

more years and Kirchoff dragged another secret from the heart of nature, giving the explanation of the phenomenon.

Now the mystery of the sun begins in real earnest. Hundreds of these lines in the spectrum have been identified with lines in the spectra of elements known to us, but not all; many denote the presence in the sun of elements either non-existent on the earth or as yet undiscovered. Yet the study goes on and the physicist does not despair; every little while some devoted student announces that one more little paragraph is to be added to the appendix to the textbook.

An example of how rapidly the stock of knowledge in these subjects increases occurred recently in Toronto. A member of the Astronomical and Physical Society, Mr. M——, had prepared a paper on the "spectra of the nebulae" and stated that what is known as the "chief nebular line" was due to the presence of some element "unknown to terrestrial chemistry." And that was the decision of science at that hour. This was shortly after the discovery of argon, the new element and hitherto unrecognized constituent of the atmosphere. Soon afterwards Mr. M—— was studying the spectrum which argon gives when volatilized in the electric arc, and comparing it with the spectrum of a nebula, when he found the strongest evidence that the unknown line in the latter was due to the presence of the newly discovered element in that mysterious mass of matter out there on the confines of space.

But if we knew what every line in the solar spectrum denotes; if we knew the constitution of the orb itself to the very centre, and understood the process going on which at present we can only call cyclonic action in the glowing

atmosphere producing sun-spots; if we knew the exact nature of the mysterious corona surrounding the orb, and which is seen so rarely, only when the moon directly intervenes at total solar eclipse, there is still one mystery, transcending all others and having a direct bearing upon all other sciences in the most remote degree connected with chemistry.

We may speak quite confidently about elements composing the sun and the earth, for there is really a great deal known about them. And we have every reason to believe that the earth was once a part of the sun, although we had better not start a controversy by venturing an opinion as to how long ago that was. Now the iron that is in the sun and the iron in the earth are the same. Volatilized, the metal is reduced to its atomic condition and the atoms have a certain vibratory motion which is the same wherever they are. If then the sun is the result of an evolutionary process, and if the earth also has passed through stages of development, both of which propositions are universally held to be true, we have yet to account for the fact that there has been, so far as we can see, no evolutionary process about the atoms composing them. The iron in your pen-nib was once a part of the sun, the particles have not changed in all these millions of years. Is this not strange? But it is true. And evolution starts off with manufactured atoms; a nebula condenses into a sun and planets, but the bond between them is everlasting.

Nay more, such elements as we know exist in the most distant stars, we are familiar with in the laboratory. What then are we to gather from this? That the sun was once a part of a mighty nebula that literally filled the whole universe; or that in separate quarters