

Kaye and Ewen (Proc. Roy. Soc., June, 1913), using an arrangement not very dissimilar to that of Dunoyer, obtained some interesting "shadow" deposits with iron. One of these, illustrated full size in Fig. 2, shows the image obtained by the normal interposition of two square-holed diaphragms between a screen and a strip of iron heated electrically in a vacuum to 1000° C. for a few hours.

This rectilinear projection is probably closely associated with what is sometimes termed sputtering, *i.e.*, the expulsion of molecules, not singly, but in relatively large aggregates, from the surface of hot metals. These projected particles would, owing to their greater mass, be less liable to scattering at high pressures by the surrounding gas molecules, and so would preserve their direction of flight longer than particles with dimensions not far from molecular.

Fig. 3 is a photomicrograph (taken by Mr. Ewen, *Zeit. f. Metallographie*) showing the pits which developed in the surface of a specimen of wrought iron when heated for about 4 hours at 1000° C. in a vacuum.

There are grounds for suspecting that the mechanism of sputtering is partly electrical, for it was found that the passage of the heating current through the specimen itself predisposed the metal to more rapid disintegration than if it

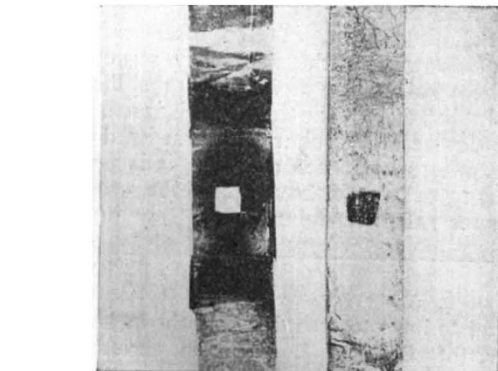


FIG. 2.—Photograph of diaphragm (on left) and iron deposit cast by it. Full size.

were heated under the same conditions in a furnace.

The practical study of high-temperature furnace experiments on thermionics finds *raison d'être*, if such were needed, in its applicability to the problems of solar electricity. If it may be regarded as legitimate to extrapolate from the results obtained over the range of temperatures (up to 3000° C.) possible in the carbon resistance furnace, then it would appear that at the estimated temperature of the sun (5500° C.) the elec-

trical emissions would amount to many millions of amperes. Thus, notwithstanding the gigantic areas of sun-spots, there is no difficulty in accounting for the enormous currents necessary to produce the magnetic fields (from 2000 to 5000 gauss), which Hale has shown to be associated with the whirlpools in sun-spots. On the same lines, we may seek to explain also the sun's general magnetism, the vertical component of which at the poles is estimated by Hale at about 50 gauss.

In conclusion, we may refer briefly to two practical developments of the study of the molar and electric emissions from hot metals. The half-watt lamp and the new Coolidge X-ray tube are first-fruits culled by observers equipped with a knowledge of the results of pure research, and

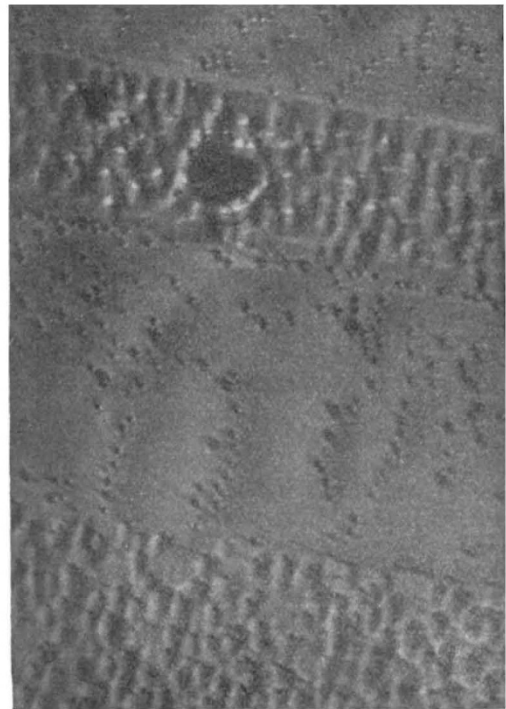


FIG. 3.—Photomicrograph of surface of iron strip which has been heated *in vacuo*, showing pits produced by volatilisation. X 1400.

an ability to apply them to industrial requirements. The work, carried out at the General Electric Co.'s research laboratory in Schenectady, is worthy of the attention of those among us who, severely practical and immediately utilitarian, seek to deprecate the study of pure science in this country.

G. W. C. KAYE.

A FORGED "ANTICIPATION" OF MODERN SCIENTIFIC IDEAS.

IN the 1913 presidential address to the Linnean Society, noticed in NATURE for January 22, 1914, Prof. Poulton gave an account of an American booklet by G. W. Sleeper, dated 1849. The work, if genuine, was an extraordinary anticipa-

tion of many modern conclusions on evolution and the germ theory of disease. The booklet itself had been sent, early in 1913, to the late Dr. A. R. Wallace by a Mr. B. R. Miller, who stated that he had bought it at a second-hand book store in 1891 or 1892. Prof. Poulton had also heard of the existence of three other copies in the possession of the author's son, Mr. J. F. Sleeper. It was pointed out in last year's address that the work was not registered, as stated; that the word "agnostic," introduced by Huxley in 1869, was used in its pages; and that there was no reference to it in an undoubtedly genuine but commonplace pamphlet published by the author in 1860. Nevertheless, the get-up of the booklet appeared to be so genuine and the style so convincing that many critical authorities were by no means convinced that it was a forgery.

Prof. Poulton, having directed attention to the subject, felt that he must make every effort to produce a body of evidence which would finally decide the question. The investigation, which could not be hurried, was only complete by Easter of the present year, and its results were communicated to the Linnean Society in the anniversary address on May 25 last. The evidence then presented to the Fellows will doubtless lead to the undisputed conclusion that the work is a forgery, and probably a very late forgery.

The Type.—Mr. J. W. Phinney, manager of the American Typefounders' Company, Boston, after an exhaustive inquiry, concluded that it was "impossible that the title-page could have been set at the date claimed for it."

The Contract with the Printer.—This document, forwarded by Mr. J. F. Sleeper, satisfied many authorities, but aroused the suspicions of Prof. C. H. Firth and afterwards of Sir Frederick Kenyon and Sir George Warner. The printer's signature, dated 1890, kindly sent by his daughter, Mrs. Endicott, was similar to that appended to the contract. It was submitted to Sir George Warner, who thought it "very remarkable that after so long an interval as forty years the signatures should be so precisely identical," and considered it "almost easier to believe that the early one is a forgery from a considerably later example." A little later Mrs. Endicott succeeded in finding another late signature also similar to that of the contract, and two early ones, dated 1856 and 1858, in both of which the B of Bense was very differently formed. It was evident, as Sir George Warner had predicted, that the signature of the contract had been copied from a late signature of the printer, W. Bense.

Other evidence of falsification was also submitted to the meeting, and will appear in the pages of the Society's Proceedings. It was suggested in conclusion that the author, self-deceived as to the importance of his own ideas, really believed that he had forestalled many conclusions of modern science. In this way he might defend the falsification of evidence as the only means by which justice could be done not only to himself but to the history of thought.

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A similar interpretation might be offered if we suppose—and many reasons were given for the belief—that the forgery was committed after the author's death by one who knew his feelings and shared his delusion that he was the victim of injustice.

THE LANGLEY FLYING MACHINE.

EXPERIMENTS made in May last, at Hammondsport, U.S.A., recall the great share which Prof. S. P. Langley had in the development of aviation, the occasion being the testing of a power-driven man-carrying aeroplane designed and constructed by Langley many years ago. The aeroplane was completed in 1903, and in September and December of that year two attempts were made to launch it from the top of a house-boat on the Potomac River, but owing to defective apparatus the aeroplane and pilot fell into the river. The experiments were discontinued owing to lack of financial support, and the rescued flying machine was carefully cleaned and preserved in the Smithsonian Institution. Now, eleven years later, with floats added to replace the launching apparatus, actual flight has been obtained on the aeroplane substantially as designed except for the floats. The engine weighed only 125 lbs., and actually developed 52 horse-power, a relation of weight to horse-power roughly equivalent to that of the first successful Gnome engine.

The actual flights have so far not exceeded ten seconds, and cannot therefore be considered as conclusive evidence of the satisfactory nature of the Langley design; the results must, however, be considered in reference to the alterations made this year preparatory to the new tests. The design was for a man-carrying aeroplane having a total weight, including pilot, of 830 lbs., whilst the addition of floats and the necessary structure to support them raised the weight to 1170 lbs., and appreciably increased the head resistance. If a launching device of the character first used by the Wright Brothers had been adopted, it is probable that to Langley would have gone the credit for the first successful aeroplane.

NOTES.

WE regret to have to record the death, in his sixty-sixth year, of Dr. R. J. Anderson, professor of Natural History, Geology, and Mineralogy at (Queen's) University College, Galway.

LORD WELBY has been elected president of the Royal Statistical Society for the session 1914-15.

MR. MARCONI has had the order of the Honorary Grand Cross of the Victorian Order conferred upon him.

THE Council of the Royal Society of Arts has received from Mr. R. Le Neve Foster a donation of 100l. for the purpose of founding a prize in memory of his father, the late Mr. Peter Le Neve Foster, who was secretary of the society from 1853 to 1879.