

Sagulin and Semenoff⁹ likewise finds a similar explanation.

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Princeton, May 16.

- ¹ Gibson and Hinshelwood: *Trans. Faraday Soc.*, **24**, 559; 1928.
² Thompson and Hinshelwood: *Proc. Roy. Soc.*, A **124**, 219; 1929.
³ R. Mecke: *Z. phys. Chem.*, B **7**, 108; 1930.
⁴ *Die Naturwiss.*, Dec. 20, 1929.
⁵ Bonhoeffer and Haber: *Z. phys. Chem.*, **137**, 263; 1928.
⁶ Haber: *Z. angew. Chem.*, 745; 1929.
⁷ Farkas, Goldfinger, and Haber: *Die Naturwiss.*, **34**, 674; 1929.
⁸ H. J. Schumacher: *J. Am. C. S.*, in press, 1930. G. B. Kistiakowsky: *J. Am. C. S.*, **52**, 1868; 1930.
⁹ Semenoff: *Chem. Rev.*, **350**, September 1929.

Photography on Copper.

DURING a metallographic examination of some copper alloys it was observed that certain etching reagents produced a surface which was light sensitive, to such a degree that the illuminated area of the specimen turned black during a few seconds' examination under the microscope. The phenomenon has been investigated, and found to depend upon the well-known light-sensitivity of cuprous chloride. The process affords a simple and rapid method of obtaining a sharp photographic image on the surface of plates of copper and copper alloys, including white alloys like German silver. It appears, however, to have escaped observation, and a brief description may therefore be of interest. It seems possible that the process may have some technical application, although I do not know of any, and I should be glad to give further information to anyone interested.

The copper or brass surface is polished and cleaned as for engraving, and dipped for ten seconds into a ten per cent solution of cupric chloride or copper ammonium chloride. A very thin white film, which X-ray examination shows to be cuprous chloride, forms on the surface of the plate. The plate is washed in running water, rinsed in methylated spirit, and dried in the air. The methylated spirit not only accelerates drying, but also makes the film much more adherent, and the wet plate can be wiped with a cloth without the film being destroyed. The plate is now light sensitive. On exposure for a few seconds to the direct light from an arc lamp the surface turns black, owing to the conversion of cuprous chloride into cuprous oxide. For contact prints from ordinary negatives an exposure of about one minute to the light of an arc lamp is required. The image (positive) so obtained is about equal in definition and contrast to that obtained in the ordinary three-colour and photogravure processes. The image can be 'fixed' by washing in dilute hypo or salt solution, but since this also reduces the intensity of the image the plate should be over-exposed during printing. For many purposes, such as engraving, fogging by diffuse daylight is so slow that fixing is unnecessary.

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Absorption Band Spectrum of Chlorine.

As a mistake which I made in a paper under the above title appearing in the June issue of the *Proceedings of the Royal Society* has been repeated on p. 989 of NATURE of June 28, I should like to direct attention to it and to correct it. In the publication first referred to, I refer to "Aston's figure for the relative abundance of Cl_{35} and Cl_{37} ". Dr. Aston in-

forms me that he has never made a direct measurement of the isotope ratio of chlorine, or published a value for it calculated from his work.

The value 1.67 which I gave as the calculated ratio of $\text{Cl}^{35}\text{Cl}^{35}$ to $\text{Cl}^{35}\text{Cl}^{37}$ was derived by using the figure 3.35 : 1 for the ratio Cl^{35} to Cl^{37} calculated by F. W. Loomis (*Astrophysical Journal*, **52**, 248; 1920), and quoted on p. 156 of "Isotopes" (F. W. Aston, second edition). Dr. Aston has kindly pointed out to me that the masses of the chlorine atoms (correcting for O^{17} and O^{18}) are 34.980 and 36.976 ± 0.006 for Cl^{35} and Cl^{37} respectively. Using the atomic weight 35.457 and these figures, the ratio $\text{Cl}^{35} : \text{Cl}^{37}$ becomes 3.185 : 1, giving the calculated ratio $\text{Cl}^{35}\text{Cl}^{35} : \text{Cl}^{35}\text{Cl}^{37} = 1.59 : 1$. This value agrees slightly better with that found from the band spectrum intensities, namely 1.35 : 1 (this is incorrectly given on the first line of p. 656 of the publication first referred to as 1.45 : 1; Table VII. of the same paper gives the correct value).

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Effect of Magnetic Fields on Dielectrics.

PROF. BURNS in his letter in NATURE of July 12, p. 59, observes that he has found a decrease of power factor when a magnetic field is superimposed on a dielectric, normal to the alternating electric field, and refers to my paper on dipoles (*Phil. Mag.*, May 1930). The view that such effects may arise from the existence of a magnetic as well as a dipolar moment is tempting, although cursory consideration of magnitudes suggests that such an effect is likely to be small.

Smouloff, however, has investigated the effect of magnetic fields upon dielectrics from atomic and ionic considerations ("Int. Congress of Math." (Bologna), Sept. 1928, *Arch. El.* p. 31, 1929). On his theory a decrease of power factor appears possible in some cases, but it would seem more usual to expect an increase in power factor. Monkhouse (*Proc. Phys. Soc.*, vol. 31, p. 83) has made experiments upon the electrical breakdown of dielectrics in magnetic fields and also mentions that large increases of power factor have been observed in agreement with Smouloff's theories.

With solids a longitudinal field appeared to have much more effect than a transverse field. In absence of experimental details it cannot be concluded that these results are contradictory, but a further examination might give interesting information upon the limitations of Smouloff's theory and the applicability of an extension of the dipole theory.

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Palæolithic Man in North-East Ireland.

DURING our present survey, unavoidably postponed last year, of existing exposures of the glacial series in Northern Ireland, we have found a palæolithic flake industry in flint, *in situ*, within undisturbed gravel beneath 21 feet of what appear to be fluvio-glacial deposits. We make this preliminary record in view of the significance of the discovery, which will form the subject of the presidential address to the Prehistoric Society of East Anglia in 1931.

J. P. T. BURCHELL.
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July 12.