Meteorites: the Number of Pultusk Stones and the Spelling of "Widmanstätten Figures"

IN criticizing others in NATURE of September 18 (p. 504), Prof. F. A. Paneth lays himself open to criticism. His calculation of the number of Pultusk stones is a remarkable example of what can be done with mathematics when all the factors are not taken into account. In 1868, Krantz supplied for the British Museum collection Pultusk stones weighing 3,545, 845, 793, 256 (half a stone), 139½ gm., and twelve others weighing together 243 gm. Towards the end of such a series it is the common practice to weigh the smaller stones together in one lot; and evidently the 212 (not 210) stones with an aggregate weight of 1 kgm. formed the tail-end of Krantz's stock. In 1908, Krantz was still offering Pultusk stones weighing 565, 492, 382 gm., and numerous others of less than 100 gm. While it is perfectly true that the best museums strive to acquire and preserve the best specimens, it is scarcely a balanced argument to quote, to the exclusion of these, a small private collection in Moravia, in which fragments of all the meteorites represented amounted to only 2 kgm.

In the British Museum collection there are 72 Pultusk stones with a total weight of 18,188 gm., the largest 9,095 gm. and the smallest 6 gm. (that is, less than the average in the Moravian collection); 264 in the Paris collection weigh 31,337 gm.; 175 in Chicago 14,291 gm.; 62 in Bonn 19,742 gm.; and 41 in Vienna 15,843 gm. These 614 stones account for half the total weight recovered. Individual stones of more than 1 kgm. in different collections (in addition to those in the British Museum) are 9,521, 8,070, 7,938, 7,150, 3,770, 2,500, 1,702, 1,040 and 1,025 gm. While it is not at all impossible or improbable that as many as 100,000 stones fell in this shower, the facts now available do not supply data for this to be proved mathematically.

In my paper in the *Mineralogical Magazine* in 1933 I collected fourteen variations in the spelling of "Widmanstätten figures" in the literature dating from 1813. Since then I have collected a few more. In the best books of reference the name of the discoverer is given as Widmanstetter (or Beckh-Widmanstetter). Prof. Paneth quotes the Austrian Biographical Lexicon, giving (from E. Cohen) the date and page, but not the volume (Theil 55), which suggests that he did not himself actually consult the original. Here the entry is under "Widmanstetter", and the same also in J. C. Poggendorff's "Biographisch-literarisches Handwörterbuch (1898, vol. 3). In the British Museum "Catalogue of Printed Books" a later member of the family, writing between 1870 and 1896, is catalogued under "Beckh-Widmanstetter" (Leopold von), with a cross-reference from Widmanstetter.

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Spiriform Morphology of some Lead Crystal Growths in Silica Gel

IT has been well known since A. L. Simon's description of the phenomenon[1], that fern-like crystal growths of lead can be obtained in silicic acid gels containing lead acetate solution. Whereas Simon used zinc to promote the electrochemical liberation of metallic lead in the gel, the use of tin for the same purpose leads to the formation of crystals of a strikingly different morphology and lustre.

Under conditions recently studied in detail, which are characteristically critical as regards the concentrations of the reactants (particularly the lead acetate) a spiriform type of growth has been observed, to which no previous reference can be found in the literature. These growths arise electrochemically in a way entirely different from those helical and spiral precipitates of lead iodide, lead chromate and calcium phosphate described in the published work of Hatschek and his pupils[2], neither do they resemble the silver chromate spiral precipitates described in Hedges's "Liesegang Phenomena", nor the spiral crystals of M. Copisarow[3]. These spiriform lead growths often take a form resembling somewhat a very deeply cut screw having a minute barrel diameter, and with a very serrated edge to the pitch; sometimes the growths are like a thin ribbon of lead, twisted into a spiriform strip. The accompanying photograph

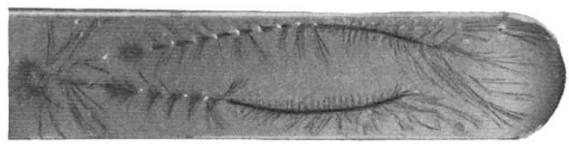

Fig. 1.

(Fig. 1), for which I have to thank Mr. E. Rowell of the Kodak Research Laboratories, Harrow, reproduces a six by one inch test-tube containing two such spiriform specimens. Whilst a non-stereoscopic view of them cannot adequately indicate the full screw-like features, a cinematic record reveals on rotating the tube that the two spirals in it are respectively right- and left-handed. At the points where they touch the glass walls, the spirals flatten out into serrated strips and these curl strikingly in opposite senses.

In collaboration with Mr. A. King of the Chemistry Department of this College, with whom work on these phenomena is being continued, it has been found that those gels, which are 0·02 normal with respect to the lead acetate concentration, can be made to reproduce spiriform growths, whilst identical gels containing a slightly different concentration of lead will produce many other strikingly different growths; the use of metals other than zinc or tin will also promote further modifications in their morphology.

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[1] *Koll.-Z.*, **12**, 171 (1913).
[2] *Koll.-Z.*, **27**, 225 (1920); *Biochem. J.*, **14**, 418 (1920).
[3] *Koll.-Z.*, **47**, 60 (1929).

Judgment by Hypothesis

PROF. J. B. S. HALDANE (see NATURE, Sept. 4, p. 428), in comparing my attitude towards Prof. E. A. Milne's cosmology with that of Lysenko towards the Russian geneticists, draws an analogy which seems to me little short of fantastic. According to NATURE of August 21, Lysenko treats Darwin's words as dogmas by which to judge and condemn, without examination, the work of modern experimenters. I accused Prof. Milne of imitating the practice of the Aristotelians who treated Aristotle's