come in of livestock afflicted with a crippling and finally fatal disease, resulting from eating grain grown in certain parts of the northern Great Plains. The trouble was finally traced to grains grown on soils of one particular geologic type, often low in sulphur but unusually high in the less familiar element selenium.

Laboratory and field-plot experiments at the Department of Agriculture securely fastened the blame on the selenium. Then it was found that the poisonous effects on the plants, and through them on animals, could be almost completely counteracted by adding sulphur compounds to the soil. The amounts of selenium taken up by the plants diminished in proportion to the amounts of sulphur added, and this led to the theory that the two "taste alike" to plants, and are absorbed in accordance with their relative availability in the soil.

When the selenium-poisoning problem first presented itself it caused a good deal of concern, for the afflicted areas were in the midst of a region where commercial grain is produced in some quantity. The practical importance of the problem has been diminished, at least for the present, by the effects of grasshoppers and drought on the agriculture of the region. However, if there is an agricultural come-back in that part of the country, the information that has been obtained should help in meeting problems that may arise.

THE BITE OF THE BLACK WIDOW SPIDER

NOT as black or deadly as she has been painted is the latest medical verdict on the "black widow" spider, according to a statement made by Drs. J. M. Frawley and H. M. Ginsburg, of Fresno, Calif., in a report to the *Journal* of the American Medical Association.

This spider has come to be feared as something of a nation-wide menace since fatalities from its bite have been reported in increasing numbers. Fifty-two cases of black-widow spider bite have been treated without a fatality in the Fresno General Hospital. They believe the right hospital treatment will save life. No treatment or the wrong treatment may result in death.

Here are some details of the treatment they recommend: They put the patient to bed and apply iodine to the site of the bite. He is required to drink large quantities of water and of nonalcoholic fluids. A hypodermic is given to allay the pain and a sedative to permit rest. Then an injection is made of a solution of magnesium sulphate, more commonly known as epsom salts. It is the latter treatment that is credited with relieving the abdominal cramps and the other severe symptoms that follow the spider's bite.

An intoxicated man has a poor chance of recovery once the black widow has injected her poison in him. Nor should any person who has been bitten by this spider be given a drink containing alcohol.

Infants or very small children may not recover because the amount of poison from the bite is large in comparison with their small bodies, and the victims go rapidly into convulsions.

AN INDICATOR FOR EPILEPSY

THE super-sensitiveness which causes hay fever and hives provides a new clue to epilepsy and mental disorders, according to a report by Dr. Joseph A. Beauchemin, of the Middletown, Conn., State Hospital at the meeting of the American Psychiatric Association.

The clue was gleaned from study of the little red bumps called wheals which appear on the skins of sensitive persons shortly after a drop of protein solution has been injected into the skin. The procedure of making these skin tests is familiar to hay fever and asthma patients and sufferers from similar disorders which physicians call allergic. The common feature of all the disorders, ranging from hay fever to migraine headache and hives, is a super-sensitiveness to protein from various sources: plant pollen; foods like milk, eggs, shell fish; feathers; or dust.

Proteins from meats and cereals and fats produced the

little red bumps on the skin of eight tenths of the epileptic patients he studied, Dr. Beauchemin reported. From this he concluded that a disturbance in the handling of these foods by the body tissues is an important feature in epilepsy.

The red bumps were caused in sufferers from mental disorders not by food or plant proteins but by solutions of gland substances. Patients suffering from dementia precox were super-sensitive to thymus and sex gland extracts, indicating a disturbance in these glands which may be only a concurrent symptom or may be of more significance.

Patients in the excited phase of maniac-depressive disorder were as a group super-sensitive to adrenal, thyroid and pituitary substances. A possible over-activity of the pituitary and adrenal glands which in turn stimulates the thyroid and sex glands is Dr. Beauchemin's interpretation of the results of skin tests with this group. Patients in the depressed phase of the same mental disorder reacted to the gland substances in a way suggesting over-activity of the pituitary and of the cortex of the adrenal glands. More of these patients than of those in any of the other groups showed super-sensitiveness to proteins from bacteria, indicating that they might be more susceptible to infectious diseases.

GLANDS AND EMOTIONS SEEN AS FACTORS IN EPILEPSY

A GLANDULAR basis for fits or convulsions, such as those occurring in epilepsy and possibility of treating the disease by gland extracts in the future, were suggested at the meeting of the American Psychiatric Association. Emotional upsets were also blamed for causing epileptic attacks and good results from psychiatric treatment in such cases and from dietetic treatment of other cases were reported.

The rôle the glands, particularly the pituitary gland, may play in epilepsy was discussed by Dr. Albert W. Pigott, of the New Jersey State Village for Epileptics. Dr. Pigott reported two cases of diabetes occurring in epileptics, a rare occurrence. In records of over eighteen thousand epileptics, Dr. Pigott found only thirteen cases of diabetes.

The two conditions are in a way contradictory and Dr. Pigott pointed out that the fundamental mechanisms in the two diseases are antagonistic. Epilepsy, it seems, may be thought of as anti-diabetes. Diabetes is characterized by too much sugar in the blood and diminution of water in the body. In epilepsy there is an accumulation of fluid in the body. During convulsions, furthermore, epileptic patients have less sugar in their blood than in the period between convulsions. This fits in with the fact that convulsions are a feature of insulin shock, which occurs when a diabetic patient gets more insulin than his body requires to burn the amount of sugar and starch that has been eaten.

The pituitary gland is now known to produce a hormone that can bring on the diabetic state of too much sugar in the blood and it also plays an important part in regulating the body's use of water. Dr. Pigott suggested that a decrease in the diabetes-producing hormone of the pituitary may play a rôle in some cases of convulsions due to deficiency of sugar in the blood. He recalled that Dr. Harvey Cushing, of Yale University, was able to prevent convulsions in some epileptics by giving them pituitary gland substances. In one of the cases of diabetes complicating epilepsy described by Dr. Pigott, the average number of convulsions was reduced from twelve or thirteen a month to four or five after diabetes had developed.

ITEMS

DISPLAYING a clock made by royal hands of young Pharaoh Tutenkhamon, in the land of Egypt over 1,300 years before Christ, Professor James H. Breasted, of the Oriental Institute of the University of Chicago, described how courageous Egypt pioneered in conquest of "time and its mysteries." He gave the annual James Arthur lecture on "Time" at New York University, where the Arthur collection of clocks and watches is maintained. Tutenkhamon's transit instrument for determining the hour by the stars was reposing in an antiquity shop in London. An inscription on the instrument states that Tutenkhamon made it with his own hands. Professor Breasted emphasized that the instrument was not unearthed in Tutenkhamon's tomb, but was made by him in restoring tomb equipment of one of his royal successors. The shop that had it thought it part of an Egyptian writing kit, and Professor Breasted was first to recognize its true significance. This timepiece and another belonging to Tutenkhamon's grand-father-in-law are the oldest surviving astronomical instruments.

THE popular custom of offering guests peppermint candy or peppermint cordials after a heavy meal has scientific support in the findings of four Chicago physicians, Drs. H. I. Sapoznik, R. A. Arens, Jacob Meyer and Heinrich Necheles, who report on their investigation in the *Journal* of the American Medical Association. Tests made both on dogs and on human beings showed that the oil of peppermint that is present in peppermint candy has a decided motor action on the stomach. Digestion is speeded up, and the stomach empties an hour faster. The peppermint is particularly useful after a meal with a high fat content, making the person's stomach feel less full and distended.

COLOR, rather than sweetness of corn, was prized by American Indians in olden times, according to the opinion of Dr. A. T. Erwin, of the Iowa Agricultural Experiment Station. Among all collections of prehistoric corn in museums, Dr. Erwin finds only one undoubted example of true sweet corn. But the ancient color scheme of corn is varied, including blue, red and yellow grains. Modern natives of Mexico, land thought to be the "cradle" of corn, raise many types of corn, but not one specimen of sweet corn was detected by Dr. Erwin in an investigation there. Sweet corn is thought to have been cultivated in the United States in the first half of the nineteenth century. It is apparently an offshoot of field corn, whose accidentally sweet grains the Indians did not trouble to propagate. Only the white man noticed the delicate difference.