THE OPTOMETER SKIASCOPE.

Dr. Sureau has recently presented to the scientific world a most ingenious apparatus designed for ascertaining in a positive manner the nature and the degree of the different anomalies exhibited by the eye (myopia, hypermetropia, astigmatism, etc.)

A normal or emmetropic eye, as we know, sees a distant object clearly; that is to say, the image of the latter forms with exactness upon the retina. In a myopic (near-sighted) eye the image is formed in front of the retina, and in a hypermetropic (long-sighted) eye it is formed behind; hence the use of divergent glasses for the correction of myopia and that of convergent ones for hypermetropia. Astigmatism is due to the fact that the power of the eye is variable in the different meridians, there being a maximum meridian of power and a minimum meridian of the same placed at right angles. In order to correct astigmatism, recourse is had to spherical glasses, and it is very important for the oculist to determine the exact position of the maximum meridian in order that he may be able to give the correcting glasses the proper inclination.

The examination of an abnormal or ametropic eye, therefore, constitutes a long and difficult operation, and one that through that fact is subject to error. Dr. Sureau renders it rapid and easy, and, it may be said, of almost absolute certainty, with his apparatus, which registers the observations automatically. It consists, in the first place, of an optometer formed of three vertical, parallel wheels, movable around a horizontal axis. One of them carries 18 cylindrical glasses—9 convex and 9 concave—numbered: 0·5, 1, 1·5, 2, 2·5, 3, 4, 5, 6.

The second carries 18 spherical glasses—9 convex and 9 concave—numbered: 0·5, 1, 1·5, 2, 2·5, 3, 3·5, 4, 4·5.

The third carries 7 additional glasses designed for strong ametropias, and numbered: + 5, + 10, +15, − 5, − 10, − 15, − 20.

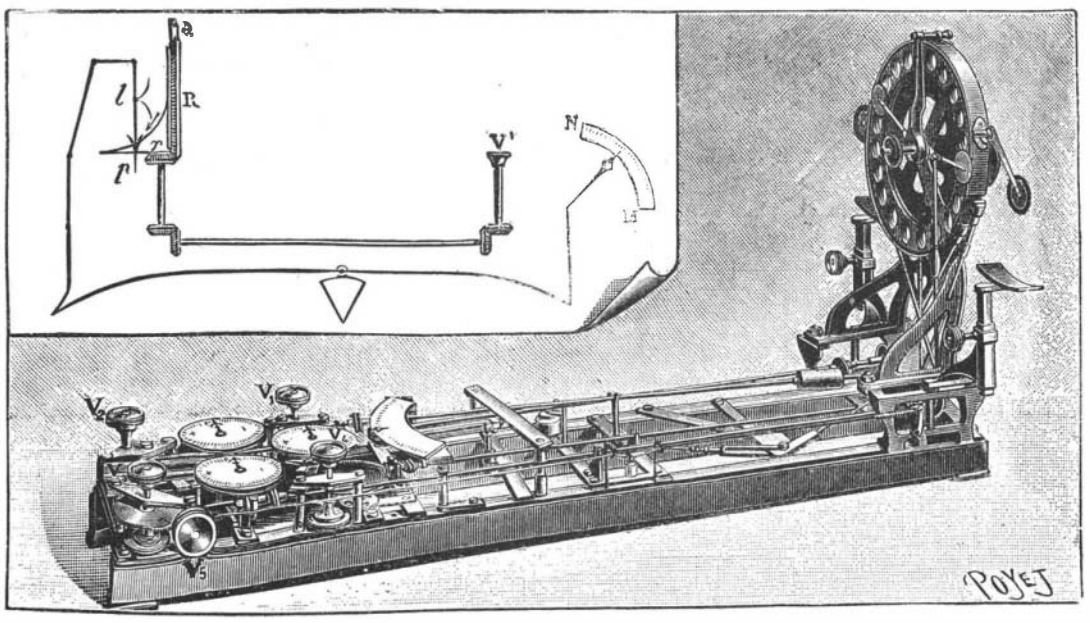
The sign + relates to convergent glasses and − to divergent ones. The two series of glasses are separated on each wheel by two orifices. We have thus a complete optometer, with which the physician will be able to measure the most diverse anomalies.

The eye is placed in a fixed position, so that any one of the glasses of the optometer may be passed in front of it. Each wheel is connected, through a mechanism, with a needle that moves over a dial so divided that the number in front of which the needle stops corresponds to the number of the glass placed in front of the eye of the subject. On another hand, a button placed under the hand of the observer affords a means, through the intermedium of levers, of maneuvering the wheel at a distance.

A peculiar mechanism permits of registering the degree of inclination of the cylinders necessary in the determination of astigmatism. To this effect, each of them is set into a toothed wheel, a, which engages with the teeth of a wheel, R, so that the rotation of the latter causes all the cylinders to turn at the same angle. Behind, there is a piece against which bears a lever that communicates with the needle of a quadrant, M N. On another hand, there is arranged a rod connected on one side with the wheel, R, through a toothed wheel, p, and, on the other, a button, V'. If a rotary motion be given to this button, it will be transmitted to R; that is to say, to the cylinders, and, at the same time, to the needle of the quadrant. This needle will indicate, very accurately in degrees, the amplitude of the angle described by the cylinders, and, consequently, their inclination upon the horizon.

The adaptation of this mechanism to the optometer permits of maneuvering it at a distance. Under such circumstances the skiascopic method for the examination of the eye is all indicated. This justifies the name of the instrument—the optometer skiascope. The modus operandi is as follows:

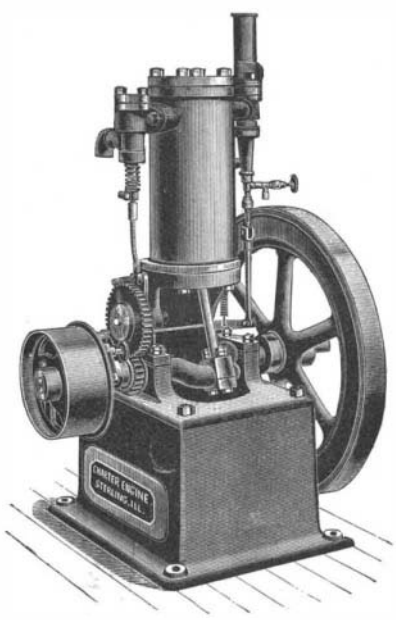
A pencil of luminous rays is projected into the eye of the subject, placed behind the optometer, with the ophthalmoscope, while, at the same time, the different



SUREAU'S OPTOMETER SKIASCOPE.

buttons of the apparatus are revolved according as need be.

The oculist then ascertains whether the entire pupil is illuminated at once or only progressively. If the former is the case, the eye is myopic by one diopter. If the illumination is progressive and the luminous zone moves in the same direction as the mirror, the eye



THE CHARTER GAS AND GASOLINE ENGINE.

is myopic by more than one diopter. If the contrary is the case, the eye is normal or hypermetropic.

Astigmatism is distinguished by the persistence of a shadow in a meridian, while in the perpendicular meridian the illumination will be total. After making these observations, it only remains to read the dials in order to write the prescription for eyeglasses. The operation is performed very rapidly, and with mathematical precision. So the use of this instrument is particularly indicated in all cases in which it is necessary to make visual determinations upon a large number of subjects, and it is to be hoped that it will soon be utilized by the ministers of war and of the navy, in both of which branches of the service it will render surgeons great services through a great saving in time.—La Nature.

Dr. Francis Henry Underwood.

Dr. Francis Henry Underwood, United States consul at Edinburgh, died in that city, August 8, from blood poisoning resulting from a carbuncle on the back of the neck. The Scotsman, of the above city, has a long and interesting sketch of the life and labors of Dr. Underwood. He was born at Enfield, Mass., on January 12, 1825. He was educated in Amherst, and at the age of 16 was left dependent upon his own personal exertions. Starting life as a schoolmaster in Kentucky, he afterward entered upon a legal training, and was admitted to the bar.

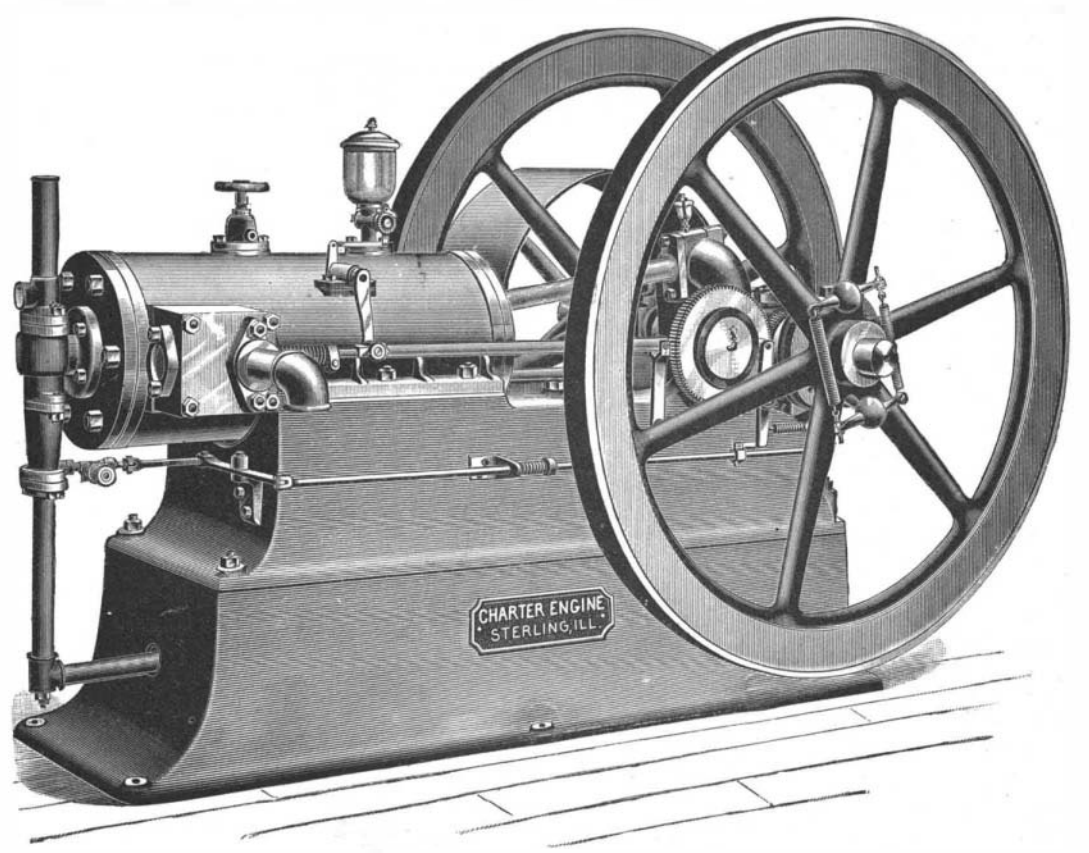
It was as a brilliant man of letters, says the Scotsman, that Dr. Underwood was best known, and will always be remembered. Though his studies were mainly in English literature, his writings cover a wider field. In his own person he constituted an addition to the long and honored roll of American citizens who have shown how felicitously eminence in literature may be combined with high diplomatic talent.

THE CHARTER GAS AND GASOLINE ENGINE.

The illustrations show two constructions of the Charter gas and gasoline engine, manufactured at Sterling, Ill, by the Charter Gas Engine Company, one being the double flywheel construction followed for the large sizes only and the other the vertical, made in but one size, viz., 1¾ indicated, 1¼ actual horse power.

The only change made in this engine since January, 1890, has been in operating the exhaust by a cam instead of an eccentric, the cam motion being shown in the larger cut. This has proved to be an improvement in facilitating the quiet working of the machine, as the motion is much more even than heretofore. This motion had been previously in use on the vertical engine, and has now been applied to the horizontal for all purposes. This engine uses gas, either manufactured or natural or producer gas, as preferred, and also gasoline, and in the use of the last named fuel its simplicity and safety have been attested by years of highly successful practice.

It is not affected by cold or changeable weather, and does not depend upon the temperature of the air or its degree of saturation to get the gasoline into the cylinder.



THE CHARTER GAS AND GASOLINE ENGINE.

Effect of Great Cold on Animals.

Pictet, the French chemist, finds by subjecting animals and insects to the intense cold obtainable from liquefied atmospheric air that animals show a wonderful power of resistance to its effects. A dog placed in a copper receiver at a temperature of —60° to —90° C. showed a rise of bodily temperature of 0·5° in ten minutes, and after an hour and a half had only lost 1°. A little later, however, nature gave up the struggle, the temperature fell rapidly, and the animal died suddenly. Insects resist a temperature of —28° but not —35°, while myriapods live down to —50° and snails to —130°. Birds' eggs lose their vitality at —2° to —3°; ants' eggs at 0°. Infusoria die at —90°, while bacteria are still virulent at —213°. This last fact is, perhaps, the most significant of all.