

Aurora observed at Ovoca, Co. Wicklow, November 3.—
Observations from 5.30 p.m. to Midnight

AT 5.30 p.m. yellow lights tinged with red were coming up all round the horizon; these at intervals formed indistinct columns to the south-west and north-west. At 6.30 there were faint reddish lights forming fans at different points; these were succeeded by red and orange lights that rose forming glows, columns, and pencils; while at 7.30 a bright silver-white arch appeared to the north—the horns from this arch were pencils of white, which seemed to cross the arch; they were very numerous, appearing and disappearing nearly instantaneously; from about four to seven appeared at one time. Some of them were very long, shooting up to the zenith. After the arch had dissolved away, brilliant narrow, well-defined, thin columns of silver light shot up, the most marked coming up to the north-west at 7.40; this darted up suddenly, and moved gradually southward, and when about due west, close to the church tower, it disappeared at 7.45.

These silver lights solely occurred between the west and north-east, while all round the horizon red and orange lights were rising; these sometimes congregated at the zenith in a mass. At 7.50 two brilliant silver pencils rose to the north-north-east, but disappeared nearly instantaneously.

From 8 p.m. to 8.50 there were orange and red glows of light sometimes in indistinct columns; but at the latter hour there appeared to the north-west a vivid display of silver light that lasted about five minutes; this was succeeded by a deep orange cloud that travelled up to the zenith. From 9 to 10.30 there was an orange to red glow round the horizon, while at intervals from the north-west rose pencils of silver light, five very brilliant ones rising at 10.30. They were succeeded by a bright silver glow over the whole of the western heaven, across which at intervals passed glows of red and orange light; columns also rose, while at times horizontal streaks of brilliant silver lights appeared and disappeared in a flash. At 11 there was an orange glow round the horizon; this, with spurts of light coming up between the south-west and north-east, were all that was observed up to midnight.

G. H. KINAHAN

MR. SPENCER AND PROF. TAIT

WHEN, in NATURE for July 17th, 1879, while reviewing Sir Edmund Beckett's book, Prof. Tait lugged in Mr. Kirkman's travesty of the definition of Evolution, most readers probably failed to see why he made this not very relevant quotation. But those who remembered a controversy which occurred some years previously, possibly divined the feeling which prompted him thus to go out of his way.

At the time I said nothing; but having recently had to prepare a new edition of "First Principles," and thinking it well to take some notice of books, and parts of books, that have been written in refutation of that work, I decided to deal also with Mr. Kirkman's implied criticism, in which Prof. Tait so heartily concurred; and by way of gauging Prof. Tait's judgment on this matter, I thought it not amiss to give some samples of his judgment on matters falling within his own department. To make it accessible to those possessing previous editions of "First Principles," the Appendix containing these replies to critics was published as a pamphlet.

In the inaugural lecture of this session, recently given to his students, part of which is published in the last number of NATURE, Prof. Tait first of all recalls a passage from the preceding controversy. From this he quotes, or rather describes, a clause which, standing by itself, appears sufficiently absurd; and he marks the absurdity by a double note of admiration. Whether when taken with its context it is absurd, the reader will be able to judge on reading the passage to which it belongs.

In disproof of certain conclusions of mine, there had been quoted against me the *dictum* of Prof. Tait concerning the laws of motion, which is that—"as the properties of matter might have been such as to render a totally different set of laws axiomatic, these laws must be considered as resting on convictions drawn from

observation and experiment and not on intuitive perception." Not urging minor objections to this *dictum*, I went on to say:—"It will suffice if I examine the nature of this proposition that 'the properties of matter *might have been*' other than they are. Does it express an experimentally-ascertained truth? If so, I invite Prof. Tait to describe the experiments? Is it an intuition? If so, then along with doubt of an intuitive belief concerning things *as they are*, there goes confidence in an intuitive belief concerning things *as they are not*. Is it an hypothesis? If so, the implication is that a cognition of which the negation is inconceivable (for an axiom is such) may be discredited by inference from that which is not a cognition at all, but simply a supposition. . . . I shall take it as unquestionable that nothing concluded can have a warrant higher than that from which it is concluded, though it may have a lower. Now the elements of the proposition before us are these:—*As* 'the properties of matter might have been such as to render a totally different set of laws axiomatic' [*therefore*] 'these laws [now in force] must be considered as resting . . . not on intuitive perception: ' that is, the intuitions in which these laws are recognised, must not be held authoritative. Here the cognition posited as premiss, is that the properties of matter might have been other than they are; and the conclusion is that our intuitions relative to existing properties are uncertain. Hence, if this conclusion is valid, it is valid because the cognition or intuition respecting what might have been, is more trustworthy than the cognition or intuition respecting what is!"

From which it is manifest that, when asking (of course ironically) whether this alleged truth was an experimentally-ascertained one, my purpose was partly to enumerate and test all imaginable suppositions respecting the nature of Prof. Tait's proposition, and partly to show that he had affirmed something concerning the properties of matter which cannot be experimentally verified, and therefore which, by his own showing, he has no right to affirm.

The first example which, in my recent replies to criticisms, I have given of Prof. Tait's way of thinking, is disclosed by a comparison of his views concerning our knowledge of the universe as visible to us, and our knowledge of an alleged invisible universe. This comparison shows that:—

"He thinks that while no validity can be claimed for our judgments respecting perceived forces, save as experimentally justified, some validity can be claimed for our judgments respecting unperceived forces, where no experimental justification is possible."

Part of Prof. Tait's answer is that "the theory there developed [in the "Unseen Universe"] was not put forward as probable, its purpose was attained when it was shown to be conceivable." To which I rejoin that whereas Prof. Tait said he found in this theory a support for certain theological beliefs, he now confesses that he found none; for if no probability is alleged, no support can be derived. The other part of his answer concerns the main issue. After pointing out that the argument of this work, "carried on in pursuance of physical laws established by converse with the universe we know, extends them to the universe we do not know," I had urged that if we have "no warrant for asserting a physical axiom save as a generalisation of results of experiments—if, consequently, where no observation or experiment is possible, reasoning after physical methods can have no place; then there can be no basis for any conclusion respecting the physical relations of the seen and the unseen universes," "since, by the definition of it, one term of the relation is absent." Prof. Tait's explanation is extremely startling. When following the discussion in the "Unseen Universe," throughout which the law of the Conservation of Energy and the Principle of Continuity are extended from the tangible and visible matter and motion around us to an