which set up a committee on science and social relations last year charged with preparing a report to be issued in 1940.

As visualized by its proponents, S. R. S. would have individual membership not confined to scientists but dominated by them. It would receive, read, discuss, and, after consideration by suitable referees, publish papers submitted to it. It would not in general express group opinions, but leave readers to accept or reject the statements in its publications. It would be a society for the advancement of knowledge, not a propagandist body.

H. G. Wells, Sir William Bragg, president of the Royal Society, Sir F. Gowland Hopkins, Prof. J. B. S. Haldane, are among the 38 scientists who commented favorably on the S. R. S. proposal.

Science News Letter, May 14, 1938

PHYSICS

New X-Ray Tube Arrangement May Reduce Cost of Treatment

Mysterious Radiation From Helium Reported to the Physical Society; Sunset Rays Inform on Upper Air

A NEW and simple arrangement of X-ray tubes which may ultimately reduce the cost of X-ray treatment in cancer therapy was reported to the opening sessions of the American Physical Society by Dr. G. Failla, chief radiologist of the Memorial Cancer Hospital, New York City.

Chief merit of the new system is that it uses existing apparatus and yet eliminates certain parts so that the cost of a superior X-ray therapy installation is cut. Moreover, the "life" of the expensive X-ray tubes—costing $450 each—has been materially increased.

Dr. Failla, well-known American authority who has served on international committees on X-ray dosage standardization, told his fellow scientists that the key point in the new, cheap installation is the use of two X-ray tubes working on alternating current.

Part of the past expense of X-ray treatment has been the necessity of using rectifying tubes which turn the alternating current from high-voltage transformers into direct current for use in the tubes.

By the Failla setup alternating current is employed and each tube works on a "half-wave" of the cycle alternately. One tube is placed below the material, or patient, being radiated and the other tube above so that double the intensity is obtained. In tests a radiation intensity of 7,000 roentgens per minute has been obtained, as compared with the 50 roentgen per minute output of standard equipment.

"The surprising thing," said Dr. Failla, "is that the tube life with this arrangement is longer than usual. In the case of two such machines used at Memorial Hospital for routine treatment of patients, one of the tubes has been in actual operation for over 3,700 hours, and is still in good condition. This is an important item, considering that each tube costs about $450."

Cosmic Rays in Cavern

Deep Linville caverns in North Carolina have been the latest laboratory of cosmic ray scientists, it was reported.

Prof. Walter M. Nielsen, Duke University, and Dr. K. Z. Morgan of Lenoir-Rhyne College, have been carrying their instruments down into the cavern blackness measuring the intensity of the penetrating component of the rays, which pierced the overlying rock.

The important finding of the research was the discovery that the effects observed can be produced by a cosmic ray having the nature of an electrified particle, like an electron. It is not necessary to assume the transmission of cosmic radiation to great depths by an uncharged particle such as the postulated neutrino.

Sunset a Clue to Upper Air

The fleeting rays of the setting sun are being used by scientists to study the temperature of the atmosphere at heights far above any possible balloon ascension, it was reported by Dr. E. O. Hulburt of the Naval Research Laboratory, Washington, D. C.

Direct measurement of the earth's atmospheric temperature and pressure have been obtained up to heights of 13.8 miles (the National Geographic Society-U. S. Army Air Corps) in manned balloon ascensions. Unmanned, smaller balloons have reached about 19 miles, said Dr. Hulburt.

Searchlights have been used to probe air and their rays have been detected, photographically at night, up to heights of 17 miles. However, Dr. Hulburt indicated, exact values of atmospheric density have not been obtained beyond a height of 14 miles by this searchlight method.

By the new system sunlight is used. "As the sun sets the earth's shadow above the observer moves upward and the region of the atmosphere illuminated by the direct rays of the sun moves to high levels," said Dr. Hulburt in his report.

At dawn, the reverse sequence occurs and the sunlight starts from high altitudes and gradually works down to the surface of the earth. Both dawn and dusk measurements were employed in the research.

The study involved the measurement of the brightness of the zenith sky for about an hour after sunset and an hour before sunrise. From these brightness studies, plus the known intensity of sunlight and the laws of scattering of light by air, the density (or pressure) and the temperature of the atmosphere was determined.

The temperature, said Dr. Hulburt, came out to be between -50 and -80 degrees Fahrenheit, from 8 miles to about 35 miles above the earth's surface. No important changes in upper air temperatures were noted in tests running from October to April.

"It must be remembered," Dr. Hulburt concluded, "that the results refer only to the atmosphere during conditions of twilight in a temperature latitude (Washington, D. C.). One would expect that the upper air grew warmer during the day and cooler during the night. However, the day and night change may not be very great."

Mysterious Radiation Found

A new type of yet-unexplained, continuous radiation has been discovered in the spectrum of helium, it was reported by Prof. A. G. Shenstone of Princeton University.

Prof. Shenstone set out to study the spectrum of helium in an attempt to produce, in the laboratory, some of the

spectral lines found in the light of the sun's corona.

None of the sought-for-lines appeared, said the Princeton physicist, but—as so often happens in research—a new discovery was made. Prof. Shenstone passed an electric current through a chamber of helium gas and excited it until it gave off its characteristic pale blue-violet rays. Near the two electrodes of his discharge tube the usual and long-known line and band spectrums of helium were obtained.

However, his studies also disclosed the new continuous radiation almost on the surface of the positive electrode and also at a point about midway between the electrodes. By analyzing the radiation, Prof. Shenstone has shown that it extends continuously from the red colors into the ultraviolet region.

The new continuous spectrum has apparently no relation with the usual line, or band, spectrum of helium, says Prof. Shenstone. No accepted cause, which might explain its presence, has yet been worked out.

However, Prof. Shenstone suggests that the new radiation might be caused by the slowing down of the electrons, of the gas, as they approach the positive, or anode terminal. This is only a hypothesis, he added, however, which will require further study before acceptance.

Nitrogen Isotope "Plant"

A rare kind of sulfur, the isotope whose atoms are mass 34 instead of ordinary mass 32, has been concentrated by Dr. Harold C. Urey, Nobel chemist of Columbia University, in the latest of his separations of the different varieties of matter. H. G. Thode, John E. Gorman and Dr. Urey presented a joint paper announcing this latest achievement disentangling the isotopes.

Sulfur mass 34 has been concentrated threefold to 6.8 per cent. compared with 2.3 per cent. which is its frequency in natural sulfur.

In giant towers of glass at Columbia University, scientists are also tediously concentrating the rare isotope of nitrogen, having mass 15. Each day the large apparatus produces only a tiny drop of the rare nitrogen isotope, containing only 0.15 grams of material. Yet this rate is 100 times that of any other method.

Two columns of glass are used. One is 40 feet high and the other 25 feet high. A 46-fold increase in concentration of nitrogen 15 has been effected with the apparatus and a still greater tenfold increase is expected as soon as a third tower 50 feet tall is added to the other two units.

Streamlined Golf Club

Something new for golfer, a streamlined golf club, was described at the meeting by Dr. S. J. Crooker, consulting physicist. Dr. Crooker exhibited a "tear drop-shaped" club which has only one-fifteenth the air resistance of a club head of the orthodox shape.

Streamlining is vital in a golf club, Dr. Crooker indicated, because at impact the club head meets the ball with speeds of something like 125 miles an hour. At these airplane speeds the application of aerodynamics to the shape of the club head has the same merits as it does to the shape of a modern transport airplane.

In windtunnel tests the superiority of the new club to the older kind was strikingly apparent. A long-hitting pro golfer, like Jimmy Thomson, should be able to strike a ball and have it carry 275 yards before hitting the ground, said Dr. Crooker. To which golfing "duffers" in the audience of physicists at the meeting added, "Woe is me!"

Science News Letter, May 14, 1938

From Page 315

said Prof. Harlow Shapley, director of Harvard College Observatory.

The two kinds of matter positively identified are galaxies and radiation, said Dr. Shapley. A third kind, star clusters, is indicated by preliminary observations still in progress.

"Of isolated stars, meteoroids and gas, we have no evidence," he declared, "and can make only rather insecure inferences."

Metagalaxies are the most extreme galaxies known to astronomers. Metagalactic space is the most distant observable region of space which can be photographed on the largest astronomical telescopic camera.

Science News Letter, May 14, 1938

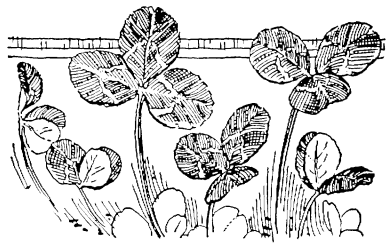
Piano wire is used in a soap factory to cut slabs of soap into small bars.

To relieve traffic congestion in Paris, a vehicular tunnel 2,700 feet long is being constructed.

Planting shrubs two or three feet away from a house allows space for painting or other work on the building when necessary.

AGRICULTURE

NATURE RAMBLINGS
by Frank Thone



New Kinds of Silage

GRASS, and legumes like alfalfa, soy beans, and cowpeas, go into silos on farms in the Northeastern states nowadays, where only chopped-up cornstalks went before. This one change in farm practice will be of incalculable help in the national campaign to check ruinous soil erosion.

For grass and the legumes are reckoned as soil-conserving crops, whereas corn, green goldmine though it is, must be counted as a soil-destroying crop because the clean cultivation it requires exposes loose soil to the action of running water.

Silos are indispensable in dairy farming, and highly desirable in the feeding of other kinds of livestock, because the slightly fermented, sauerkraut-like green fodder stored in them is not only highly nutritious but rich in vitamins. The fermentation keeps out undesirable kinds of microorganisms in much the same manner that sour-milk bacilli keep out putrefactive bacteria in the making of acidophilous milk and similar fermented health drinks.

Hitherto, corn and a few similar plants have been the only practicable materials for ensilage, because grasses and legumes do not contain enough