SCIENCE NEWS

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VARIABLE STARS IN THE LARGE CLOUD OF MAGELLAN

A SUPER-GIANT variable star with light flashing up and down so vigorously that its brightness changes from 12,000 to 33,000 times that of the sun within less than one month has been found in the Large Cloud of Magellan, a distant mass of stars visible in the sky of the southern hemisphere. This star is but one of many super-giant variables in the great star cloud that lies at a distance of ninety thousand light years from the earth. A light year is approximately six trillion miles.

One star out of seventy, among the hundred thousand super-giants in the Large Cloud, has been found to be variable. In 1908 Miss Henrietta S. Leavitt, at the Harvard Observatory, published a list of eight hundred variable stars which she found in the Large Magellanic Cloud. Her discoveries were made by the method of superposing a negative plate of the cloud on a positive, and examining the double images so obtained. The two plates used were taken at different times, and the changes of light of the variables in the interval between made their images look bright on one plate and faint on the other. Thus the pulsating stars were detected. An examination of several such pairs of plates, taken at different intervals of time to show the different periods of variation, resulted in Miss Leavitt's discovery of the large number of variables.

Since Miss Leavitt's time, much work has been done in the discovery of variables in the Milky Way. But until very recently no further hunt was made in the Magellanic Clouds. Within the past few years, however, a number of new photographs of this galaxy have been taken at the South African Station of the Harvard Observatory. These new plates, when recently examined, have yielded a rich harvest of some seven hundred hitherto unknown variable stars in the same regions that contain the earlier discoveries.

The finding of these fifteen hundred variables, together with the probability that there are still others too faint to be detected on the photographic plates, furnishes important information on the structure of galaxies, the distribution in brightness of stars and the distances of the systems that contain them.

One of the outstanding results of this recent survey has been the verification of the important period-luminosity relation found for variable stars. Miss Leavitt noticed, in determining the period of time it took the variables to complete one pulsation cycle, that this period was directly related to the brightness of the star. From her data, and from the data derived from variables in star clusters, Dr. Shapley established the period-luminosity relation by means of which the intrinsic brightness and therefore the distance of the stars can be determined. This relation has done more than any other empirical fact to give us knowledge of the distances of stars and clusters and the structural form of the Milky Way.

It is significant that new periods derived for the Magellanic Cloud variables confirm this relation. Not only in the Large Cloud, but in the Small Cloud of Magellan as well, this powerful tool of the astronomer has found its verification.

CHEAPER HYDROGEN FOR INDUSTRY

CHEAPER methods of making hydrogen from powdered fuel were discussed by Dr. A. Thau, of Berlin, at a joint meeting of the Institute of Fuel and the Institute of Gas Engineers, held recently in London. Apart from its use in domestic gas, industrial hydrogen is in increasing demand for the synthesis of ammonia gas, for the hydrogenation of oils and probably in the near future will be used for the liquefaction of coal. The hydrogen is separated from so-called water-gas which is made by the action of steam on red-hot coal or coke.

Great efforts have been made in recent years to reduce the price of water-gas by utilizing a cheaper fuel, as production costs are comparatively high. At present the process depends on the use of high-class lumpy fuel such as coke or coal which is free from small particles.

Dr. Thau pointed out that the size of the fuel is not of so much importance as evenness of grain, which allows an evenly distributed passage of gas over the whole area of the fuel bed in the "producer," where the chemical action takes place.

The first continuously operated water-gas producer to consume powdered fuels instead of lump fuel, continued Dr. Thau, was designed by Dr. Oswald Heller, of Aussig, Czechoslovakia. Exhaustive trials of the system have been conducted at the Tegel works of the Berlin Gas Company. The producer is of horizontal cylindrical shape and superheated steam is blown into it at seven different places.

The trials have not yet reached a conclusive end, but water-gas can be produced by this process considerably more cheaply than before.

THE CAUSE OF PELLAGRA

EVIDENCE that pellagra, the distressing skin disease which has become known as the hard times disease of southern states, may be caused by alcoholism as well as by improper diet was recently presented to the Medical and Chirurgical Faculty of Maryland by Dr. Thomas R. Boggs, chief physician to the Baltimore City Hospitals.

With Dr. Paul Padget, of Baltimore, Dr. Boggs has studied cases of pellagra at the hospital during two ten-year periods, from 1911 to 1920, inclusive, and from 1921 to 1931. They found that alcohol is playing an increasing part in the development of pellagra.

In the first period, there were 24 cases of the disease. Five of these cases, or 20.8 per cent., were due to excessive use of alcohol. In the second period, however, there were 78 cases of which 35, nearly half, were of alcoholic origin. The increase in the total number in

the second ten-year period corresponds to the increased capacity of the hospital, Dr. Boggs explained, and to the increased total admissions, so that the greater percentage increase of alcoholic cases is truly representative of the alcoholism and not merely of a greater total admission.

This research of Drs. Boggs and Padget suggests possible additional factors in the cause of this disease which has made its appearance rather recently in the United States, although it was known for centuries in Europe. At first it was thought to be caused by a germ and to be contagious. This theory was disproved by studies made by Dr. Joseph Goldberger and his associates of the U. S. Public Health Service. Their investigations showed that it was due to lack of an important factor in the diet which they called vitamin G. This factor is found plentifully in lean meat, milk, eggs and yeast, and in smaller amounts in some vegetables.

This vitamin factor is certainly basic in the cause of the disease, Dr. Boggs said. "But alcohol *per se* or other substances in the present day bootleg supply may play a part."

It may be that the liquor acts to inhibit the vitamins, and so causes the disease, or the disease may occur purely because of the irregular and insufficient food supply of the man on a spree, Dr. Boggs suggested. This last, however, would not apply so well to the regular heavy drinker.

Pellagra is primarily a skin disease with a characteristic eruption and discoloration. It looks somewhat like a severe sunburn, and attacks the hands more severely than any other part of the body. It has also nervous complications and rather serious mental disease develops in advanced cases.

THE HEALTH OF SAVAGES

THE popular theory that savages are healthier than civilized men, chiefly because of their diet, has been well discounted in a report of a three-year research into the physique and health of two African tribes. This prolonged study was made by Dr. J. B. Orr, director of the Rowett Research Institute for Animal Nutrition at Aberdeen, Scotland, and Dr. J. L. Gilks, director of the Medical and Sanitary Service, Kenya, East Africa.

The report, published by the Medical Research Council, is a scientific study of the diets and diseases of two East African tribes, the Masai, famous as lion-hunters, and the Akikuyu.

These two tribes, although they live according to nature, are not the healthy, robust creatures the native free from civilization's restrictions is generally supposed to be. They have not balanced their food ration. The Akikuyu diet is too rich in carbohydrate and deficient in calcium, while the Masai have insufficient carbohydrate and cellulose vegetables, that is, not enough roughage. The report points out that improvement might be brought about by increasing the use of green vegetables by both tribes, and of milk by the Akikuyu.

A special study was made of the Akikuyu dinner table. It was found that the ordinary meal consists of a thick porridge called "irio" and a gruel called "ucuru," but the women make a special "irio" of their own, which no males over five years of age eat. In this dish, green leaves and salt are added to the ordinary maize, legumes and plantains. The women have a virtual monopoly of green leaves, and also have a weakness for edible earths and for ashes.

Analysis of samples of these native dishes at the Rowett Research Institute showed that the ordinary "irio" and "ucuru" were very low in the mineral elements vital to nutrition, particularly in calcium.

On the other hand, the leaves eaten by the women were very rich in certain minerals, the percentage of calcium in some being higher than that previously recorded in any natural foodstuff. Some of the edible earths were rich in iron, and one special delicacy, a red millet, which is eaten before and after childbirth, contained fourteen times as much calcium and sixteen times as much manganese as ordinary millet.

The significance of these discoveries lies in the effect which the larger "iron-ration" eaten by the women has upon their health, as they are admittedly superior to the men in physique, and appear to be more healthy and freer from pulmonary diseases. One of the native chiefs was asked why the men did not follow the example of their wives and eat green leaves. "Such food prevents them from being swift of foot if defeated in battle by the Masai," he replied.

THE RECOGNITION OF SCIENTIFIC DISCOVERIES

A GREAT scientist must also be a great salesman if he wants his discovery to be understood and welcomed in his own time. This idea was advanced at the dedication of the Science Hall of the University of Southern California by Professor Wilder D. Bancroft, of Cornell University.

There is more danger of a great new idea's not being accepted than most people realize, said Professor Bancroft. To be received by the multitude of non-discoverers an idea must obviously be acceptable to them in some way or other. This is one of the most fundamental of all questions involved in human progress and at the same time one of the most difficult.

Quoting a great chemist of last century, Professor Bancroft continued, " 'When the prospective genius has done his great work and has communicated it to the world, one likes to think that he can go quietly to bed and wake up famous the next morning.' This, however, hardly ever happens. Very often the work of getting the new idea accepted is scarcely less than that of originating it.

"In many cases the man who has had the idea is not able to get it accepted and this task falls to the lot of another man who may be less clever, but who speaks a language which makes the world conscious of the treasure which it had been offered in obscure words."

Professor Bancroft said that a new discovery is accepted for one of four reasons. It is accepted because it is made by a man of recognized authority or of per-

sonal magnetism, because it clears up points over which people have puzzled or because it shows what to do next, because of extensive proofs, or because the results are useful or striking.

If a good idea falls flat it is customary to say that the time was not ripe for it. However, it may be possible in some cases to change the temper of the time or as Professor Bancroft said, to "ripen time." "To ripen time we must establish our view by many proofs; we must discover something for which the world is ready; we must educate the world up to our discovery, or somebody else must educate the world for us."

Dr. Bancroft gave many examples to show that new discoveries had often to wait many years before being accepted by scientific men. Avogadro's law, fundamental in modern chemistry, was formulated in 1813 but had to wait over 40 years before trained chemists really understood and believed in it.

A Russian chemist, Lomonossoff, who lived from 1711 to 1765, had views on oxidation, the wave theory of light and the nature of heat that were from 50 to 100 years in advance of his time. Thus credit for his discoveries, which were many, has been distributed among others. Even to-day his name is little known. It is only a few years since his work was rediscovered and reprinted by a fellow-countryman.

"One can not count on having some one else exploit one's discoveries and the worker in pure science will not and should not limit himself to discovering only those things which the world knows that it wants," concluded Professor Bancroft. "Consequently, he must make up his mind to sell himself to the scientific world. . . . Since the greatest discoveries are likely to be the ones for which the world is least ready, we see that the greatest scientific men should really be super-salesmen."

ITEMS

FIFTEEN icebergs, instead of the usual scores or even hundreds, represent the total crop of 1931 in the waters off the northern coast of North America. Dr. Olav Mosby, Norwegian oceanographer now cruising on the U. S. S. *General Greene* to study icebergs in the waters off Newfoundland, has wired *Science Service* that during May only thirteen irebergs had been seen south of Newfoundland, and only one during each of the preceding two months. None of this scanty crop of floating ice-mountains got as far south as the usual steamer tracks. The farthest south was the forty-sixth parallel of latitude, which is fully three degrees north of the normal limit for this time of year. Dr. Mosby found also that the Labrador current is still weak and has brought down less than the normal quantity of cold water.

THAT recent earthquakes in southeastern California follow the passing of the moon overhead was announced to the meeting of the Seismological Society of America by Dr. Maxwell W. Allen, of Sanger, Calif. These earthquake shocks are not caused by the moon and they would have occurred anyway without its assistance. But in far more cases than chance would allow, the earthquake occurs when the moon is in a certain part of the sky. The critical time seems to be about five hours after the moon has reached its highest point in the sky and again some twelve hours later. Earthquakes do occur at other times but less frequently. Some weak part of the San Jacinto fault is believed to be the origin of these minor quakes. Probably at some relatively shallow depth, there is a point little able to resist the forces created by the moon and the quake is "set off" at this point. Strong shocks, on the other hand, according to Dr. Allen, take place a few days after the moon is either new or full. Evidently the sensitive spot of the crust in this case is deeper and more plastic. Forces can thus deform this layer without causing a disturbance. Only by the repeated action of the tidal pull from day to day is the quake set off. The moon may produce these effects either by a direct pull on the surface of the earth or by pilling up waters in the upper part of the Gulf of California, in Dr. Allen's opinion. He explained that it is not yet known whether the trigger effect on the quakes is due to water tides or to earth tides.

SIAM'S sacred white elephant bids fair to be matched with a sacred white rhinoceros in Uganda, one of the great British protectorates in Africa. The protection given this rare and diminishing species has become so absolute and exacting that even photographers going into the district to photograph the great beasts are required to obtain a license, and are warned not to do anything to frighten or enrage them. Infractions of this rule are punishable by a fine of a hundred pounds or imprisonment for six months. If the offense is repeated the fine goes up to £250 and the jail sentence is trebled. Any one killing or wounding a white rhinoceros forfeits his hunting license.

DIRECT rays of the sun are being utilized by forest service entomologists in exterminating destructive beetles which in recent years have killed millions of board feet of timber near Diamond Lake, just north of Crater Lake National Park. The treatment is applied by felling beetled-infested trees and exposing the trunks to the sun in forest clearings. "At this time of the year, air temperatures of 85 degrees in the direct sunlight will raise the temperature of the infested bark to 130 degrees Fahrenheit," according to A. J. Jaenicke, federal entomologist in charge of the work. "This," he says, "literally cooks the beetles to death."

THE pencil wood supply near large factories is practically exhausted and the industry is now investigating the possibility of utilizing Alaska red cedar, the finest-grained wood of the Northwest. Cedar wood intended for lead pencils must be soft, light, yet strong, close and straight-grained and free from defects. The older the tree the better pencil wood it makes. The wood from the heart of aged logs that have lain in deep woods for years makes admirable pencil material. A possible substitute for cedar in lead pencils is Pacific coast myrtle. Its wood is light, straight-grained, well-scented and of good color. Both cedar and myrtle woods are immune to the effects of quick climate changes.