Royal Astronomical Society on March 14. He provisionally assumed that absolute magnitude could be expressed as a function of the mass plus a constant; also that absorption in the star's interior varies as density/(temperature)$^{\frac{7}{2}}$. A curve was drawn in which Capella, the mass of which is accurately known, was taken as the standard star. The masses of the highly luminous stars were taken from Professor Shapley's results for the Cepheids and Professor Plaskett's recently published results for Algol-variables in which both spectra can be photographed. The other end of the curve was filled in from the masses of the binary stars of large parallax. Professor Eddington noted that he had not expected that the results from drawf stars would fit on the curve derived from giant stars, but to his surprise they did so. He concludes that the principle, enunciated when the giant-and-dwarf theory was started, that the dwarf stars do not obey the laws of a perfect gas, is unsound; that, in fact, these laws are obeyed even for densities much greater than that of the sun. He thought that this fact might be explained by the atoms in the interior of the stars being ionized and stripped of their outer electrons. Their bulk is thereby greatly reduced, and there is room for them to move freely, even when the density is considerable. The interior of the dwarf stars continues to get hotter and hotter, but the surface cools by radiation.

Professor Eddington suggested that the small mass of the dwarfs might be due, as he had indicated some years ago, to the annihilation of matter within the star, colliding atoms destroying each other and liberating the large amount of energy locked up in them. The mass of a star would thus be less in its old age.

The results of the paper would necessitate considerable alteration in the manner of stating the giant-and-dwarf theory. Professor Eddington did not anticipate opposition from the authors of that theory (Professors Russell and Hertzsprung), as he gathered from recent communications that they were reaching conclusions similar to his own.

MORTALITY FROM DIABETES

ACCORDING to the Metropolitan Life Insurance Company one of the most encouraging items in the 1923 mortality statistics of the industrial policyholders is the drop in the diabetes death rate. The decline, it is true, was only 6.4 per cent., the death rate in 1923 being 16.1 per 100,000 as compared with 17.2 for 1922. But slight as is the drop it may have great significance; for it follows a period of three years during which time deaths from diabetes had been increasing continuously and at a considerable rate. Between 1919 and 1922 the rate rose 28 per cent. These figures for the company's industrial department relate to the great group of American and Canadian wage-earners; but there are also available from the ordinary and intermediate departments of the company (which include policyholders of a somewhat higher economic status) figures which show considerable declines in 1923 in deaths from this disease. Among the ordinary policyholders 7.8 death claims were paid in 1923 per 100,000 policies in force as compared with 10.5 claims in 1922; and in the intermediate department, 9.6 claims were paid as compared with 10.2 in 1922.

The interesting fact is, of course, that the lower diabetes death rate last year was contemporaneous with the beginning of the more or less general use of insulin to check the devastating effects of this disease. It is too early, as yet, to say finally that the sudden check in the rising mortality from diabetes is to be credited to the use of this apparently successful treatment. Before this can be done we must have figures showing declines for a series of years, and a greater rate of decrease must be shown. If the rate drops again in 1924 it will be safe to assume that there is *some* well defined cause for the reversal of the trend which was observed between 1919 and 1922. And, as there appears to be no *other* outstanding reason for the check in diabetes mortality last year, it is extremely probable, to say the least, that the increasingly successful and widespread use of insulin was the chief factor in lowering the death rate from this disease.

The mortality figure for diabetes, so far in 1924, is more than encouraging. The January death rate for the industrial policyholders was 17.2 per 100,000 as compared with 20.3 for January, 1923. Obviously, we can not guage the outcome for 1924 by what has transpired in a single month; but the change is in the right direction. If this rate of decline persists throughout the year the fall in the death rate will be more pronounced than that recorded in 1923.

OIL AND HELIUM RESERVES

A SPECIAL commission has been appointed by President Coolidge to study the problem of conserving fuel oil for the navy and providing facilities for storing fuel. The commission consists of Dr. George Otis Smith, director of the Geological Survey; Rear Admiral Hilary P. Jones, president of the General Board and commander-in-chief of the United States Fleet, and R. D. Bush, of the Bureau of Mineralogy of the State of California.

In a statement issued at the White House, Mr. Coolidge said that the commission will make a general study of the problem, but specifically it will review the situation in each one of the navy's reserves and seek to ascertain whether it will be possible to create larger or better protected reserves than those existing. The statement says:

The purpose for which the naval oil lands were set aside was to provide reserves for the future. In order to do this in the best manner the oil should be, wherever possible, retained in the ground. Where this is not possible, however, it should be retained in tankage above ground.

This oil is an important part of the national insurance. At the present rate of production there is estimated to be but twenty years' of oil supply within the limits of the United States. When this is exhausted we will be dependent upon foreign sources for our supply. In time of war such supply will certainly be jeopardized and possibly cut off. Unless the navy has conserved in this country sufficient oil wherewith to fight a war, our national security is seriously endangered.

The general board of the navy, which has made a careful study of the problem of national defense, has recommended a presidential commission to give more careful study of the fuel question. In view of present conditions I have decided to appoint this commission now. This commission will have the same access to data and information contained with the governmental departments as was granted to the United States Coal Commission (H. R. 12,377) Sixty-seventh Congress. The commission will have as its mission the general study of this problem, but specifically it will review the situation in each one of the navy's reserves and endeavor to ascertain whether it will be possible, by assignment of additional public lands, transfers, trades, purchases or otherwise, to create larger or better protected reserves than those existing at present. This not only pertains to the United States proper, but, in addition, to such oil lands as might exist in Alaska.

It is also announced that President Coolidge, by executive order, has created in Mery County, Utah, the first helium reserve in the United States. It is designated as helium reserve No. 1 and consists of 7,100 acres of land in which the greater part of the mineral title is vested in the United States. The reserve is withdrawn from all forms of settlement, location, sale or entry.

Several prospecting permits on the area were issued three years ago and an oil company drilled to a depth of between 3,000 and 4,000 feet. No oil was found, but a helium bearing gas was encountered, which, under the terms of the general leasing law, is reserved to the United States. The extent and value of the deposits of helium are not definitely known, and the lands are still subject to various prospecting permits, but to conserve the helium for government needs, Secretary Work recommended to the President that a reserve be established.

BLACKWATER FEVER IN RHODESIA

ACCORDING to the *British Medical Journal* letters from Dr. J. Gordon Thomson, director of protozoology, London School of Tropical Medicine, who is at present in Rhodesia investigating blackwater fever, report that he has examined for spirochaetes the blood of six patients suffering from this disease. He adopted the method of triple centrifugalization of the blood used by Blanchard and Lefrou (1922), but so far has been unable to confirm their results or to demonstrate spirochaetes of any description. Examination of specimens with dark ground illumination, however, showed numerous fine threads or filaments, varying in length and thickness and possibly derived from the blood platelets, which simulated spirochaetes very closely indeed. Dr. Thomson has also attempted to make cultures—chiefly on Noguchi's medium—of any spirochaete which might be present, but his results have been negative. Inoculation of guinea-pigs has also failed to produce evidence of the existence of a spirochaete. Again, he makes mention of the fact that relapsing fever is fairly common among the native population, and that acute infective jaundice undoubtedly occurs, so it is quite possible that either of these diseases might be superimposed on an attack of malaria or blackwater fever. So far as he has gone Dr. Thomson is inclined to the view that blackwater fever is a manifestation of chronic malaria, and is due to some obscure haemolytic phenomenon caused by repeated attacks of malignant tertian malaria. In the parts of Rhodesia where malaria does not exist there is no blackwater fever, and, conversely, in the areas where malaria is prevalent blackwater fever is common.

BOTANICAL EXPEDITION TO SOUTH AMERICA

PROFESSOR G. S. BRYAN, of the department of botany of the University of Wisconsin, and Francis Macbride, of the Field Museum of Chicago, have returned from an expedition to South America made under the auspices of the Field Museum, bringing with them 6,000 specimens. Professor Bryan collected algae, fungi, lichens, liverwort, mosses, ferns and their allies, and Mr. Macbride collected specimens of flowering plants. Half of Professor Bryan's collection has been given to the Field Museum, and half of it will be placed in the botanical museum of the University of Wisconsin. The expedition, which sailed from New York last February, went *via* the Panama Canal, down the west coast of South America to Callao. From Callao, Professor Bryan and Mr. Macbride went to Lima, then by train over the western mountains to Cerro de Pasco, which is 14,200 feet above sea level. With a pack train they went over the mountains, 75 miles further into the interior, and established a base camp. They made three separate trips from there into the interior, near the headwaters of the Amazon River, which is practically a wilderness with only a few small native settlements. These