SCIENCE NEWS

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THE SEVENTH STAR OF THE PLEIADES

CORROBORATION of a world-wide legend, rooted in ancient mythology, that once the six resplendent star "sisters" of the Pleiades numbered seven, has been offered by Dr. William A. Calder, of Harvard Observatory. The star "Pleione," identified by astronomers as "Number Seven" of this group, has been suspected in the past as the mysteriously disappeared sister, and careful comparative measurements of stellar magnitudes in this region by Dr. Calder tend to confirm this suggestion.

Pleione was observed to diminish in light about a sixth of a magnitude in a slow continuing decline during the winters of 1935–36–37. Before this investigation, slight changes in the brightness of certain members of the group had been suspected. In this study, Harvard cameras utilized a potassium-hydride photoelectric cell, permitting very exact detection of slow or minute variations in the star light. In all, the relative brightnesses of twenty-five of the most conspicuous stars in the Pleiades region were observed during the three winters of the survey. The report includes a reminder, which is not elaborate, that the spectrum of Pleione formerly had emission lines and resembled that of P Cygni, a star that was at one time a nova. In recent years the bright lines of Pleione have disappeared.

"That some change has taken place in the Pleiades is borne out by tradition," Dr. Calder pointed out. "Almost all nations of the earth have legends about the 'seven who are now six.' The surprising universality of this impression is difficult to explain unless a now diminished seventh Pleiad formerly was conspicuous." Six Pleiades are normally visible to the unaided eye, but under exceptional conditions double this number have been noted. Telescopes show a population of several hundred stars which, for the most part, are members of a physically related aggregation, as is shown by a general unanimity of motion.

PROGESTIN, OESTRIN AND PREGNANCY

IMITATION pregnancies produced in experimental animals by small pellets of paraffin are yielding new light on the delicate balance of the animal body during the growth of the embryo. In addition, the rôles played by the two hormones, progestin and oestrin, receive new significance in view of a report by Dr. S. R. M. Reynolds, of the Long Island College of Medicine, to the biological symposium at Cold Spring Harbor, N. Y.

Tiny cylinders of paraffin were anchored in the uterus of a rabbit whose ovaries had been removed. Suspecting that these paraffin pellets might have a stimulating or irritating effect on the walls of the uterus the rate of growth of the walls was carefully measured. When the pellets of paraffin were too small no growth occurred. There was no stimulation to growth. When the pellets were too large, also, there was no growth. In this latter case it is believed that excessive stretching of the walls cut off some of the blood supply and thus limited the available food to the tissues.

For the special and rather critical size of pellet, however, a growth of the walls of the uterus occurred just as it would during real pregnancy. In a rabbit undergoing this imitation pregnancy, Dr. Reynolds found that injections of the so-called female sex hormone stopped the growth of the walls of the uterus. In contrast, progestin, given off by the follicles which have liberated eggs seemed greatly to sensitize the tissues and promote their growth. Thus, during the development of the embryonic rabbits, there seems to be a device that at first will allow growth to meet the increase of size and then finally will stop the growth of the uterus so that it no longer is able to retain its contents and birth results.

SILICOSIS

TINY traces of aluminum dust added to the already dusty, silica-filled air breathed by certain classes of miners may some day stay the ravages of silicosis. This is the suggestion implied in the medical report of investigators and physicians at the University of Toronto, appearing in the current issue of the *Canadian Medical Association Journal.*

Technical and financial guidance of this research are shared by Sir Frederick Banting, discoverer of insulin, and J. P. Bickell, president of the McIntyre Porcupine Mines, Ltd., of Schumacher, Ont. J. J. Denny, metallurgical engineer, and Dr. W. D. Robson, chief surgeon of the McIntyre Mine, and associate professor Dudley A. Irwin, of the department of medical research at the University of Toronto, have reported as follows: (1) The addition of small quantities of metallic aluminum dust almost completely inhibits the solubility of silicious materials in a laboratory beaker. (2) Rabbits dusted with quartz to which less than one per cent. of metallic aluminum dust had been added showed practically no fibrosis, while control rabbits, dusted with quartz alone, showed well-developed silicosis. Discovery 1 suggests that the addition of the aluminum reduces the ability of the silica to go easily into solution. Soluble silica has previously been recognized as a factor in the dangerous pre-silicosis phase. Discovery 2 bears out the first finding, but uses the more decisive animal experimentation criterion as a test. Results in test tubes and those on living animals sometimes fail to show comparable results as they did in this case.

Behind these two simple but striking and significant results lies a trail of theory and research that goes back to 1930 and to a report by Sir William Bragg, published in a little-known and highly-specialized German technical journal devoted to the structure of crystals. Sir William described the probable molecular arrangement of freshly fractured quartz and a fellow Englishman, P. Heffernan, suggested that the possible cause of acute silicosis arose from the unsaturated oxygen atoms present in such freshly broken quartz. These dissatisfied oxygen atoms, as it were, might join to the lung tissues and hence bring the start of silicosis. After crediting Bragg and Heffernan for prior work the following statement is made:

"This (Heffernan's hypothesis) suggested to us that if the unsaturated oxygen atoms could be satisfied with nascent hydrogen it might diminish the toxicity of silica in tissue and change a fibrosis response into a simple foreign body reaction."

Laboratory test tube experiments came first, but just about a year ago animal experiment was started with 13 rabbits which, for six months, lived in a world of silica dust. Seven rabbits breathed the silica with a tiny trace of powdered aluminum dust added. The other six breathed the silica dust alone. At intervals up to six months the lungs and other organs of these animals were sent to Dr. Irwin for pathological examination in his laboratories at the University of Toronto. In the control animals, breathing the quartz dust alone, the gradual onset of silicosis with its characteristic and spreading fibrous growths in the lungs could be traced. In no case did a similar reaction show in the animals breathing the quartz dust plus the aluminum powder. Both groups of animals had large quantities of dust in their lungs, of course, but in the group breathing the quartz-aluminum mixture the lungs had reacted in simple fashion as they do when any dust is breathed. This well-known condition is called a "foreign body" reaction and it is definitely not linked to silicosis.

It is suggested that a virtue of using metallic aluminum dust as a silicosis preventive is that its specific gravity is almost exactly the same as that of quartz itself. Thus if aluminum dust is mixed with quartz dust it will stay suspended in the air an equal length of time. In conclusion the authors write: "We are of the opinion that the aluminum reacts as in the beaker, when taken into the lung with the dangerous dusts. That is, that the rapid initial rise and concentration of the solution of the silicious material is inhibited, thereby preventing degeneration of the dust cells and the production of fibrous tissue. Due to the remarkable results obtained in the quartz and aluminum treated rabbits in conjunction with the beaker results, it seems reasonable to assume that metallic aluminum in small quantities administered in a similar manner will prevent other forms of pneumoconiosis, such as asbestosis, etc."

INSECTICIDES AND PUBLIC HEALTH

NEED for development of new insecticides harmless to man and domestic animals is stressed editorially by the *Journal* of the American Medical Association in commenting on a recent death from eating apples from which poisonous spray residue had not been completely removed.

Cabbage bought in a public market in the southeastern part of the United States was found to contain from 0.02 to 0.45 grain of arsenic and from 0.09 to 1.24 grains of lead per pound. From 1 to 2 grains of arsenic may be poisonous and even fatal to an adult. The person who ate a pound of these cabbages would be getting from a fourth to one half of a fatal dose of arsenic. In addition he would be receiving the poison of lead and this accumulates in the system, gradually breaking down the health.

The hazard is unfortunately not limited to the eating of spray left on the vegetables. Water supplies, cattle feed, and the soil itself is contaminated. Vegetation grown on the contaminated soil gradually takes up the poisons. In some regions, stock raisers have been forced to go out of business. "One valley in the Pacific Northwest has received as much as 7,000,000 pounds annually of lead arsenate for the past twenty years," the report states. "Therefore perhaps 50,000 tons of lead arsenate has permanently contaminated the soil. Some assume that the spray residue is washed away by rains or is blown away by winds, but the evidence available at the present time indicates that this is not the case."

Three rules that the physicians feel should be enforced legally on the producer pending the elimination of all poisonous sprays are: (1) Remove spray residues as completely as possible from apples and other such fruits, preferably by hydrochloric acid rinse. (2) Do not use skins of sprayed fruits in making cider, vinegar, jelly or other products. (3) Never use lead arsenate or other arsenical sprays on vegetables such as cabbage, cauliflower, Brussels sprouts, broccoli, spinach, kale, celery and snap beans that are eaten whole.

The housewife, in addition, is urged to wash thoroughly all fruits and vegetables that may have been sprayed.

THE DENTAL HEALTH EXHIBIT

AN x-ray photograph of a man with 52 teeth, rings that chart tooth growth much as tree rings record tree growth, tooth decay produced by injection of a pituitary hormone —these and other scientific discoveries in dentistry were exhibited before more than 15,000 dentists at the annual convention in Atlantic City of the American Dental Association.

Open to the public for the first time in its history, the dental health exhibit emphasized the warning of the council on dental therapeutics to "beware of pyorrhea cures which contain sulfuric acid, pumice and tar." There was also official pronouncement that there is "no difference between tooth powders and pastes." Evidence of the 52-toothed man was shown by Dr. George B. Winter, of St. Louis, past president of the American Dental Association. All were imbedded in the bone, some were almost microscopic in size and they had to be removed surgically. The man wore a complete set of artificial teeth, in addition.

Jaw bones from the Egyptian pyramids allowed Dr. Winter to demonstrate to fellow dentists that ancient dwellers near the Nile suffered from impaired wisdom teeth. "Like men and women living to-day," said Dr. Winter, "the Egyptians and other ancient people evidently suffered not only the inconvenience or pain that such teeth may cause when retained, but even deafness or insanity, which have been known to result from impacted wisdom teeth." Dr. Isaac Schour, of the University of Illinois, explained in showing his "tree ring" tooth study for the first time publicly, that rings in human teeth are associated with the rhythmic processes of growth and calcification. Living rats with caries in their teeth after seven weeks of endocrine gland treatment were displayed by Dr. M. T. Barrett, of Philadelphia.

INVENTIONS AND NATIONAL ECONOMY

THIRTEEN important inventions, in the opinion of the Science Committee of the federal National Resources

Committee, "may soon be widely used with resultant social influences of significance."

These inventions, as listed in a voluminous report, recently issued, treating technologic trends and national policy, are the mechanical cotton picker, which may displace millions of southern cotton-field workers; air conditioning equipment; plastics, which are chemically made materials substituting for wood, steel and other substances; photoelectric cell, the "electric eye," that can substitute for human routine operations; artificial cotton and woolen-like fibers made from cellulose; synthetic rubber; prefabricated houses; television; facsimile transmission, by which pictures and messages are sent by wire and radio; automobile trailers; gasoline produced from coal, now commercially practised in Europe; steep-flight aircraft planes, such as autogyros and heliocopters and tray agriculture, or raising crops not upon soil but in tanks of nutrient solutions.

An immediate study of these inventions and their effects on our national economy is urgently recommended. This would be undertaken by experts in science, technology, economics and other fields. Technological unemployment would be investigated by a special committee from government agencies. Science committees should be set up in the federal departments to investigate regularly the progress, trends and economic effects of science and invention. The necessity of a national resources board to plan for the whole nation is pointed out. The whole patent system would be reviewed by a group of social scientists and economists with a view to better adaptation of the system to changing conditions.

The report was prepared by experts under the guidance of a subcommittee on technology with Dr. William F. Ogburn, of the University of Chicago, as chairman and research director, and President John C. Merriam, of the Carnegie Institution of Washington, and President Edward C. Elliott, of Purdue University, as members.

Among the findings are: The large number of inventions made every year shows no tendency to diminish. Inventions create jobs as well as take them away. Because of increased productivity per worker, production of the nation this year would have to be increased 20 per cent. over that of 1929 to have as little unemployment as existed then. Advance of many aspects of industry and the correlated technologies is dependent upon scientific research and discovery. If the contribution of research were reduced, the industries would tend to freeze in a particular pattern. From the early origins of an invention to its social effects the time interval averages about 30 years.

ITEMS

FINSLER'S comet, found by a Swiss astronomer on July 4, can be seen in the northern sky with the naked eye, and by mid-August will be as bright as Megrez, the star in the Big Dipper where the handle joins the bowl. At that time it will be passing above the dipper and through the stars of the handle. Just now the comet is in Perseus, a constellation which can be seen low in the northeast, under the W-shaped group of Cassiopeia, about midnight. It is just bright enough to be seen as a fuzzy spot of light without optical aid if the sky is very clear and free from smoke and glare. A small tail has been observed by astronomers, and this might be seen with a pair of binoculars, which will help in locating the object. Its distance is about 110,000,000 miles, but in August it will be less than half as far away. As it approaches, the tail will increase in prominence. About August 15 it will be nearest the sun, at a distance of about 79,000,000 miles.

THE solution of two century's old mathematical problem is reported by I. M. Vinogradov, of the U.S.S.R., through the Tass Agency. The problem, first proposed by the great mathematician Goldbach in the eighteenth century, consists of proving that each whole number over five can be presented in the form of a sum of three prime numbers. Even as late as 1912 the Congress of Mathematicians at Cambridge, England, stated that the science had not yet advanced sufficiently to solve Goldbach's famous problem. Vinogradov's solution will be published in the Reports of the Academy of Sciences of the U.S.S.R.

AFRICA was once a vast forest-covered continent and the present great deserts of Sahara and Kalahari are the result of a "drying up" of that part of the world. This is the conclusion of Dr. Herbert Friedmann, curator of birds at the Smithsonian Institution, after an exhaustive study of bird specimens from Ethiopia and Kenya Colony. There was a vast and rapid exodus from the steppes of Asia to the then newly created African grasslands. Present-day life of the east African plains is very similar to that which flourished in central and south central Asia during the Pliocene geological era before the great Ice Ages. The ostrich and other birds, such as the vultures, marabou stork, larks, cranes, etc., were originally Asiatic and came into Africa when the great forests disappeared. The present dense jungles of Africa are survivals of the primeval wilderness.

A POWERFUL and spectacular "figure-eight" headlight for the locomotive of the crack train running between Chicago and Minneapolis-St. Paul is the latest means by which, it is hoped, the death toll from grade crossing accidents can be lessened. Shining with 2,500,000 candle power the oscillating light is a vivid warning to motorists that the high-speed train of the Chicago and North Western R. R. is approaching and that they should resist the impulse to cross the tracks even if the train seems far away. The headlight is visible at night for six miles. But it is also used during the day and can then be seen for three miles. The light casts a gyrating beam of light on either side of the right of way for a distance of 800 feet in the shape of a figure eight. The motion of the light spot is caused by a motor-actuated reflector in the lamp which makes the beam undergo its weird, moving pattern. The beam shines down the tracks for over 2,000 feet and gives a warning to approaching motorists when they are still 1,000 feet from the tracks. The lamp is dimmed momentarily when another train is approaching. The new safety measure was adopted for the "400" because it has an average speed of over 63 miles an hour and a top speed of more than 85 miles an hour.