

SCIENCE NEWS

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THE INTERNATIONAL PHYSIOLOGICAL CONGRESS AT ZURICH

CANCER and its causes are up for discussion at the meeting of the Sixteenth International Physiological Congress, which opened in Zurich on August 15. While politicians and military leaders eye each other suspiciously and work at cross purposes, scientists from the same lands form a united front against a common enemy. Two prominent participants in the discussion are Americans. Dr. M. J. Shear, of the U. S. Public Health Service and the Harvard Medical School, told of his researches on cancer-causing derivatives of the chemical known as benzanthrane. The compounds on which he worked are not known from ordinary, spontaneous cancers, but they do appear to have significance in forms of the disease produced by contact with greasy, sooty or tarry substances, such as occur in certain industries. Something in crude ether-extracted wheat germ oil, possibly a chemical relative of the same cancer-causing hydrocarbons studied by Dr. Shear, has been found guilty of producing malignant tumors in rats, it was reported by Dr. Leonard Rowntree, of the Philadelphia Institute of Medical Research. Dr. Rowntree worked in collaboration with Drs. A. Steinberg and W. R. Brown. Wheat germ oil figures importantly in present-day therapy because it is a rich source of vitamin E, the fertility vitamin; but the cancer-producing part of the oil is not the vitamin. This discovery means that scientists must search more deeply into the possibility of diet's playing a part in causing certain types of cancer.

DESPITE all the research that has been expended on the eyes, it has been possible for Professor S. Krauss, of the Hebrew University at Jerusalem, to find a hitherto unknown function for the organ of sight. The minute sensitive rods that crowd the retina, he said, have as part of their job the perception of brightness-differences in the "medium," or general background, of objects that we look at. Professor Krauss gave a demonstration of his discovery.

MUSCLES and other working parts of the body can increase or diminish the blood supply they receive according to their needs from moment to moment, quite as accurately as a householder can turn the water supply on or off. A description of the mechanism of blood supply control was presented by Professor H. Rein, of the University of Göttingen. The key to the situation is the presence of waste products of muscular activity, particularly carbon dioxide. Increase in its local concentration results in wider opening of the blood vessels, permitting more blood to reach the spot where it is needed.

At the congress, Dr. Emil Bürgi, of the Pharmacological Institute, Berne, and Dr. F. Flury, of the Pharmacological Institute, Würzburg, discussed the permeability of human and animal skins to various poisons and drugs.

Dr. Bürgi's method of investigation is very neat and exact. He puts the substance to be used in a little hemisphere of glass, open on the flat side. This is sealed securely against the skin. After a suitable time lapse, the subject's breath and body secretions are analyzed for the presence of the chemical. Alcohol, ether and chloroform, he found, penetrate the skin very easily, as also do all the aromatic oils. Some substances that will not penetrate the skin by themselves do so readily when dissolved in alcohol, acetone or other solvents; in this class Dr. Bürgi mentioned camphor, cocaine and pericaine. Some of the drugs in his experiments were tried on animals. Thus, he found that folliculin, a powerful female sex gland extract, will go through the skin of a mouse. He also used mice to demonstrate skin permeability to mercury in ointments. Dr. Flury confirmed the results of his Swiss colleague. The horny layer in the human skin is much overrated as a protection against foreign substances in solution, he stated. Poisons and drugs that might be stopped by that layer will find openings through it at the hair follicles, especially if mechanical factors or physiological stimuli are at work. Permeability of the skin is therefore something for the physician to take into consideration. On the one hand, the skin can admit poisons; on the other, it is possible to use it as a gate-of-entry for beneficial medicines.

VISUAL purple, the chemical compound that enables us to see, has been successfully extracted from the eyes of frogs in the laboratory and made to perform in the test-tube as it performs in the eye, Dr. A. M. Chase, of Columbia University, reported before the meeting of the congress. Visual purple plays a rôle in the living eye similar to that of the sensitive silver compound on a photographic film in a camera. Only it does it better, for whereas a photofilm once exposed holds the same image forever, the reaction of visual purple in the retina of the eye is reversible. That is, it receives a light-impression, transmits the story of its image to the brain, and then returns to its original state, ready for another job of looking at something. The stuff is called visual purple because it is purple except when it is exposed to light. Then it loses its color, but after a short time "regenerates" and regains its purple hue. In the Laboratories of Biophysics at Columbia University, visual purple has been changed from colored to colorless phase and back again, a feat which physiologists and chemists had for many years vainly endeavored to perform.

ANOTHER section of the congress devoted considerable attention to the effects of various drugs on heart and respiratory action. Dr. McKeen Cattell and Dr. H. Gold, of the Cornell University Medical School, presented papers on the mechanism by which digitalis relieves heart failure. Dr. H. J. Stewart, of the New York Hospital, also talked on digitalis, telling of its effect on the heart's output under various disease conditions. Dr. M. Sumwalt dis-

cussed the effects of certain morphine derivatives in depressing the breathing rate.

Food requirements, figured by nations instead of individuals or families, occupied the attention of the congress. Appropriately, perhaps, the leaders of the discussion were from the two countries now strenuously endeavoring to establish complete self-sufficiency, which would be most menaced by blockade if war should come—Germany and Italy. The speakers were Professor E. Abderhalden, of the University of Halle, and Professor G. Quagliariello, of the University of Naples. Standardization of the national diet, though desirable at least in case of emergency, is not fully possible, it would appear from the discussion. For example, individual requirements for protein may vary from person to person all the way from 25 to 300 grams a day. Some persons can substitute one kind of energy-food for another (*e.g.*, starch for fat, or vice versa) to a greater extent than others. A few generalizations, however, appeared possible. Whole wheat bread, declared Professor Abderhalden, is decidedly preferable to white bread both as a measure of national economy and for better health. Complete substitution of fat for carbohydrate, or the other way about, is impossible. It is quite impossible to lay out a strictly standardized schedule for vitamins.

ITEMS

THE rocks of the earth beneath our feet contain much more nitrogen, one of the chemical elements, than the atmosphere of the earth. This is the latest discovery by Lord Rayleigh, president of the British Association for the Advancement of Science, which opened its annual meeting at Cambridge on Wednesday. Lord Rayleigh, an authority on the physics of the earth, has investigated in granite and other rocks the amounts of elements usually thought of as occurring in the air. The results are contrary to what has been supposed. The total amount of nitrogen in the earth is many times more than in the atmosphere. If the earth's mass consists of about 65 per cent. rock as has been estimated, the rocks contain 37 times as much nitrogen as the atmosphere. This fact is expected to have a bearing on theories as to how the earth was formed.

THE vast clouds of dark matter in interstellar space, that obscure some stars and redden the light of others, are composed largely of iron and aluminum, according to Dr. B. Sticker, of the observatory at Bonn. He estimates the diameter of particles as averaging one ten thousandth of a millimeter, or one two-hundredth-thousandth of an inch. Dr. Sticker agrees with astronomers in the United States in the opinion that this dark, "unorganized" matter in space makes up a very considerable fraction of the material universe.

THE stratosphere contains a great deal more of carbon dioxide than it theoretically should. This gas, a by-product of life activity, should have its greatest concentration near the surface of the earth and should diminish rapidly with increasing altitude. Actually, Professor N. Regener,

of Stuttgart, has discovered by analysis of upper air samples captured by means of high-flying robot balloons, the carbon dioxide content of the atmosphere at 18 miles elevation is only five parts in 100,000 less than it is at the surface. Constant mixing by vertical air currents is credited with this unexpectedly even distribution of carbon dioxide.

LISTENING to a new explanation of the old phenomenon of phosphorescence, investigators attending a Stanford University summer conference on photochemistry, heard the words "exciton" and "phonon" as new descriptive terms applied to subatomic particles whose behavior under certain conditions produces phosphorescence. Light may excite two kinds of energy when it strikes a solid body, Dr. Teller, of the George Washington University, believes. It may excite electronic energy, the moving particles thus resulting from the impact of the light being defined by the scientist as an "exciton." A particle vibrating from the other type of excitation for which he holds light responsible Dr. Teller calls a "phonon."

DRILLED in utmost secrecy and with the application of several new methods, the first oil well ever drilled inside the levee of the Mississippi River has begun to produce oil in St. James Parish, La., from a deposit more than 6,000 feet below the river. More than 200 barrels of oil a day are coming from Realty Operators No. 1, a well drilled for the Continental Oil Company. Digging of other wells on river bottom land inside the walls that protect the countryside and systematic tapping of the pool below the river is expected as a result of the success of the well. Forty-foot pilings had to be driven into the river bottom land to support the drilling rig and plank boarding had to be laid over the mud to transport tools and supplies. The well is producing through tubing perforated from 6,358 to 6,364 feet. More than 4,100,000 cubic feet of natural gas are also being produced daily.

DR. F. L. WELLS, of the Harvard Medical School, has discovered that spiders can hear at least some of the sounds audible to human ears. He tested a number of species of orb-weaving spiders, the kind that make the handsome wheel-shaped webs, using a tuning fork of medium pitch, held close to them but not touching them. The spiders showed various responses, ranging from slight movements of the legs to attacks upon the fork itself, as if it were an insect. Most interesting was the reaction of some of the species, which made their webs vibrate or dance violently. The individuals that attacked the tuning fork swathed its end in loops of silk and tried to bite it.

PHOSGENE, the deadly war gas, has been harnessed to the service of medicine by combining it with sex hormones and other glandular products, which are rendered ten to fifteen times more powerful when thus combined. The process of producing these phosgene-hormone compounds has been patented in Germany by the discoverers, Dr. Lorenz Ach, of Mannheim-Walldorf, and Dr. Wilhelm Dirscherl, of Frankfurt-am-Main.