SCIENCE NEWS

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THE MILKY WAY IN CONSTELLATION OF CEPHEUS

DARK, obscuring matter in space interferes with our view of the Milky Way in the region of the constellation of Cepheus. Although on a clear evening we may believe we have a clear view of the stars, no part of the Milky Way studied by Dr. A. Marguerite Risley, of Randolph-Macon Woman's College, and Harvard Observatory was entirely free of absorbing material.

Just as the light, fleecy clouds and the dark thunder clouds in our atmosphere keep us from seeing the heavens clearly, so dark matter many light years out in space veils the true brilliance of the stars. Dark lanes and flares are characteristic of Cepheus north of the galactic plane. In some places dark nebulae are visible, while in others, although there is no obvious obscuration, the stars are found to be shining through a thin veil of dark material.

A total of 750 square degrees, three-fourths of the area between 20 hours, 30 minutes, and 0 hours in right ascension, and plus 45 degrees to plus 75 degrees in declination, were studied. Miss Risley reports in *The Astrophysical Journal* that not a single part of this field could be considered unobscured.

The survey points out, however, several comparatively clear regions where the study of the colors of the stars of known spectral type should let us know the effectiveness of the haze, and enable us to get a better idea of the star density in the direction of Cepheus.

T. CORONAE BOREALIS

THE old nova of T. Coronae Borealis, one of the stars in the constellation of the northern crown now high in the evening sky, is believed to have developed a stationary shell. This phenomenon is occasionally observed in early type stars, according to a report by Dr. Rudolph Minkowski, of the Mount Wilson Observatory, but this is the first time on record that an old nova has shown such a development.

T. Coronae Borealis is believed to be a binary system composed of a normal M-type giant and a blue variable star, the old nova. The hotter component of this star, probably the old nova of 1866, is credited by Dr. Minkowski in a report to the Astronomical Society of the Pacific with not only having become brighter, but with also having developed a stationary shell.

The actions of many stars can best be determined by a study of the star's spectrum. A comparison of the spectrum of Nova T. Coronae Borealis made in February, 1943, with one made in May, 1942, states Dr. Minkowski, shows a profound change in the violet and near-ultraviolet while the two are very similar in the red.

A number of absorption lines, characteristic of light shining through a glowing gas, have recently appeared in the spectrum. The faint presence of one or two absorption lines of helium in the earlier spectrum was probably the first indication that this transformation was taking place.

AN IMPROVED METHOD FOR RIFLING ARTILLERY

THE head of the principal national organization for coordinating and making effective for war purposes American scientific resources, Dr. Vannevar Bush, director of the Office of Scientific Research and Development, personally contributes a significant technical advance, among the five hundred and eighty inventions of the week on which patents have been issued by the U. S. Patent Office.

Dr. Bush's invention is an improved method for rifling artillery, which makes practicable a type of gun bore which ordnance men have long regarded as ideal but unattainable in practice. Gun bores at present are cylindrical or practically so. Much better, for the purposes of obtaining smoothness of starting and movement of the projectile when fired, would be a bore having a cylindrical portion near the breech, a gradually tapering portion throughout the greater part of the length, and another cylindrical portion near the muzzle. Such a gun might be rifled with existing tools, but the cost in money and time would be prohibitive.

In Dr. Bush's method, the barrel of the gun is bored and reamed to approximately the desired conformation. Then a plug, with its outer dimensions closely corresponding to the desired shape of the finished, rifled interior, is inserted. This plug has a groove along one side, in which two long wedges operate. These wedges press against the smooth interior of the bore a series of cutting tools, linked into an endless chain, which is slowly drawn through the gun while it slowly rotates around the stationary plug. This produces a series of twisted grooves, properly rifling the gun, no matter what the curves of its breach-to-muzzle profile may be.

The inventor has assigned rights in his patent, no. 2,319,206, royalty-free to the Government.—FRANK THONE.

THE AIRPLANE OF THE FUTURE

FOUR-WHEELED planes with bigger, more efficient engines housed within the wings are possible features of future air transports is predicted by W. W. Davies, United Air Lines research engineer, in a report to the American Society of Mechanical Engineers. Continued rapid development of all types of aircraft engines after the war should produce at least a horsepower for every pound of engine weight, due to better design and improved materials. Engines will be much more powerful. Current research projects indicate that specific fuel consumption at normal cruising power may be cut by nearly a fourth. Fuel of higher octane rating is one means of lowering fuel consumption, thereby cutting down the fuel load per trip.

War experience in the higher altitudes will undoubtedly make it possible to cruise satisfactorily at well above 20,000 feet and yet keep fuel consumption to a reasonable figure. Diesel engines may well power a good percentage of future aircraft, but fuel consumption will not be as amazingly low as enthusiasts have claimed.

Propeller efficiency will be pushed still higher and prop styles may look strange to oldtime fliers. Wide blades, multi-blades, dual or counter-rotating types and probably completely reversible units are some of the possibilities. Into the discard will go conventional landing gears, generally speaking. In their stead will come increased use of the tricycle gear, main wheels plus a nose wheel, and future developments may well see the use of four wheels, two each fore and aft on either side of the fuselage.

Over-all drag of planes has been cut by a fourth through new developments already seeing service. Auxiliary high-lift devices coupled with improved wing design aid materially in maintaining desirable landing and maneuvering speeds.

"Considerable effort has been expended in research toward the production of new wing designs and airfoils," Mr. Davies states. "The wing itself is responsible for a major portion of the over-all drag of an airplane." Reduction in wing area has further lowered the amount of drag. This gives higher wing loadings, often looked at askance because of questionable effects on take-off and landing performance and because of troublesome icing difficulties.

However, larger airports of the future will solve the take-off problem, while complete instrument landing control and better auxiliary high-lift devices will do much to permit increased landing and maneuvering speeds. Use of heat will nullify the icing problem.

For more economical operation of future transports the present bucket-brigade type of loading must be replaced. "Future equipment must be so designed that, regardless of airplane size, complete loading, transfer, and unloading can be accomplished in five minutes." Movable ramps, conveyor systems and docking facilities are some of the possible solutions. Further delay is due to trouble-shooting and repair work during airport stops.

"Future equipment will be so designed," according to Mr. Davies, "that complete replacement of a malfunctioning assembly or unit can be made during a scheduled stop. This may apply even to the complete power plant."

ITEMS

ANOTHER volcano has suddenly burst forth near the now famous Paricutin cone which itself rose unexpectedly from a corn field last February some 300 miles west of Mexico City. When it appeared a burst of fire was seen a hundred miles away in Morelia, the capital of the state of Michoacan. The new cone which is increasing rapidly is located five hundred feet west of the older active volvano. Simultaneously with its birth there was greater activity in the 1000-foot high original crater. Its creation was accompanied by violent and noisy eruptions. Both craters have continued active. The little village of San Juan Parangaricutiro about three miles from the twin volcanoes is reported to be virtually abandoned after the outburst. Dr. Ezequiel Ordonez, dean of Mexican geologists, stated recently that a narrowing of Paricutin's crater was in his opinion the forerunner to a new outburst near-by. He left Mexico City to revisit the volcano and probably was there when the new volcano was born.

THE newly occupied island bases in the southwest Pacific—the Trobriands, Woodlark and New Georgia—are smaller editions of the areas in New Guinea and the Solomons previously recovered from the Japanese invaders. They are the rugged, volcanic tops of submerged mountain systems; the Trobriands and Woodlark constituting an extension of the mountainous "tail" of New Guinea, and New Georgia a short emergent range parallel to those of the other Solomons. Like their larger neighbors, they are covered with lush tropical vegetation, with coconut plantations as practically the only type of agriculture of commercial importance. Mineral resources are unimportant or little developed. The natives are all of the dark-skinned, fuzzy-haired Melanesian stock already familiar to our forces in the field, and to the public through news pictures and newsreels. They are among the most primitive peoples of the world.

THE national medical service of England must be designed to prevent rather than cure. The causes of ill health should be tracked down and removed, the *Journal* of the American Medical Association reports that Ernest Brown, British minister of health, urged recently. It is not enough to organize the treatment of sickness, individual fitness should be promoted and maintained. Every one in England, under the Beveridge scheme, would have at his beck and call when need arose the best medical services that modern science could provide. Yet the medical service could be organized so as to give the average practitioner freedom to utilize his professional talents to the best advantage. The minister of health declared that the government looked confidently to the local health authorities, experienced in meeting both war- and peace-time problems, to undertake the new responsibility.

SEAWEEDS, long neglected by Americans as land weeds, are now under close scrutiny at the University of California as possible sources of food. In rather crude form, they are traditional articles of diet in Japan; and it is considered not impossible that with better processing they might be made palatable to Americans and Europeans. In the botanical laboratories a Chinese scientist, Dr. C. K. Tseng, has transplanted a number of species from offshore rocks to tanks of sea water where they can be studied under known and controlled conditions. His idea eventually is to establish a "submarine agriculture," with large-scale cultivation and regular harvesting methods. A South African botanist now at the University, Dr. George Papenfus, states that several seaweed species along the coasts of his native land have been found to be good sources of agar, a kind of vegetable gelatin needed for laboratory culturing of bacteria and other microorganisms. Before the war, agar was supplied practically altogether from Japan, and the lack of it has been a serious handicap in hospitals and research laboratories.