through which a light shines. An electrical arrangement measures the amount of light which gets through and makes an automatic record by a moving spot of light on a strip of photographic paper. A single sharp narrow line makes a deep notch in the line on the paper after development. But if the spectrum line is broad and faint, it makes a flat "bay," broad and shallow. The "contour" of the line refers to its shape when recorded by the microphotometer. As the spectrum line of wave length 4481 due to ionized magnesium is ordinarily sharp and narrow, it is well adapted to such studies and was the one used by Mr. Elvey.

Of 59 stars that he has studied, the average surface speed is 60 kilometers (37 miles) a second. The sun, at its equator, turns only about 2 kilometers a second. Therefore if these stars are the same diameter as the sun, which is of about average size, they turn about thirty times as fast, or about once in 24 hours. The sun is about 865,000 miles in diameter and turns once in about 28 days. At the equator of the earth the speed is only about 400 meters, or about a quarter of a mile, a second, because of its much smaller size.

These speeds for the stars are conservative, because Mr. Elvey has made no consideration of the effect of darkening at the limb of the star. Most of the star's light comes from the center as it faces us, the region which is not approaching or receding. This makes the broadening of the spectrum line less than if the light came with equal intensity from all parts of the star.

One star studied by Drs. Shajn and Struve is turning even faster. It is known as W Ursae Majoris, and is in the Great Bear. Though about three quarters as large as the sun, or 650,000 miles in diameter, it turns once in a third of a day.

Science News-Letter, August 16, 1930

Fish Die in Water for Want of Air

Physiology

FISH dying in an abundance of water, because they were not getting enough of the air that is traditionally supposed to be fatal to them, have been the subjects of study in two German laboratories during the past few months.

The researches were prompted by the fact that great numbers of fish died of suffocation under the thick ice produced by last winter, which was unusually severe in Europe; and scientists wanted to know, for both practical and theoretical purposes, just how much oxygen has to be dissolved in water in order to sustain fish life.

Goldfish and carp became distressed and finally died when the oxygen in the water fell to a concentration of from four one-hundredths to one-tenth of one per cent. Whiting, perch, and several other species of fish showed signs of distress at one tenth of a per cent., and died when the concentration fell below eight one-hundredths of one per cent.

The requirements of trout, earlier experiments showed, are higher. This active fish can get along on water containing from five-tenths to eight-tenths of one per cent of oxygen, finds one third that much insufficient, and dies if the oxygen falls below that. Carp can live easily where trout find it suffocating, can endure what kills a trout, but finally die at the low figure of five one-hundredths of one per cent.

Tenacity of life under ordinary hardships does not seem to have anything to do with ability to withstand low oxygen rations. Observers noted last winter that eels, one of the hardest-to-kill of all fish, were the first to suffocate when thick ice cut off the air supply from their water.

Science News-Letter August 16, 1930

Parks for England

THE preservation of natural beauty in England by the transfer of large parks, at present owned privately, to public ownership is advocated by S. K. Ratcliffe in a report to the Royal Society of Arts.

The expansion of cities, and the changing system of land ownership which is reducing the amount of land held by single individuals, is increasing the need for a national park policy in that country if any large stretches of country are to be preserved for the future in their present state. The American national parks were cited as models, but Mr. Ratcliffe proposed that the national parks in England should be barred to motor cars.

National Parks

Science News-Letter, August 16, 1930

Million Volt Globe

THE shiny metal globe which the front cover pictures was spun on a lathe from two flat sheets of copper one-eighth inch thick. It will be used with another by the Westinghouse Electric and Manufacturing Company to measure man-made lightning of 2,000,000 volts and greater.

When high potentials are measured by sphere spark gaps the distance between the spheres must not be greater than their diameters if the measurements are to be accurate, it has been found. One hundred centimeter, 39.3-inch diameter, spheres had been made to measure one million volts. This one is 150 centimeters, 59.16 inches, in diameter.

The old spheres were turned from cast brass and were heavy and expensive. The new one is simply made and weighs little more than 400 pounds. The flat metal was spun against a huge hemispherical wooden form. Two hemispheres of copper were made and soldered together. So accurate are they that their diameters differ by less than one-tenth inch.

Electrical Engineering

Science News-Letter August 16, 1930

Up from New Mexico

THE small town of Roswell, New Mexico, will soon be the scene of preparations for one of the most spectacular and also the most important scientific experiments ever performed. Prof. R. H. Goddard, of Clark University, famous authority on rockets as a means of exploring the upper atmosphere, has gone to Roswell and has announced that he will make his future experiments from that region. The favorable climate, the nature of the country and the clear air were the chief factors that induced him to select the site.

A grant from the Guggenheims recently made to Prof. Goddard, will permit him to continue his experiments on a much larger scale than in the past. Camp Devens, Mass., near Worcester, his home, had been selected before, but the New Mexico location will now be used instead. Prof. Goddard emphasized that the preliminaries would take considerable time, and that it is impossible at present to state when he will start shooting actual rockets into the air.

Astronautics

Science News-Letter, August 16, 1930