

John Goodricke, an English astronomer, who in 1782 determined the period of the variability of the famous star Algol, thought that Tycho's star might be the same as the new stars reported to have been seen in the years 945 and 1264. This would make the period of its variability between 300 and 320 years, and hence this star should re-appear in the latter part of the present century. Goodricke's conjecture seems to be very uncertain, since the reports for the years 945 and 1264 are extremely vague. It will be seen that if we assume the period of the variability of Tycho's star to be 315 years, five such periods would carry it back to near the beginning of the Christian era. Astrologers and others have not been slow to catch at such analogies, and to base predictions on these uncertain data; and thus we have it asserted that Tycho's star is identical with the star of Bethlehem, and that it will re-appear in the year 1887, with wars and social revolutions. Of course it is impossible to reply to such assertions. Wars and social revolutions are continually going on, and such grim predictions are as safe therefore, as it is to say, that to-morrow the winds will be variable, or that we shall have "rain in areas;" or snow next January. The only wonder is that intelligent people are imposed on by such assertions.

At the present time more than a hundred variable stars are known to astronomers, and every year increases their number. Many of their periods are well determined, but what causes the variations of light we do not know. The so-called new stars may be only extreme cases of the variable stars, and the appearance of one is an interesting astronomical phenomenon which should be carefully observed. There is a rich field for observation and for study.

A. HALL.

WASHINGTON, D.C., Nov. 29, 1886.

NEW YORK ACADEMY OF SCIENCE.

We direct special attention to the excellent course of lectures provided by the New York Academy of Sciences, to which non-members are admitted free, on making application to the proper authorities.

The lecture for Monday next, December 6th, will be delivered by Professor W. Boyd Dawkins, F. R. S., of Owens College, Manchester, England, the subject being "The Man of the Caves."

We understand the present will be the only opportunity for hearing Professor Dawkins lecture in this country on a subject on which he is a specialist. We anticipate a large attendance.

The present efforts of the executive of the New York Academy of Science, under the presidency of Professor Newberry, to provide a course of free lectures of the highest order, should be fully recognized by all interested in Science and we advise those who would avail themselves of the opportunity to address Professor D. S. Martin, of 235 West Fourth street; or Professors W. P. Trowbridge and Alexis A. Julien, both of Columbia College, N. Y., as these gentlemen constitute the Committee on Lectures.

HISTORICAL NOTES ON GAS ILLUMINATION.

At the present moment when the public is all impatient to see the electric light perfected for general illuminating purposes, it may be interesting to note a few particulars descriptive of the early days of gas, when it struggled into existence for the same purposes.

In looking over a few somewhat ancient scientific papers I found much relating to the subject, and will now reproduce these historical facts in the order in which I found them.

It appears that in the British Museum there is preserved a paper (Ascoug's Cat. 4437), entitled "Experiments Concerning the Spirit of Coals, in a Letter to the Hon. Mr. Boyle, by the late Rev. James Clayton, D.D., B. Mus." These experiments were undertaken by him in consequence of his having observed that the gas, issuing from certain fissures near a coal pit at Wigan, in Lancashire, took fire when a burning candle was presented to it. He therefore distilled coal, and obtained first "phlegm," afterwards a black oil, and then "an inflammable spirit," which he collected in bladders. By pricking these bladders he was able to ignite the gas at pleasure. Hence it is evident that the discovery of the carburetted hydrogen gas took place previous to the year 1664.

So states a paper, No. 66, in the *Philosophical Journal*, by Mr. John Webster, "*On the Discovery of the Inflammable Gas from Coals*;" the date of the paper is not before me, but its republication, in the form I found it, was in 1807.

In the *Phil. Jour.*, No. 67, the subject is again mooted by a Mr. Hume, who states that in the forty-first volume of the *Philosophical Transactions*, p. 59, is a "sheet-paper," which appears to have been read before the Royal Society in January, 1739, as "A Letter to the Hon. Robert Boyle, from the late Rev. John Clayton, D.D., in which is described how the discovery originated, and also some of the effects produced by this gas or 'spirit' of coal."

Mr. Hume further draws attention to the difference in the Christian names given to Mr. Clayton, in the first instance "James" and the second "John," and draws the very probable conclusion that the same person is referred to in both papers, and states, "At any rate, the merit of this discovery can be no longer claimed by any living person."

This remark was called forth on account of the public papers of that day, 1808, being much taken up with the proposal of a Mr. Winsor to light cities with gas. It appears that Mr. Edward Heard also obtained a patent in June, 1806, for "Obtaining inflammable gas from pit coal, in such a state that it may be burned without producing any offensive smell."

There was money in this patent, for Mr. Winsor was organizing a large company, which was not to buy the patent, but to pay a royalty as a license for the exclusive right to make use of it. As usual in such cases there was a great outcry, and the attempt was made to break down the patent by asserting that the invention was not new, one Nicholson taking the ground that the patent was invalid, because the inflammable nature of coal gas was demonstrated by "Boyle" before 1691; and he further stated that Lord Dundonald used gas from coal to give light many years ago, and that a Mr. Murdock also put it in practice upon a large scale in 1792 and 1798, so that it was absurd for Mr. Winsor to claim the invention for the public use of gas.

To parry these attacks Mr. Winsor published a small pamphlet, and boldly asserted that it was true that the inflammability of coal gas had been long known, but that no one had purified gas, and thus made it fit for general illuminating purposes, until he took out his patent in 1804. He also accused others, who were in the field, of having obtained their knowledge from him.

Mr. Winsor had to contend against other difficulties; for, at that date, the statute law of the realm prohibited more than five persons holding a patent as joint property, and it was held that as the shareholders of the proposed company would share the profits, they would be joint holders of the patent. To this Mr. Winsor replied that he retained the patent himself and merely sold the right to use it. To show the poor prospects for gas illumina-