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(Illustrated articles are marked with an asterisk.)

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No. 139,

For the Week ending August 31, 1878.

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THE RIGHTS OF INVESTIGATORS.

In the SCIENTIFIC AMERICAN SUPPLEMENT for July 20, 1878, there was published an article entitled "How to Build a Working Phonograph," with working drawings for the construction of a cheap and practical instrument.

In so doing we have only carried out the wish of the inventor, as expressed to us, in helping to give the widest publicity to his invention. The company which has purchased the right to make the phonograph for commercial purposes, however, take a different view of the matter, and protest that it is not only inconsistent on our part so to encourage infringements, as they term it, but illegal on the part of our readers to follow the directions we have given for making phonographs for experimental purposes.

The law on this point is not obscure. Investigators have rights as well as patentees; and among these is the right to make any patented article for the purpose of ascertaining its sufficiency to produce the described effect; in other words, for testing its practical utility.

If this were not the case the progress of invention would be very seriously hindered: improvements would be next to impossible; and practical investigators and students—from whom most inventions come—would be grievously hampered at every stage of their progress.

As it appears to us, the parties controlling the phonograph, like the telegraph companies, have missed, or rather have refused to avail themselves of, a most profitable field of operation, in not meeting promptly the eager public demand for experimental instruments.

THE PLANET VULCAN.

After twenty years of dispute, complicated by many doubtful and conflicting observations, the intra-Mercurial planet discovered by the Parisian physician, Lescarbault, will probably now have to be admitted to full standing among the planets.

Ever since Le Verrier completed his demonstration of the existence of a disturbing body somewhere between Mercury and the sun, not a few astronomers have been convinced that only a favorable opportunity was necessary to verify by sight the evidence of mathematics.

Among these was Professor Watson, whose confidence was so strong that he went to Colorado determined to make the search for Vulcan his chief business. He said to a townsman on his return "I was satisfied that there was a planet within the orbit of Mercury, just as I am satisfied that there is one outside the orbit of Neptune.

In his report to Rear Admiral Rodgers, Superintendent of the United States Naval Observatory, Professor Watson says. "I have the honor to report that at the time of totality I observed a star of the four and a half magnitude in R. A. 8h. 26m. dec. 18° north, which is, I feel convinced, an intra-Mercurial planet. I observed with a power of forty-five, and did not have time to change the power so as to enlarge the disk. There is no known star in the position observed,

and I did not see any elongation, such as ought to exist in the case of a comet very near the sun. I will hereafter report to you fully in regard to observations made. The appearance of the object observed was that of a ruddy star of the four and a half magnitude. The method which I adopted prevents the possibility of error from wrong circle readings; besides I had memorized the Washington chart of the region, and no such star was marked thereon.

Speaking of the discovery, the English astronomer, Mr. Lockyer, said that he did not look for Vulcan and did not see it, though he believed in Le Verrier's prophecy that it would be found at some time. He added: "We may rely upon Professor Watson's statement that it is not a comet, and it is certainly not a star, therefore it must be a planet, and, from its position, an intra-Mercurial one."

Much to Professor Watson's delight his discovery was in a measure confirmed by that of Mr. Lewis Swift, of Rochester, who was at a neighboring station. Mr. Swift's observation seems to have been, in a sense, accidental, yet there is no reason to question its scientific value. In giving an account of his discovery to the Rochester Democrat, Mr. Swift says: "About one minute after totality two stars caught my eye about three degrees, by estimation, southwest of the sun. I saw them twice and attempted a third observation, but a small cloud obscured the locality. The stars were both of the fifth magnitude, and but one is on the chart of the heavens. This star I recognized as Theta in Cancer. The two stars were about eight minutes apart. There is no such configuration of stars in the constellation of Cancer. I have no doubt that the unknown star is an intra-Mercurial planet, and am also inclined to believe that there may be more than one such planet."

AMMONIA IN THE AIR.

Dr. R. Angus Smith, who has done so much for the chemistry of the air, lately read before the Manchester Literary and Philosophical Society a paper on the distribution of ammonia, in which he described the simplest method yet proposed for determining the amount of ammonia in the air. And since such ammonia may be taken as an index of the amount of decayed matter in any locality, the hygienic importance of an easy test for it is not small.

Of the practical working of the test Dr. Smith remarks that it must not be forgotten that the ammonia may be pure or it may be connected with organic matter; and consequently this mode of inquiry is better suited as a negative test to show that ammonia is absent than to show what is present. When ammonia is absent we may be sure that the air is not polluted by decaying matter; when it is present there is need of caution.

SOFT VS. HARD IRON.

A series of most careful experiments recently undertaken by Mr. David Kirkaldy, to find out the relative merits of wrought iron plates manufactured by Krupp, of Essen, and those made in Yorkshire, demonstrated that, as regards the elastic limit, or the amount of load at which the elasticity becomes impaired, the result was in favor of the Yorkshire plates by 9.2 per cent, which is attributed to their greater hardness; but that the ultimate or breaking stress was in favor of the Essen plates by 5.5 per cent, the softness of the iron, as shown by the contraction at area of fracture, being also in favor of this latter.

To ascertain the reduction of tensile strength by drilled and punched holes, 42.5 per cent of the plates was removed by rivet holes made in their centers 2 1/2 inches apart between