

apply the name of Geber is cited, through Avicenna's "De Anima" (the phrase is given by Hoefer, i. 329, as Bacon's), which work is, naturally, condemned by Lippmann, on quite inadequate grounds, as "pseudographisch." That it differs in style from the "Canon" is probably correct, but Newton's "Daniel and the Apocalypse" differs in style from the "Principia." Avicenna's "De Anima" was condemned as spurious by Dr. James in his "Medical Dictionary" (London, 1743, vol. i., unpagged). The quotation in Avicenna is not to be found in the Latin works of Geber.

According to Berthelot the "Liber Septuaginta" (the Latin MS. of which was noted by Hoefer, whose valuable pioneer work has been considerably underestimated) is entirely different in style and content from the Latin Geber, although he attributes it, on what seem insufficient grounds, to Jâbir. There are some strikingly similar passages in the above work and in the Latin Geber, though I do not assert that they had the same author.

For some years I have asserted in my lectures that the criticisms of Berthelot were unsatisfactory. There are many other reasons why the arguments of Berthelot should be rejected and a new start made. Mr. Holmyard inclines to the original view that the Arabic Jâbir and the Latin Geber are one; my own view, which like his is still hypothetical, is that a Greek, Syriac, or Hebrew MS. may be as likely to be the original source as an Arabic one. The details of the life of Geber are very contradictory, but he is said to have been "a Christian who afterwards became a Mohammedan," or "of Tarsus." This is suggestive.

The "Summa perfectionis" is probably the earliest Latin work of the group attributed to Geber. It differs only little from the Greek writings of Alexandrine authors in its ideas, and the doctrines it teaches do not seem to represent that remarkable advance which is held to throw doubt on its early date. The "Testamentum" referred to by Mr. Holmyard differs in content and outlook from the "Summa"; it does not appear in the earliest printed edition of Geber's works (British Museum, catalogued as possibly printed at Venice in 1475, but I am informed by the authorities in the Incunabula Department it was probably printed at Rome not before 1480-1490). The "Testamentum" first appeared in the Vatican edition (? 1525; the 1480 was also a Vatican edition; Kopp, Hoefer, and Berthelot have been confused by editions of Geber which they have not seen). The "Liber de investigatione" may be a compilation by some later writer. The "Alchimia Geberii," of which Kopp, Hoefer, and Berthelot speak, is not a separate work, but merely an edition of Geber's works. As Mr. Holmyard seems to have gone some distance in another direction, I thought it useful to state briefly what conclusions I have reached; the detailed justification of these would take up far too much space. The "pseudographic" school, however, do not seem to have made out their case.

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The Stoat's Winter Pelage.

A FRIENDLY stoat, which has made our flower-garden and rockery his hunting-ground for mice and voles during the last three years, has donned his winter livery of ermine, and become very conspicuous—a snow-white little athlete—amid the greenery of the present exceedingly green winter.

This seasonal change of the stoat's brown summer pelage to creamy white is regulated, not by winter

temperature, but by latitude. Invariable in the stoats of the Scottish Highlands, nearly so in those of the Scottish Lowlands, it becomes gradually less frequent towards the English Midlands; until in the southern counties a complete change of hue is exceedingly rare. This change is not due to the growth of a new coat; it is the old fur that becomes white. Nor is prevailing temperature the cause of change. Here, on the western Scottish seaboard, winter is usually very mild; snow seldom falls and still more seldom lies. *Chianthus puniceus*, from the north island of New Zealand, and *Abutilon megapoticum*, from Brazil, have been flowering profusely on walls in the open all through this winter; yet our stoats regularly assume the protective winter garb of circum-polar animals; while in Warwickshire and Leicestershire, where the average winter temperature is far more severe, a complete change in the stoat's pelage very rarely occurs.

May we not recognise in this a heritage from the last ice age? So long as the land so far south as Herts lay under the ice, stoats in the Thames valley and south thereof must have worn the ermine pelage—at least in winter, and so did those which followed the ice in its northward retreat. But some thousands of temperate seasons have enabled the race of stoats that remained in the southern counties to dispense gradually with a costume which has become the very reverse of a protective disguise.

A few thousand years more and it may be as difficult to find a white ermine in Caithness as it is now in Cornwall!

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Stirling's Theorem.

For very large values of n , Stirling's theorem,

$$i.e. \lim_{n \rightarrow \infty} \frac{|n|}{n^n e^{-n} \sqrt{n}} = \sqrt{2\pi},$$

reduces in its logarithmic form to

$$n \log n - n = \log |n|.$$

It is in this form that the formula is required in Planck's radiation theory. Wanting to use this formula, and unwilling to make my students go through the proof of Stirling's theorem as given, for example, in Chrystal's "Algebra," I thought of the following deduction, and should like to know if it is sound or if it has been given before.

When $dn = 1$

$$\log n = \frac{d}{dn} \log |n|,$$

and since n is to be very large the value of dn is an infinitesimal. Therefore we may say

$$\begin{aligned} \log n \, dn &= d \log |n| \\ \therefore \int \log n \, dn &= \int d(\log |n|) \\ \therefore n \log n - n &= \log |n|, \end{aligned}$$

which is the form required.

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Stonehenge: Concerning the Four Stations.

JUST within the surrounding earthwork of Stonehenge there are two stones symmetrically placed with reference to each other on opposite sides of the centre. There are also two low earth heaps or mounds in corresponding complementary or reversed