

negative or zero." If it is negative or zero the universe is infinite.

The two-hundred inch telescope now being built in California will see

a larger sample of the universe, Prof. Einstein anticipated, and thus may allow a better answer to this question.

Science News Letter, January 5, 1935

MEDICINE

Seek Cancer Control Through Study of Cell Growth

First Step is to Stop Cell Increase; Next to Find What Makes Cells Mature In Normal Fashion

TEACHING cancer cells to forsake their fast-growing youth and become mature is the ambition of Dr. Frederick S. Hammett of Philadelphia's Lankenau Hospital Research Institute. He reported his latest steps in cancer research to the American Association for the Advancement of Science.

A first important step has been taken through the discovery that a sulfur-containing chemical, called sulfhydryl, is essential both for normal growth and for the riotous growth of "flaming youth" that is one characteristic of cancer cells.

Discover another chemical that will inhibit this wild growth, and Dr. Hammett believes that the first step toward cancer control will have been taken. And sulfoxides, derived from sulfhydryl, might accomplish this if they could be put into the cancer tissues so as to do their work.

This is all very well in theory, but practically, Dr. Hammett pointed out, it is another matter.

A Research Problem

The preparation of sulfoxides is a research problem in itself. Fortunately, Dr. Gerrit Toennies of the Lankenau Institute is solving this. But the sulfoxides used must be able to reach the cancer tissue without getting destroyed themselves by the life processes of the cells which would tend to break them up into ineffective chemical groups. There is also the probability that any such chemical group that could check the growth of cancer cells might also check other cell growth which is essential to health, such as blood cell formation. Finally, even if malignant growth could eventually be slowed by means of this sort, the effect might be only temporary.

Enormous though the difficulties are,

Dr. Hammett and associates refuse to be discouraged.

"To allow oneself to be sidetracked because of the apparent impossibility of solution of the problem set is to admit that scientific progress is impossible," Dr. Hammett declared with the unbeatable spirit of the true scientist.

Determiners of Maturity

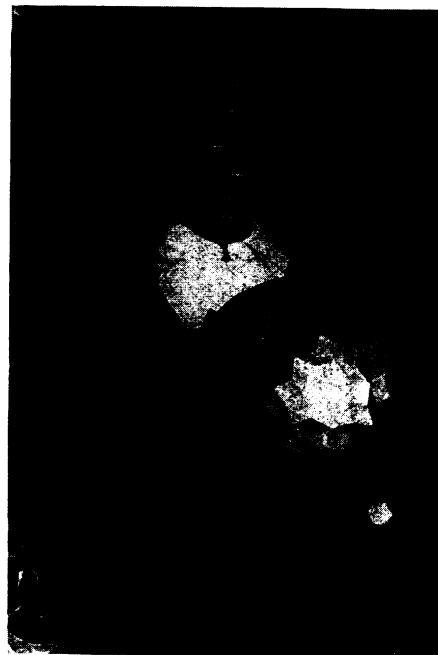
He has, in fact, another string to his bow. That is to discover the naturally occurring chemical factors which determine cell maturity. Since scientists have found the naturally occurring chemical factor, sulfhydryl, that is of major importance in growth of cells by multiplication, he hopes that he and other scientists will be able to discover what chemical group it is that makes them mature, that is, organize and get ready to take over grown-up functions and activities.

Dr. Hammett and associates have been working at this phase of the problem for three years, and while they have attained some results, the work is being continued and he believes it will be many more years before success is achieved. If they can find the chemical agent responsible for cell maturity, and can develop the practical aspects of the sulfoxides that neutralize sulfhydryl's quality of increasing cell numbers, they will be able not only to stop cancerous growth but to do away with its malignancy.

Science News Letter, January 5, 1935

Early men and women learned to grow food plants before they learned to make durable pottery, judging by discoveries in Palestine.

Investigation of the low vitality displayed by children in an English school showed that, for one thing, 62 per cent. of them got insufficient sleep.



HYPER-CUBE

At the exhibit of the American Association for the Advancement of Science, scientists saw this model with 24 dimensions devised by Paul S. Donchian who has discovered a method of projecting symmetrically into 3-dimensional space the hyper-cube series to any number of dimensions, preserving a standard unit edge. This photograph and that on pages 3 and 13 were snapped by the staff photographer of the Pittsburgh Press.

PHYSIOLOGY

Nervous System Likened To Radio Broadcast

THE brain and nervous system should be compared, not to the telephone and switchboard, but to the radio broadcasting system with each nerve a receiving set tuned to pick up its own individual messages, Prof. Paul Weiss, of the University of Chicago, told scientists attending the meeting of the American Association for the Advancement of Science.

The muscles are the operators that tune in their nervous receiving sets to pick up the correct messages, Prof. Weiss said. He bases this conclusion on experiments conducted since 1921 in the transplantation of extra, or supernumerary, limbs and supernumerary muscles on such lowly creatures as salamanders.

Live animals with such transplanted limbs were demonstrated before the meeting. When an extra limb, or series of them even, are transplanted next to the normal limb of the animal, these extra limbs behave like extra sets of

receivers tuned in on the same program as the normal limb. They pick up exactly the same program. When the normal limb bends its hand, spreads its fingers, or flexes its elbow, the extra limbs do exactly the same thing at the same time, although connected with a different nerve and transplanted from a totally different location on the body. The only requirement is that the transplanted limb must be connected with some nerve within that level of the central nervous system ordinarily leading to the limbs; any limb nerve will do.

Just how the muscles act to control

the "selectivity" of the nerve supplying it with signals is not known. It may be through impregnation of the nerve fibers with some specific substance emanating from the muscle, Prof. Weiss said, or it may be a sensitization of the nerve, or some other unexplored possibility.

The older theory that the nervous system may be pictured as a sort of telephone system with fixed pathways connecting the brain and central nervous system with the muscles, must be abandoned in the light of these new facts, Prof. Weiss concluded.

Science News Letter, January 5, 1935

take elaborate precautions to prevent any possible infection of the air of the laboratories. To this end, the exhaust of the machine was mixed with illuminating gas and burned.

Temperature in the tank was maintained at about 70 to 80 degrees Fahrenheit and relative humidity was below 70 per cent. saturation. To avoid consideration of the factor of light, the experiments were conducted in darkness except for momentary observations by an interior tank light or Tyndall beam. The question of light, as well as the density of germs in the air and the number left suspended by an average sneeze or cough, is now being determined.

Science News Letter, January 5, 1935

MEDICINE

Germs Expelled By Coughs Live in Air for 48 Hours

A SCIENTIFIC discovery which holds promise of revolutionizing accepted theories on the possibility of certain respiratory infections being airborne, has been made by William F. Wells, instructor in sanitation at the Harvard University School of Public Health.

The discovery lies in positive evidence that minute droplets expelled in coughing, sneezing or even in talking, do not fall immediately to the floor, but evaporate and may leave behind infective germs which drift about alive in the air for many hours.

According to previous theories these droplets fell immediately, due to gravity, within a few feet of their source. Accordingly, the range of possible infection was assumed to be very small, it being believed that the germs must be inhaled directly as they fell for transmission.

Mr. Wells points out that the most significant feature of his work is the distinction between large and small droplets. The larger do, of course, fall to the ground, as has been known for the past 40 years, but the smaller ones, more minute than finely granulated particles of sugar or sand, never reach the floor at all.

Evaporating almost instantaneously, they leave behind tiny "nuclei," so small they are easily carried about by the lightest air currents. Some types of germs, it was found, remain alive for several days, while others die in less than an hour. The infective danger from the spread of germs in this man-

ner is, of course, limited by their respective rates of survival or viability.

Experiments on the longevity of various kinds of germs showed wide differences. Of special hygienic significance, says Mr. Wells, is the difference in viability between respiratory and intestinal bacteria. While none of the intestinal organisms was found alive after eight hours, four respiratory organisms were recovered alive after 48 hours' suspension in air, including the deadly carrier of pneumonia and the source of diphtheria and scarlet fever.

The apparatus used in these tests comprised a large, closed, glass-lined chamber, in which atmospheric conditions could be regulated, and deadly bacteria injected without fear of their escaping. The germs were mixed in distilled water and projected into the chamber in finely atomized droplets, most of which were smaller than a hundredth of an inch in diameter, and as predicted, evaporated before falling to the floor of the chamber.

At specified times ranging from half an hour to eight days, the air of the chamber was sampled by connecting the glass lined chamber to a small glass cylinder with a rubber tube. The sides of the cylinder were especially prepared with a substance upon which microorganisms feed, nutrient agar.

The rapid revolution of the cylinder drew air from the chamber into it, throwing the bacteria against the sides. Once deposited, colonies developed in the nutrient medium.

During the tests it was necessary to

MEDICINE

One Kind of Streptococci Dangerous in Childbirth

ONLY one kind of streptococcus "germ," known as Group A strain of hemolytic streptococci, is capable of causing definite infection in childbirth, Rebecca C. Lancefield of the Hospital of the Rockefeller Institute, New York, and Ronald Hare of Queen Charlotte's Hospital, London, reported to the Society of American Bacteriologists.

If this kind of streptococcus is present in the birth canal, the mother is almost sure to develop infection which is a serious threat to her life. Other kinds of hemolytic streptococci, however, may be present without causing disease.

These investigators had previously developed a method of separating the sheep from the goats in the streptococcus family. Their test distinguishes those organisms which are likely to do harm during childbirth from those which are not.

Over a hundred patients at Queen Charlotte's Hospital were examined for the presence of the different strains of streptococci at the time of childbirth. All strains obtained from patients definitely sick with puerperal fever belonged to Group A; whereas only one Group A strain was obtained from patients who did not have fever. All other strains of streptococcus "germs" from the mothers not having fever belonged to groups other than Group A.

Science News Letter, January 5, 1935

Ancient Carthage is again the scene of archaeological explorations.