SERING THROUGH A PLANET.

By R. A. PROCTOR, B.A.

Very strange news has recently reached us from an Australian observatory. Mr. Todd, of Adelaide, using a very fine telescope 8 in. in diameter, believes that he has two or three times seen a satellite of Jupiter, through the edge of the planet's disc as it were. Thus on July 2, he saw the innermost of the satellites for a few minutes through the southern dark belt at that time present on Jupiter. "The definition was very good," he says, "or I should think I might be deceived." On this occasion, he adds in a note, "The satellite was distinctly seen through the edge of the planet for the space of its (the satellite's) full diameter." If no optical explanation can be found for this observation, we should have to accept the inference that the apparent outline of Jupiter's disc lies more than 2,000 miles from the real surface of the planet. We should have indeed to infer much more than this. For it is quite certain that one of Jupiter's moons could not be seen through the atmosphere of the planet, if that atmosphere extended about 2,000 miles below the level at which it seemed to form the visible outline of Jupiter. The conclusion to which we seem led if we accept Mr. Todd's observation is so startling that many will be disposed to think that he must have been deceived. Yet other observations, quite as remarkable, have been made before now. Thus, on one occasion, a satellite which had entered on the planet's face at the beginning of transit, was seen four or five minutes later outside the planet's disc, as though this moon had changed its mind and gone back for a while. Three well-known observers—Admiral Smyth, Sir Richard Maclear and Professor Peacock—all witnessed that strange sight. We can only explain what they saw by assuming that the outline of the planet's disc had changed in position, owing, perhaps, to some change in the condition of clouds floating at an enormous height in the atmosphere of Jupiter.

An attempt has been made to explain Mr. Todd's observation as a mere optical illusion. It is well-known that a bright object shining on a dark back-ground appears larger than it really is. A sort of fringe of light surrounds the bright object, this fringe being due apparently to an extension of the action produced by the object's light outside the space really occupied by the image on the retins. Now, in consequence of this optical illusion, when the disc of the moon passes over a bright star, a phenomenon, which at first sight seems to resemble what Mr. Todd saw, is occasionally observed. The star seems to pass within the edge of the moon's disc to a perceptible distance before disappearing, which it does quite suddenly. The appearance presented just before the star disappears is as though the star were shining through the edge of the moon. It is suggested that the appearance seen by Mr. Todd may be thus explained. In reality, however, there is no real resemblance between the two cases. The star is very much brighter than the disc of the moon, and is a mere point ; whereas the satellites of Jupiter are about the same brightness as this disc, and are not mere points, but in such a telescope as Mr. Todd's have discs of appreciable size. If we consider what effect irradiation can alone produce when a small disc passes behind a large one of equal brightness, we perceive that there could not be at any moment such an appearance as Mr. Todd observed—namely, a small disc seen within the outline of a large one.

It appears to me that it is wiser to accept observations such as Mr. Todd's and other observations even more remarkable which have been made by experienced observers, and to endeavour to find an explanation for them, than either to reject them utterly, as some do, or to attempt to explain them as mere illusions. It is only because the conclusions to which such observations seem to point appear surprising, and involve conceptions of the solar system differing widely from those commonly adopted, that objection is raised against these observations. Jupiter and Saturn must be utterly unlike our earth if the changes of shape and other amazing phenomena which have been noted by observers have really taken place. But all the evidence we have tends to show that these giant planets are utterly unlike our earth. Thus we know that, despite their enormous volume, these planets are of much less density than the earth—Jupiter's density being only a fourth of hers, Saturn's only a seventh. Despite their enormous distance from the earth, they appear to be enwrapped in tremendously deep envelopes, such as the sun's small heat could never have raised. The appearance of the cloud-belts in these mighty atmospheres favor the belief that the vapors forming the clouds have been thrown up from enormous depths. And—to mention no other form of direct evidence at present—it appears from the observed movements of the

moons of Jupiter that the central part of the planet must be very much greater density than the outer part. I myself attad great weight to the indirect evidence derived from the theory of the development of an allow the development of our solar system ; for certainly, according that theory, in any form which can be reasonably adopted Jupiter must be much younger in development (though probably much classic sector) much older in years) than our own earth. He must be in the condition which our earth was in many hundreds of millions of years ago. If so, we can well understand that with his nuclear regions in a state of intervention of the state of intervention of the state of intervention of the state of th regions in a state of intense heat, the exterior and cooler regions which we can alone see should present from time to time some otherwise inexplicable phenomena as have been described above. I do not know of any valid reason for believing that Jupiter and Saturn resemble the earth in condition, though differing from the so immensely in volume and mass. Yet I know of no other reason for rejecting the strange observations of Jupiter which have been made by many astronomers, except the existence of the foregone conclusion in the minute of the existence the foregone conclusion in the minds of some students of astronomy, that all the planets have been made to one pattern - 000 he earth being the model. The conclusion is as little likely to be correct as the old-fashioned notion that all the planets were made for one purpose and for the second seco made for one purpose viz., for the convenience and proit of our little world.

Scientific.

ANOTHER NEW METAL.

The services the spectroscope is capable of rendering to science become more and more evident daily, the latest proof of the fact being the discovery of a new metal called scandium. In some of the mines in Sweden and Norway small quantities of earthy in a set of the mines of the set minerals are found, called gadolinite and euxenite, composed, a oxides of very rare metals. The bulk of the substance is of rose-color, arising from the presence of erbium, and is called urbine. At first it was a substance is of erbium, and is called urbine. At first it was supposed to be simply mixed with some earthy substances which rendered it impure, but not long and M. Marignac discovered the presence of another metallic and stance which is a supposed to be simply mixed with a sostance, which he called ytterbine, the oxide of ytterbium. How ever, great uncertainty existed as to the composition of the bodies, and M. Nilson undertook a series of experiments on the subject. M. Barthelot at the late matter of the series of the serie coones, and M. Nilson undertook a series of experiments on the subject. M. Berthelot, at the late meeting of the Academy of Sciences, gave an account of what had been done so far, the result being the discovery of a new metal to which M. Nilson has given the name of scandium, to indicate that it is of Scandi-navian origin. Erbine is, as before mentioned, of a brilliast rose-color, while ytterbine is white. But the separation of the two substances can only be effected with extreme difficulty. two substances can only be effected with extreme difficulty. The earth has to be dissolved in boiling nitric acid, and the viterbine then presentiated by the line of the viterbine then presentiated by the viterbine the viterbi ytterbine then precipitated by sulphuric acid; and M. Nilson found that the operation repeated more than 20 times did not completely separate the two bodies. When he had obtained of comparatively pure ytterbine he commenced an examination of it, and then he found that it gave absorption bands in the spectrum unknown of the second trum unknown to any substance previously examined. After repeated trials he became convinced that he was dealing with metal never before supported and the substantial to the supermetal never before suspected, and he continued his researcher He is unable to say at present what may be the chemical properties of the new body, as the quantity of material at his var posal was insufficient to allow him to isolate the metal. Not can he decide as yet the place the new metal is to take among the older ones but he consider that the older ones, but he considers that its properties differ material ally from those of erbium and ytterbium, and that it should range between tin and thorium, as the atomic weights of these two as 118 and 234, while he calculates that of scandium at from 160 to 180.—Galianami's Macana 180.-Galignani's Messenger.

THE NOBILITY OF SCIENCE.—And as to nobleness of character how can one accuse science of striking at it when he sees the minds that science forms, the unselfishness, the absolute derotion to life work that she inspires and sustains ? With the saints, the heroes, the great men of all ages we may fearlessly compare our men of scientific minds, given solely to the research of truths indifferent to fortune, often proud of their poverty, smiling the honors they are offered, as careless of flattery as of obloadly, sure of the worth of that they are doing, and happy because the possess truth. Great, I grant it, are the joys which a firm bailed in things divine confers, but these the inward happiness of the wise equals, for he feels that he toils at an eternal work and belongs to the company of those of whom it is said, "Their works do follow them."—Renan's Inaugural Address.