

The theory is strengthened by the appearance of some of the spots, which in shape resemble a snail's shell, that is, consist of a band coiled round a head, and this would be their natural form did they result from whirlwinds. On the other hand, strong objections present themselves. To note but a few of them, it is universally conceded that this circular form of the spots is rather the exception than the rule. Again, whirlwinds on the earth tend to embrace a larger and larger amount of air until at last the resistance becomes equal to the force at work, and those atmospheric disturbances disappear. On the sun, the spots act in just the contrary manner. They grow smaller and smaller, the penumbra gradually invading the nucleus from all sides, until this dark portion is entirely transformed into the radiant photosphere. The cause, also, which Mr. Faye gives is always at work, yet considerable periods frequently elapse without the occurrence of spots.

As an alternative, then, we have Father Secchi's theory. According to him, the spots are not the main centres of activity on the sun, but are merely the result of other more important phenomena. He looks upon the sun as a gaseous body, the portion within the photosphere being made up of gases at the critical state, that is, in such a condition that a slight change of temperature would occasion great changes of volume. Assuming that these changes do take place, irruptions of the most violent character must occur upon the sun. Fr. Secchi by actual observation has found that such is really the case. They throw out immense masses of gaseous and metallic vapours. These latter, as they go further from the centre grow cooler, condense, and consequently become heavier until, finally, the photosphere is unable to hold them in suspension. They then fall back to the centre by the force of gravitation, thus constituting the nucleus of the spot. The penumbra is the result of the bending in of the photosphere by the weight of these condensed vapours. The flame-like protuberances seen during eclipses, may be portions of the chromosphere thrown out by the same cause. The faculae are likewise portions of the photosphere elevated above the general level. According to this theory, then, the spots are but secondary phenomena, the eruptions being the real primary agents.

Without pronouncing absolutely for one theory or the other, it may be said that that of Father Secchi gives a fuller and more simple explanation of facts, without taking for granted any more, if as much, as does that of Mr. Faye. Such, then, is the sun as we now know it.

The present accepted theory explaining the production of the sun's heat was lucidly explained in these columns recently in connection with the exposition of Laplace's Nebular Hypothesis, so that it will suffice here to state that scientists now believe that it is by a slow condensation of his own mass, that the sun is enabled to continue his work of vivifying the solar system.

As to what the future holds in store, it would be hard to conjecture. Certain it is we have no reason for believing that the day may not come when the sun, his last bit of heat radiated into space, will roll forward a burnt-out cinder of a planet, charred and blackened, with all its present activity and splendour stilled and blighted in the gloom of eternal death.

But ere its span is run, may we not utilize some of its prodigious energy for our own benefit. When the day comes, as come it will for a' that, when dame Nature shall dole out to us her last scuttle-full of coal, and when, in consequence, complete paralysis threatens to fasten upon all our industries, nay upon our very civilization, may we not go ninety-five millions of miles through space and there find a new servant to turn our engines and drive our factories. This is the problem which now confronts our scientists. Some progress in its solution has already been made. Whoever has had occasion to observe the indications of the magnetic needle, knows that these are not constant, but are subject to daily variations. Facts have been observed, which go to show that these variations are in part, in some obscure way, connected with the spots of the sun, for when the spots are most numerous the variations are greatest. Possibly, then, at some future time, we may be able to foretell several weeks, if not months beforehand, what will be the electrical state of the atmosphere which may lead to the power of, in part, forecasting the weather. In such a case, the benefit to agriculture and other fields of labor would be incalculable. It must be admitted, however, that, so far, all attempts to do so have ended in failure.