of the line corresponds to an activation energy of 1·3 electron volts. This energy is little influenced by ionic impurities, or by the electrodes used to measure the conductivity. If the water is replaced by methyl alcohol, the conductivity phenomena remain unchanged except that the activation energy is lowered to 1 electron volt.

These facts make it difficult to identify the electric conductivity of wool with ionic conductivity, whilst they do appear to fit readily with the hypothesis that the wool-water and wool-methyl alcohol systems are electronic semi-conductors; or that there are electronic energy bands in the system which are separated from the ground-levels by forbidden zones.

The conducting system seems to be the water or methyl alcohol appropriately adsorbed on a surface. This was tested by a study of the conductivity of glass surfaces. These show the same variation of conductivity with relative humidity of the surrounding atmosphere, and with temperature, that other fibres show. The activation energy is 1 electron volt, but otherwise the electric conductivity of glass surfaces appears to be the same as that of wool. The energy band system is therefore a property of suitably adsorbed water molecules. Water molecules adsorbed at interfaces must be common in biochemistry where cell wall surfaces are abundant, and it may be that electronic transfer of energy takes place along layers adsorbed at these interfaces.

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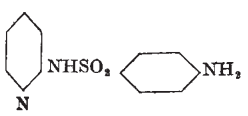
Aug. 29.

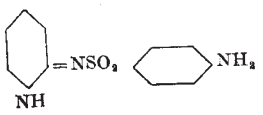
[1] NATURE, **148**, 157 (1941).
[2] Marsh, *Trans. Far. Soc.*, **29**, 173 (1933).
[3] Dorsey, "Properties of Ordinary Water Substances", Reinhold Publishing Corpn. (1940), p. 374.

Constitution of a Sulphonamide

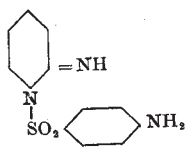
Crossley, Northey and Hultquist[1] consider that 2-(*p*-aminobenzenesulphonamido) pyridine has the constitution I below and not II or III mainly on the grounds that it is unchanged after prolonged boiling with concentrated caustic alkali solution.



I



II



III

This stability to caustic alkali[2] appears to me to be evidence against formula III and this view is supported by the synthesis of this sulphonamide from 2-halogeno pyridines and *p*-acetamido or *p*-amino benzene sulphonamides by the Ullman method[3]. The possibility, however, that this compound is a tautomeric mixture of the forms II and III must not be overlooked. Further evidence for the above view is afforded by the behaviour of 2 (*p*-aminobenzenesulphonamido)-pyridine on treatment with chloroacetamide in alkaline solution when *p*-aminobenzene sulphonyl α-pyridylglycineamide is obtained. This, on hydrolysis with caustic alkali gives *p*-aminobenzene sulphonyl α-pyridylglycine which on further treatment with hot dilute mineral acids gives the hitherto-undescribed α-pyridylglycine. This is a well-defined substance very soluble in water and sparingly soluble in alcohol; these characteristic glycine-like properties are quite different from those of the well-known isomeric compound, α-pyridoneimide-N-acetic acid obtained from α-amino-pyridine and chloracetic acid[4].

This latter compound on decarboxylation is known to give N-methyl-α-pyridoneimide; the interrupted study of the properties of α-pyridylglycine, including its de-carboxylation, will shortly be resumed.

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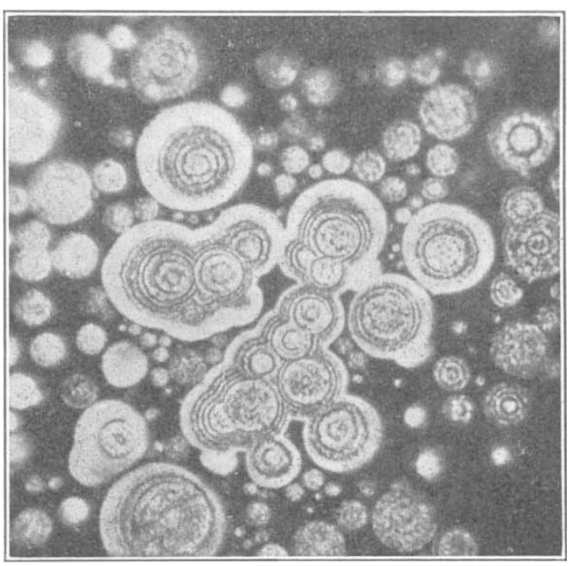
August 25.

[1] *J. Amer. Chem. Soc.*, **62**, 372 (1940).
[2] See, for example, Phillips, *J. Chem. Soc.*, 10 (1941).
[3] Phillips, *loc. cit.*; English Patents Nos. 512145 and 530187.
[4] Tschitschibabin, *Ber.*, **57**, 2092 (1924); Reindel and Rauch, *ibid.*, **58**, 393 (1925); **59**, 2921 (1926).

'Onion Skin' Structure of Carbonyl Iron

THE 'onion skin' structure of carbonyl iron is well known to those who are familiar with powder metallurgy technique. W. D. Jones in his book "Principles of Powder Metallurgy" states that this structure is probably due to interruptions in the decomposition of iron carbonyl vapour.

Recently while examining a pressed compact of carbonyl iron we came across a remarkably fine



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