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TITAN

THAT the atmosphere of the planet Saturn's largest satellite, Titan, consists of methane or marsh gas and possibly of ammonia has been discovered by Professor G. P. Kuiper, of the McDonald Observatory of the Universities of Chicago and Texas, as a result of successfully photographing its spectra. The Titan thus becomes the only moon in the solar system known to have an observable atmosphere.

This information is being transmitted by the Harvard clearing house to astronomers all over the world, as it has an important bearing on problems concerning the atmospheres of all planets and their moons as well as on the origin of the solar system.

Several decades ago, observations indicated that Titan, which is larger than the earth's moon in both size and mass, had an atmosphere, but the difficulty of getting satisfactory spectra prevented study of the constitution of such an atmosphere, if it really existed.

Now Dr. Kuiper's observations prove the existence of the atmosphere and show that it must have abundant quantities of methane, which is usually called marsh gas and is composed of one atom of carbon combined with four of hydrogen. Its atomic weight is about 16, while that of ammonia, composed of one molecule of nitrogen and three of hydrogen, is about 17. It is the relative heaviness of the atoms of these gases, when compared with hydrogen and helium, which enable them to cling to a moon of rather small surface gravity.

Of great significance to astronomers is the fact that Titan's atmosphere appears to be similar to that of Saturn itself. This may indicate a common origin for the two bodies and also a similar constitution. However, Titan has a density about three and a half times that of water, whereas Saturn itself is lighter than water, the only planet for which that is true. Saturn's low density is explained by assuming it to be composed largely of hydrogen. Atmospheres of methane and ammonia for both Jupiter and Saturn add to the evidence supporting this belief, and the finding of an atmosphere containing large amounts of hydrogen around Titan is further evidence along the same lines.—CHARLES A. FEDERER, JR.

INDIANS OF THE MISSISSIPPI VALLEY AND THE EAST COAST OF MEXICO

THAT early Indians of the lower Mississippi Valley may have had direct connections with Indians on the east coast of Mexico, was stated by Dr. William Duncan Strong, director of the Ethnographic Board of Smithsonian Institution, in an address before the Washington Academy of Sciences.

Pottery unearthed in both areas, in excavations directed by Dr. Gordon Eckholm, of the American Museum of Natural History, is decorated with similar patterns of broad, grooved, incised lines. However, Dr. Strong pointed out, as the pottery found in Mexico dates back approximately to 300 A.D. and that found in the United States is placed at approximately 1000 A.D., it indicates an 800-mile, 700-year migration of the Indians from Tampico, Mexico, to Louisiana. Most of the other significant Mexican evidence of this relationship has long since decayed in the humid Mexican climate.

The oldest Indian culture yet unearthed in Chile and the coast of Peru—a simple fishing population which preceded the agricultural and horticultural civilizations—was also described by Dr. Strong. Fishhooks, bowls cut from lava, barbed harpoons with stone points finely flaked by pressure, and coarse percussion-flaked stone tools made by banging one stone against another to rough-shape the instrument, remain to tell of the customs of this prehistoric people. Junius Bird, of the American Museum of Natural History, with Dr. Strong, brought this evidence to light in the course of a year of intensive excavation.

"The great vistas in time and space revealed by the present program of intensive research and excavations make it abundantly clear that the field of Middle and South American archeology is rapidly ripening, with a promise of rich scientific harvest. It has always been a field of superlative prehistoric interest, but only recently has scientific work been envisaged on sufficiently broad and clean-cut lines to give definite promise of more sweeping and valid culture-historical results," Dr. Strong predicted. "There seems little doubt that when the blight of the present war is removed this type of research work will surge forward in all the American republics."

DISCOVERY OF A METEORITE

A FOUR-POUND meteorite has been discovered quite by accident in a farmhouse yard in the northern part of Cowley County, Kansas. While serving as field representative for an oil company, H. H. Nininger, of the American Meteorite Laboratory, found the stony specimen.

"While pumping a drink, I was, as always, scanning the premises for odd-looking stones," Mr. Nininger reports in the current issue of *Popular Astronomy*. "Under some plum bushes a few steps away I noticed a rusty-looking chunk of rock about the size of my two fists and at once decided that it needed investigation. I stepped over and picked up the rock, which was evidently a badly weathered stony meteorite (an aerolite)."

Students of meteorites seldom have the good fortune to stumble upon a meteorite in the field. This specimen represents a completely new find. No other meteorite has been reported from any point nearer than 50 miles, and the stone is recognized as belonging to a different fall from those.

Meteorites are classified roughly as stone and iron. Iron specimens are more numerous in museums because they are more easily identified. Many more stones than irons, however, have been seen to fall.

A GIANT-GRAINED HYBRID WHEAT

A GIANT-GRAINED hybrid wheat, with individual kernels almost three times the weight of ordinary wheat grains,

is one of the agricultural novelties which Soviet scientists are preparing to carry back into western Russia as soon as it has been cleared of Nazis. A cablegram received here from the Soviet Scientists' Anti-Fascist Committee in Moscow adds that the new grain variety is also highly resistant to practically all known fungus diseases of wheat.

The hybrid was orginated by Academician Anton Zhebrak, member of the Belorussian Academy of Sciences and professor of genetics at the Timiriazev Academy. He was working on his breeding experiments in the White Russian city of Minsk when Hitler's invasion was launched, and carried his priceless propagation stock with him as he left the burning streets behind. Now he is ready to carry the descendants of those grains home from exile, for further tests in their ancestral soil.

Academician Zhebrak's hybrid is a cross between the standard hard or macaroni wheat known botanically as Triticum durum and a recently discovered wheat species from the Caucasian highlands, called Triticum timopheevi. He has patriotically given it the name Soviet wheat, or Triticum sovieticum.

It is from the timopheevi wheat that the new hybrid apparently derives its extreme resistance to fungus attacks. The same species has been introduced into breeding practice in the United States; of no economic value by itself, it is prized for the contributions it makes in hybrid combinations.

Academician Zhebrak has also produced a hybrid between the timopheevi species and common wheat (Triticum vulgare), which has progressed to the stage of large-scale field tests.

Both these hybrids are of the type which geneticists call amphiploid. This means that the full number of heredity-bearing chromosomes in the cells of both parents are added together in the offspring, instead of being halved and the half-numbers then added. This increased chromosome number often gives the resulting hybrids considerable advantages such as increased size and greater vigor.

The chromosome number for timopheevi wheat is 28, for durum wheat the number is also 28, and for common wheat it is 42. The timopheevi hybrid with common wheat thus has 70 chromosomes per cell, while the new Soviet wheat has 56.

ITEMS

NOVAE may owe their sudden flash of brilliance to the union of the small dense cores of Cepheid stars, those variables of the heavens which increase and decrease in brightness with clock-like regularity, according to a theory developed by two British astronomers. The two center cores whirl around each other within a large, tenuous atmosphere, which cloaks the cores so that the star does not appear double. The cores get closer and closer together until finally they unite into a single body. At this point some of the stellar material may be thrown out into space in an attempt of the star to restore its stability, is reported by Dr. R. A. Lyttleton and F. Hoyle of the *Monthly Notices* of the Royal Astronomical Society. As the dense center cores unite, the main body of the star may be torn away and the extremely hot surfaces underneath be exposed. The star would therefore shine for a time with much greater brilliance than its real surface temperature warranted. Novae would be just another stage in the development of these Cepheid variable stars, according to the authors, who think it possible for a star to flare up in brightness enough to be called a nova more than once in its lifetime.

HIGH-OCTANE fuels such as are used in aircraft are not suitable for ordinary automobiles. These fuels produce tremendous pressure, and any automobile engine which could be developed to use them effectively would be too expensive, too heavy and too noisy. This is the opinion expressed by C. B. Veal, of the Coordinating Research Council, Inc., New York, at the Detroit meeting of the Society of Automotive Engineers. Even if designers should produce an automobile engine capable of satisfactory operation with high-octane fuels, petroleum refiners would be forced to adopt expensive and uneconomical refining methods, he stated. "Production of these fuels consumes special chemicals at costs prohibitive in peacetime," he added, "and greatly reduces the yield of fuel per barrel of crude oil."

The man with the wrench holds the responsibility for the service life of assembled machine parts, declared J. O. Almen, of the General Motors Corporation at the same meeting. "Just how much he tightens a nut, bolt or stud determines the ultimate working life of the assembly." He is "held to be a factor 16 times more important than design, metallurgy, or processing." "Good design and materials, heat-treatments, and superior manufacturing processes all are desirable," Mr. Almen said, "but the fatigue strength of highly loaded bolts, studs, and nuts finally is determined by the man with the wrench—and how little, or much, he applies that tool in the tightening procedure." Tests show, according to the speaker, that if the initial tension on a bolt is increased from 1,420 pounds to 8,420 pounds, fatigue durability goes up from 5,960 stress cycles to more than 5,000,000. When a nut is tightened against reasonably rigid abutments to produce in the bolt a tension equal to or greater than the working tension load, the speaker stated, practically no stress change takes place and the bolt's operating strength approaches its static strength.

TRADITIONAL hog-scalding to remove the hair in butchering may soon be "out," replaced by a new scientific method. In the new process porkers are plasticized and peeled. The dead hog is submerged in a tank of liquid plastic, then pulled out coated with the sticky stuff. When properly cooled, the plastic is stripped off, taking all the hair with it. The process is quick, clean, thorough and economical. The plastic used is a resin chemical. After being used on one hog it is remelted and used again and again. Bristles, whiskers, stubble and hairs are removed from the liquid before it is re-used. They are just as suitable for commercial uses as if they had been removed by the old scalding-scraping method. The new chemical shaving method, and the resin chemical used, were developed by the Hercules Powder Company.