

SCIENCE NEWS

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THE FORCE OF GRAVITY OF THE MOON

If men from the earth were ever able to reach the moon, by the methods of Jules Verne or H. G. Wells, they could engage in warfare in a way unprecedented on the earth, for the ordinary 75 millimeter field gun would shoot three times as far there as did the German long range gun that bombarded Paris during the war. Though the range of the 75 is about 13,000 yards on the earth, on the moon this would be about 250 miles, according to Dr. Fred E. Wright, petrologist of the Geophysical Laboratory of the Carnegie Institution of Washington, who gave a lecture at the institution on November 23.

With the long range gun that bombarded Paris from a point about seventy miles away, and had a muzzle velocity of about a mile a second, the lunar gunner could fire nearly half way around the moon, nearly 3,400 miles. If the gun were pointed directly upward, its shell would reach a height of a thousand miles above the lunar surface. At a muzzle velocity of a little less than a mile and a half per second, which is not beyond the realms of possibility, the projectile could be fired completely off the moon, at the earth or some other planet if desired. For a projectile to leave the earth, it would have to be fired with a velocity of 18 miles or more per second; or at nearly 7 miles per second, if the earth had no atmosphere.

Dr. Wright has made those studies of the diminished force of gravity and lack of an atmosphere on the moon's surface in connection with the work of a Carnegie Institution committee of astronomers, mathematicians and geologists who are collaborating in an effort to learn more about the earth's satellite.

"The geologist, accustomed as he is to working with conditions as they exist on the earth's surface, finds himself in a different kind of world when he studies the moon," said Dr. Wright. "The force of gravity to which he is accustomed, being so much less, many phenomena would be different. For example, volcanoes on the earth throw rocks only a short distance, so that they often fall back into the crater from which they came. But moon volcanoes would throw such material much farther. The result would be that the inside flood of the volcanic craters would be lower than the outer surface, just the opposite of the earthly volcanic conditions. Also the craters would be much larger than any on the earth. Telescopic observation shows that both of these conditions actually occur. Another point of marked difference is the lack of erosion forms on the moon. While so many of the earthly surface features are the result of weathering by wind and water, the moon is without atmosphere and moisture and these forms are absent."

Dr. Wright has also been investigating the force of gravity of the earth and is developing a new form of apparatus for measuring its intensity. The standard

way of doing it is with a very accurate pendulum, but the method is complicated and a week or more is required to set up the apparatus at any one place and make the readings. The new instrument, which measures the twisting of a spiral tungsten spring due to the earth's attraction, gives promise of permitting readings comparable in accuracy with the pendulum to be made in a few hours.

THE IMPROVEMENT OF HIGHWAYS

W. C. MARKHAM, executive secretary of the American Association of State Highway Officials, who believes that the increasing congestion on the highways of the country will force some innovations in highway engineering, among them being cross-overs and cross-unders at intersecting points on all important highways and boulevards.

As a prerequisite for concerted action Mr. Markham's organization has the united backing of every state in the Union. Uniform road signs and danger signals have already been officially adopted unanimously for use in every state, and roadside signs such as "Stop—Eat Here" have been outlawed as being inimical to the welfare of the majority.

Roadways 120 feet wide, well lighted at night by electricity or possibly by some method yet to be applied, such as radioactive substance, will if present trends continue, be policed throughout their entire lengths by "stop" and "go" lights. Instead of speed limits of forty miles per hour it is predicted that all motorists will be required to maintain some minimum figure, such as twenty-five miles per hour; and, failing to do so, they may be arrested for obstructing traffic. A pedestrian who risks his own life and the peace of mind of drivers by crossing opposing traffic may be subject to a sentence in jail if he escapes the morgue. In congested areas, Mr. Markham believes, pedestrian and vehicle traffic will be separated, and probably second story sidewalks will come into use.

As partial evidence to support these predictions, it was pointed out that during the past ten years much improvement has become evident in road conditions, and especially in the last few months. The Lincoln highway in Pennsylvania and Indiana is being widened to forty feet; entering Philadelphia the width is fifty-five feet. The Boston post road is being widened to thirty-six feet. Wisconsin and Illinois are building several four-lane pavements, each twenty foot strip being kept within its bounds, preventing cutting-in either from opposing or accompanying traffic.

In order to cross Wacker drive in Chicago the lowly pedestrian is forced to steer through fourteen lines of autos; but in the not distant future his wails, if extant, will be due to some other cause, for an escalator will whisk him over or under the street.

Throughout the country, a digest of expert opinion

shows, the overwhelming conviction is upon traffic officials that as automobile production, like rain, will not stop because some think we've had enough, the only way out is to find room for more cars. Pico Boulevard in the southwest has been widened to seventy-five feet as a first step, and Cahuenga Pass road out of Los Angeles is now being widened to seventy-two feet. And around Detroit, the cradle of the automobile, eighty-eight foot roads are being constructed on a right-of-way 204 feet wide.

CHILDREN'S DISEASES

THE year 1926 has experienced a wave of very high mortality from measles and whooping cough. This is in accordance with what seems to amount almost to a natural law, namely, that these diseases rise to a peak together, periodically, about every seven years, the last peak having been about 1920. This fact has been established by statistics analyzed by the Metropolitan Life Insurance Company, covering the four principal diseases of childhood, namely, measles, whooping cough, scarlet fever and diphtheria. These four diseases have run a fairly parallel course, and from a study of the Metropolitan's charts, based on the figures collected by the United States Census Bureau, it is shown that there is particularly close correlation between measles and whooping cough. The cause of the periodicity and of the parallel course of these diseases have, so far, found only tentative explanations. It has been suggested that some circumstance in the life cycles of the organisms causing these diseases may have something to do with their recurrence at regular intervals; or, perhaps, the seven-year period may be related to astronomical phenomena influencing weather conditions.

Fortunately the general level of these childhood diseases has been decreasing in past years, but the seven-year peaks still continue consistently to put in their appearance. In the present year, the wave in measles and whooping cough has risen to an exceptionally high crest. It may reasonably be expected that the peak has been passed for these two diseases, but it can not be assumed offhand that the danger is passed for scarlet fever and diphtheria. In the case of scarlet fever present indications are favorable, as the death rate in 1926 has been quite low. As for diphtheria, there is now-a-days a recognized and thoroughly tested preventive known as toxin-antitoxin, and physicians, school teachers and parents are advised by medical authorities to bear this in mind, to consider the advisability of Schick tests and to act on the strength of this warning. With such precautions made available by modern medical research, the year 1927 ought to be a good one for the youngsters.

RAT BITE FEVER FOR PARALYSIS

INFECTING a paralytic patient with malaria parasites has been practised for the past nine years, with varying success; in some cases great improvement has been noted. The malaria is subsequently cured with quinine.

Now comes Dr. H. C. Solomon, of the Boston Psychopathic Hospital, who, with his associates Drs. A. Berk,

M. Theiler and C. L. Clay, have reported in *The Archives of Internal Medicine* that "rat bite fever" is preferable to malaria in alleviating syphilitic paralysis.

Rat bite fever, or "sodoku," say Dr. Solomon and his associates, is superior to malaria, for a number of reasons. "The organisms," he declares, "can be maintained in laboratory animals and is thus always available for use, which obviates the necessity of transmitting human blood, or having on hand a case of human infection. The disease is less debilitating than malaria. A further value is that it can be given to patients who are more or less immune to malaria." The disease itself, says Dr. Solomon, responds instantly to treatment with arsphenamine, which is a specific cure.

Other diseases which have been tried include tuberculosis (tuberculin), typhoid, streptococcus and staphylococcus infections, pneumonia and relapsing fever. Malaria has been used chiefly because of its advantages of being generally controllable with quinine, and of producing high fever which seemed to be particularly valuable.

THE FIRST WORLD SEX CONGRESS

DR. MAXIM BING, Science Service correspondent, writes that the First International Congress on Sexual Research, whose meeting in Berlin has just closed, is regarded by European sociologists, psychologists and scientists generally as a long step in advance in handling delicate and difficult questions that have in the past been suppressed and silenced, with much resulting mischief. The mere fact that such a meeting could be held at all, and problems of sex frankly discussed, is pointed out as an index of modern progress away from the ideas our forefathers entertained on the subject.

The meeting was subdivided into a number of sections. There were separate divisions for physiological, biological, sociological, ethical, criminal and law proceedings. The chief problems dealt with were the questions of the correlation of internal secretion and sex life, rejuvenation, psychology of sex instincts, new laws concerning the criminality of sex, questions of heredity, of compulsory sterilization of criminals, the attitude of the churches toward questions of sexual ethics and the value of juvenile witnesses in law cases involving sex crimes.

The collective opinion of the congress on the question of rejuvenation by surgical means may be summarized by saying that the German theoretical researchers entirely accepted the scientific views of Professor Steinach, of Vienna, even hailed him as the founder of a new branch of medicine and biology. It was agreed by the majority that his methods applied by surgeons on human beings in case of premature senility have satisfactory results, although the duration of the effect of this cure is not yet definitely determined. Dr. Harry Smith and Dr. Benjamin, of New York, lectured on the results of over 500 cases operated by them. Professor Haberland, of Cologne, disagreed with the majority opinion and showed a number of microscopic sections which he stated showed that the implanted glands are absorbed by the system in a short time, their place being filled

up by indifferent tissues. Although he did not absolutely deny an effect if the glands implanted are human ones, he declared that animal glands are absolutely useless.

At the session of the psychologic-neurologic division it was declared that the sexual instinct can not be regarded as a single undivided impulse, but that one has to distinguish at least two separate desires, one being the erotic aiming at sexual union, the other being the parental one, directed at "filling up the universe with human life" as Mrs. Dora Russel, of London, expressed it.

Socially important was the work done on the problem of curing and protecting against venereal disease. A certain caution was advised in the sexual enlightenment of youth. Progress in the combating of venereal diseases by means of the late Professor Paul Ehrlich's salvarsan was generally acknowledged.

The value of the evidences of juvenile witnesses in criminal law suits concerning sexual crimes was called in question. The eminent Hamburg psychologist, Professor William Stern, entirely denied the competency of such witnesses, owing to their tendency of easy suggestibility and auto-suggestibility, their inability to sharply distinguish between real and imagined occurrences, and their dependency on the questioning. He strongly recommended extreme caution. Professor Moll's views were different. He thought youthful witnesses to be not less trustworthy than adults. A middle course was advised by Dr. Albert Hellwig, judge to the court of Potsdam, who said that in doubtful cases the accused should be acquitted, and that the experts in any case should be psychiatrists.

The attitude of the churches towards the problems of sexual life was dealt with from the Protestant point of view by Professor B. von Rohden, of the theological faculty of Halle University. According to his optimistic notion of life, the erotic instinct of man is regarded as a noble one, which helps men to overcome their egotism, sacrificing their interest to that of companion and family. The Roman Catholic point of view was referred to by Professor Johann Ude, of the theological faculty of Graz university. He stood firmly for the indissolubility of marriage, the absolute refusal of any birth control measures, declared as an aim of love exclusively the production of offspring, declared every other aspect to be sinful.

The practice of compulsory sterilization of sick and criminally disposed individuals was deprecated by the congress, on the ground that the present knowledge of heredity is insufficient for such drastic measures. Such measures should be taken exclusively as the result of the free, uninfluenced consent of the person in question.

The next meeting, to be held in 1929, was decided, upon the invitation of Prof. Silvestro Baglione, to be held in Rome.

ITEMS

THE legislative halls of the Arkansas state capitol are being set as the scene of an evolutionary battle like those already fought in Georgia, Tennessee and several other states. Several petitions to bar the teaching of evolution in tax supported schools of Arkansas have

already been prepared, and will be filed when the legislature meets in January. One member of the legislature is said to have made plans to introduce an anti-evolution bill containing the provisions desired by petitioners. The bill, as it has been drawn, is short. The chief paragraph is to the effect that "it shall be unlawful to teach in any educational institution supported wholly or in part by public funds, any theory contrary to the Biblical story of creation of man, or that man has descended from any species of lower animal." Organization of the anti-evolution forces in the state is being perfected in preparation for the coming legislative conflict.

SMALLPOX had more than its average potent-killing power in eighteen states and several of the Canadian provinces in the first half of this year. If the same proportion of deaths had occurred throughout the country that prevailed in the single state of Arizona, 7,000 lives would have been lost of the total 20,561 cases that occurred in this country in the six-month period. From surveys of Metropolitan Life Insurance statistics it is evident that the large numbers of unvaccinated persons both here and in Canada provide ample material for a smallpox situation that may at any time lead to catastrophe. Prevention of the disease by vaccination and re-vaccination is of vital importance to both countries.

MORE fossil fishes and sharks are being turned out in a day by a power shovel operating in the region to the west of Cleveland, known to geologists as the Big Creek basin, than the patience of old time collectors would bring to light in a whole season. Since lots are being laid out in this section of Cleveland shale prized by scientists for its fishy relics or a past age, the Cleveland Museum of Natural History has obtained the cooperation of one of the land companies and funds from friends to manipulate a steam shovel. Though Big Creek is only one foot deep, sharks five feet long are caught by the shovel while the bungalows creep closer every day. Many choice fishes, millions of years old, are being saved to science that would otherwise be lost, according to Dr. J. E. Hyde, curator of geology of the Cleveland Museum.

ELECTRICALLY warmed shelves and artificial sunlight will help tropical monkeys bear up under the London fogs this winter. The old monkey house of the London Zoological Gardens which dates back to 1864 has been torn down and will be replaced by the last word in simian architecture. It will follow the lines of a small experimental house already in use in which the most recent ideas on mammalian hygiene have been put into practice. Electric lights supply sunlight when the natural variety fails and radiators are replaced by electrically warmed shelves. Revolving doors connecting the indoor compartments with out-of-door cages insure fresh air for the apes whenever they so desire. Delicate animals that have previously been kept alive with difficulty have survived cold weather in this new house in good health.