

SCIENCE NEWS

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X-RAYS IN MEDICINE

THE vital part played by x-rays in guarding and improving the health of the people was described by Surgeon General Hugh S. Cumming, of the U. S. Public Health Service, at the opening meeting of the American Congress of Radiology in Chicago on September 25.

"To no branch of medicine does the public health of the nation owe more than to radiology," according to Dr. Cumming. "In fighting cancer and tuberculosis, in protecting industrial workers from the dangers to their lungs and health of certain industrial dusts, in giving accurate diagnoses of tumors of the brain, the x-rays have played a leading part. Upon radiology, perhaps, more than any other single science except surgery, we depend for aggressive and defensive measures against cancer. In connection with the fight on tuberculosis, I know of nothing more valuable than the diagnostic and prognostic means thus placed at the disposal of the specialist.

"In connection with the study of industrial diseases the Public Health Service has for several years investigated the kinds of dust in quarries, mines and grinding establishments. We have found that the best defense against 'dusting' the lungs and respiratory tracts of the workmen in such occupations to a point that is dangerous to their health is periodic examinations of them by the use of the x-ray. Thus we become able to exclude from such occupations those individuals who are most susceptible to the dusting process.

"Another contribution of the Public Health Service came about through the efforts of Dr. Liberson, a roentgenologist serving the three New York Marine Hospitals. Dr. Liberson was first to perfect a method for use in diagnosing tumors of the brain and since his findings 248 operations for encephalography have been performed in these hospitals without a single mortality."

Dr. Cumming paid tribute to the pioneers in radiology who often suffered and died in their efforts to give mankind the benefits of x-rays and radium. "An ardent group of devoted workers have in slightly over thirty years developed a toy into a machine, wonderful in construction, precise in operation, awe inspiring in its effects," he said. "The x-ray embodies the accumulated ideas, the best thought, fearless enterprise and untiring devotion of a large number of physicians, technicians and other scientific men and women. In this great American congress are the men who have raised this wonder child from infancy to helpful manhood. In a single generation we have seen this miracle develop before our eyes."

Dr. Cumming also pointed out that the U. S. Bureau of Standards played an important part in bringing about an international standardization of therapeutic "dosage" of x-rays, and that the bureau, represented at the congress by Dr. Lauriston S. Taylor, head of its x-ray laboratories, has rendered valuable service to manufacturers in standardizing x-ray equipment.

BIRTHMARKS TREATED BY RADIUM

MOLES, birthmarks and similar masses which are known to physicians under the name of nevi may for the most part be safely and permanently removed by radium treatment, it appears from the experience of Dr. William S. Newcomet, Philadelphia radiologist. Dr. Newcomet reported to the American Congress of Radiology the results he had obtained in treating such cases during the last fifteen years.

"There is a well-grounded idea existing among the laity that to treat a nevus is to invite malignancy," said Dr. Newcomet. "Yet it is a well-established fact that many cases of malignancy start from nevi. Unfortunately, even with the publicity that has been given to this subject, there still remains, among a certain class, a constant fear that it is dangerous to remove nevi."

Dr. Newcomet prefers radium to x-rays for treating these cases on account of the susceptibility of the surrounding parts of the body and also because it is easier to confine the effects of radium to a more limited area. In fact, he stated that these marks should always be irradiated with radium, never with x-rays. Occasionally the radium treatment must be followed by surgery to remove scars in the case of very large marks. Sometimes, when the patient has been treated in childhood, some slight deformity has resulted in adult life from lack of development of the affected part or because some of the natural tissues were replaced by the tumor mass. These cases are comparatively rare.

In the majority of cases results of treatment were very satisfactory. The marks or tumor masses had disappeared; the site was practically normal and without scar. No other method could accomplish so much and, while the treatment is not so rapid as some other method, the results are better.

These lesions are not dangerous to life, therefore there is no justification for the employment of any dangerous procedure. In conclusion the fact is stressed that in all cases the mild application of radium may bring about a diminution of the tumor mass and it should always be used previous to operation. Even in severe cases the reduction of the tumor mass will materially reduce the operative risk.

MILD ATTACK OF ENCEPHALITIS

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THE first case of encephalitis in one of the investigators fighting the epidemic in St. Louis appears to have been suffered by Dr. J. P. Leake, U. S. Public Health Service officer in charge of the investigations.

This attack was not incurred as a result of the experiment in which three of the scientists submitted to bites from mosquitoes that had previously fed on encephalitis patients. It is too early for results from this experiment, planned to determine whether mosquitoes do carry the disease, as has been suspected from the fact that they transmit a similar disease of horses.

Dr. Leake himself pooh-poohs the idea that he had an attack, but his associates are convinced that he did. The attack occurred early this month while he was on his way to Washington from St. Louis, to report on the situation to Surgeon General Hugh S. Cumming. The attack was very mild, lasting about one day.

There have been many such attacks during this present epidemic. In fact, the men investigating the outbreak believe that there have been hundreds of such cases that have not been reported, simply because they were so mild that the sufferer did not realize himself that he had anything serious ailing him and failed to consult a physician. In these cases, the attack consists of intense headache, nausea and vomiting. The patient feels very ill for several hours, but by the end of a day has recovered.

This very mild type of case, among other things, has convinced the investigators that the disease which has been epidemic in St. Louis is not typical encephalitis as previously known, and they are now calling it encephalitis B. Further indication that this is a new form of the disease is seen in the fact that there are absolutely no after-effects, which have been a serious feature of ordinary encephalitis. The patients who do not die in this epidemic recover entirely.

The names of the scientists who volunteered for encephalitis-infected mosquito bites have been withheld by the U. S. Public Health Service. This sort of service is considered merely part of the day's work by officers of the service.

Meanwhile encouraging results are being obtained from the efforts to establish the disease in monkeys. If this can be done the need for human guinea-pigs will have been eliminated. Symptoms of the disease are now appearing in the second group of monkeys, inoculated with material from a group that developed the disease after inoculation from encephalitis patients.

PENETRATION OF COSMIC RAYS

COSMIC rays from celestial space that are four times as penetrating as those known before have been shown to exist. They can plow through half a mile of water without being completely absorbed.

Professor W. Kolhörster, working in the cosmic ray laboratory of the Magnetic Meteorological Observatory in Potsdam, and at great depths below the earth in the salt mines at Strassfurt, has obtained evidence for these ultra-penetrating rays. Bombs filled with gas at high pressures served as the cosmic ray meters. Half a mile of water or its equivalent thickness of earth was necessary to cut out these high frequency rays, Professor Kolhörster reports in a communication in a recent issue of *Nature*.

Besides their great penetrating abilities these new rays have the property of maintaining the enormous negative electric charge of the earth which has been puzzling scientists for many years. The earth is charged with negative electricity to a voltage so high that it fairly bristles with the charge. The Department of Terrestrial Magnetism states that in order to maintain this charge a positive electric current of 1,500 amperes must be flowing continuously away from the earth. Something must

maintain this negative charge and Professor Kolhörster believes that the new hard cosmic rays can do this.

American physicists, principally at the California Institute of Technology and at the Bartol Research Foundation, have found that the most penetrating cosmic rays yet observed here could not serve to keep the earth negatively charged, but would tend to discharge it. Experiments at Mexico City have shown definitely that the previously known cosmic rays were made up of both positively and negatively charged particles but that there were more positive than negative particles. These would dissipate the earth's negative charge.

NEUTRONS MADE BY HIGH VOLTAGE

ARTIFICIALLY produced neutrons, made in the Norman Bridge Laboratory of Physics by the use of high voltage rather than radium, may prove to be more effective in splitting the hearts of atoms than anything previously known.

In the brief time that neutrons have been known, they have proved particularly useful for atom smashing. It does not seem to matter how much energy they have. They slip into atomic hearts or nuclei and make trouble that gives physicists important information on the composition of matter. Neutrons are released from atomic hearts by artificially speeded helium ions corresponding to radium-emitted alpha particles but with lower energy.

Several months ago H. R. Crane, a graduate student, Dr. C. C. Lauritsen and Dr. A. Soltan, an international research fellow from Poland, working with the large x-ray tube at the California Institute of Technology, found that artificially speeded helium hearts could be used in producing neutrons. At that time they did not formally publish their results as they desired to perform checking experiments. A report has now been made to *The Physical Review*.

Helium atom hearts are speeded with a potential of a million volts, the limit of the present tube. These slow helium ions are ten thousand times less efficient than alpha particles in producing neutrons. They are, however, so much more numerous in the electrical apparatus that more neutrons can be produced in this way than from any radium source at present available anywhere. In fact, slow neutrons such as those artificially induced by the Pasadena experimenters can not be obtained in appreciable numbers from any radioactive source.

INFLATION AND DEFLATION OF THE UNIVERSE

THE universe is periodically expanding and contracting and we are living at a time when an expanding period is nearly finished and a contracting period is about to begin. This is an alternative theory of the expanding universe pointed out by Dr. Janet H. Clark, associate professor in physiology in the School of Hygiene and Public Health of the Johns Hopkins University, in a communication to *Nature*.

Dr. Clark bases her argument on the fact that the nebulae furthest removed from the earth appear to be receding at the greatest rate and the five nearest neighbors are not receding but are approaching the earth.

The farthest nebulae, so far removed that it takes 150,000,000 years for their light to reach the earth, appear to be speeding away from us at the enormous rate of about 15,000 miles per second. That is what they were doing in the dim past when the light signals now received by astronomers were sent out by them. What they are doing now is a mystery that will not be solved for another 150,000,000 years. The nebulae that are only 3,000,000 light years away have a more modern history. They are only receding at about 350 miles per second.

This variable recession of the outermost nebulae and the approach of the five nearest neighbors of the earth suggested to Dr. Clark that the universe is periodically expanding and contracting. Because astronomers can not "see" all the parts at the same time they can not determine the speed of the various parts at any one instant. It may be that only time and many millions of years of observations on the nebular velocities will solve this problem and settle this theory.

Astronomers compute the velocity of the stars from color pictures or spectra of their emitted light. If the spectral lines are shifted to the red the star is moving away from the observer and the amount of this shift is a direct measure of the velocity of recession. Since the majority of the nebulae exhibit this "red shift" the theory of the expanding universe was propounded.

Sir Arthur S. Eddington, professor of astronomy at the University of Cambridge, England, comments on Dr. Clark's theory in another communication to *Nature*. He welcomes an alternative theory of the expansion of the universe and adds some criticisms of the new theory.

ITEMS

TAKING advantage of the fact that dismantled warships can be obtained for practically nothing, M. Georges Claude, well-known French chemist and inventor, has decided to try at his own expense a new and unusual method of obtaining power to run an ice-making plant, using for the purpose the temperature difference between surface and deep sea-water. Using the Claude-Roucherot process, which was given a trial some years ago in Cuba, it should be possible to utilize economically a temperature difference of only 10 degrees Centigrade. A 10,000-ton ship, the *Tunisie*, is now being reconditioned at Dunkerque, and transformed into a floating ice-manufacturing plant. It is expected that the work will be completed in ten months.

DEATHS are now recorded for the first time in the whole United States. With the admission of the State of Texas to the U. S. death registration area, just announced by Secretary of Commerce Roper, the Census Bureau is able for the first time to compute reliably the death rate for the entire nation. The cause of every death in the United States will now be a matter of record, as will also the age, sex, occupation and nativity of the dead person. When the Census Bureau first began to gather vital statistics for the nation, in 1902, only ten states and the District of Columbia were included in the death registration area. Gradually other states have been added. But six states have been admitted only in the last six years. Texas is still not included in the

area of registration of births. It is hoped that this will be attained during the coming month, however, thus making Uncle Sam's vital statistics 100 per cent. complete so far as area is concerned.

THE bite of a little red simuliid fly has brought blindness to some 45,000 Indians in Chiapas and 5,000 in Oaxaca, according to the Mexican Health Department. The life history of the parasite which the fly deposits in the blood of man is now known, but no good remedy to combat it has been worked out. Because the Oaxaca region is small, Health Department brigades have chosen it as a field of experiment. The larvae of the flies are found among dead leaves along creek and river banks, and by cleaning these and burning the debris some impression has been made on the blindness epidemic. Tumors appear on the heads of those affected, and these are being operated on by the wholesale by the sanitary brigades. This eventually cures the individual if the disease has not gone too far. The tumors are filled with long, thin, coiling organisms that can be seen by the microscope. Being phototropic, or light-loving, these make their way to the eye. Indians with affected eyes are almost blind in the sun, but see better at night.

ULTRA-VIOLET light is being used in Winnipeg, Manitoba, to detect ringworm carriers in the cat population. If Kitty or Tom is carrying the disease, the infected hairs will emit a brilliant greenish light when ultra-violet rays filtered through Wood's glass strike them. The test will disclose the presence of the fungus that causes the disease, even in apparently healthy cats. The importance of determining such carriers is illustrated by a case reported to the Canadian Medical Association. Drs. A. M. Davidson and P. H. Gregory, of the University of Manitoba. A little boy developed ringworm about three weeks after being given an apparently healthy kitten for a pet. The ultra-violet light test showed the kitten to be infected, although other tests had failed to do so. Microscopic examination of the fluorescent hairs confirmed the presence of the fungus. Drs. Davidson and Gregory believe it very probable that the boy was infected by the kitten. Since similar cases may frequently occur, they suggest using the ultra-violet light test on kittens before giving them to children as pets, in order to prevent the disease in the young masters.

SCREW worm flies, long a major cattle pest in southwestern states, have staged a severe outbreak in Florida and Georgia, which has caused a good deal of alarm among cattle raisers in the Southeast. Entomologists of the U. S. Department of Agriculture, however, do not feel that this invasion is permanent. They credit it to the abnormal weather in that section during the present summer. The screw worm fly normally lays its eggs in the carcasses of dead animals or slaughter-house offal, but when these are not available in sufficient numbers it will deposit them in the bodies of living cattle, taking advantage of new brand marks, chance wounds, or tick and insect bite punctures. The larvae or "worms" invade the tissues, causing much discomfort and pain, and sometimes death.