

(1) I observed that streams of fine gas bubbles evolved during electrolysis, which rose vertically upwards, were deflected by a magnetic field in a direction at right angles to the field. The direction of this deflection was reversed by reversing the magnetic field, and the extent of the deflection was found to depend upon the strength of the field. The deviation was different in the case of different gases evolved during the electrolysis of several solutions. Thus, during the electrolysis of sulphuric acid the bubbles of hydrogen gas were deflected in one direction and those of oxygen in the opposite direction, thus indicating that they were oppositely charged.

(2) Streams of hydrogen gas bubbles evolved during the decomposition of acids by metals like zinc, which is a purely chemical reaction, were not appreciably deflected by the magnetic field; but when a pure zinc piece with a copper wire wound round it was immersed in sulphuric acid, there was an immediate evolution of hydrogen gas bubbles, which were certainly deflected by the magnetic field. Thus in the cases examined by me so far the gas bubbles evolved during purely chemical reactions were not charged, whereas those liberated during an electrochemical reaction were electrically charged. I am at present making a systematic study of the effect of the magnetic field on the gas bubbles evolved in reactions of different types, and I expect that the results will throw light on the nature of these reactions.

(3) Further, I have found that streams of charged colloidal particles moving under the influence of an electric field were also deflected by a magnetic field, the direction of deviation depending upon the charge of the particles.

The fact that charged particles like the electrons, α -particles, etc., are deflected has been well established by the classical researches of Sir J. J. Thomson and others, and the idea underlying the above-mentioned observations of mine is therefore not altogether new. Nevertheless, the interest in my observations perhaps lies in the extension of the idea to the case of the charged colloidal particles, gas bubbles, etc., and particularly in the application of the phenomena observed by me to a number of important problems in modern physical chemistry. A short account of some of these applications is given below.

One of the applications is in the determi-

nation of the mass of the individual charged particles in colloidal solutions, suspensions, etc., by measuring the deflection of these charged particles as observed in an ultra-microscope under the simultaneous action of electric and magnetic fields. From a knowledge of the extent of deflection, the intensity of the applied fields and the charge of the particle, which is determined separately, the mass can be easily calculated. I am at present busy developing this technique. An account of the results will be published in the near future.

Another application is to the separation of diplogen (heavy hydrogen) from ordinary hydrogen—a problem which is receiving much attention at present. The method which I have adopted is as follows:—In the electrolysis of water containing an acid or an alkali the electrode at which hydrogen was evolved was made of a fine platinum wire, fused into one end of a narrow glass tubing so as to expose only a very small portion of it to the solution, and conditions were so adjusted as to give gas bubbles of practically uniform size. When the electric current was passed, a fine stream of bubbles was found to ascend upwards, but when the magnetic field was also applied the stream spread out into different streams. I believe that I have thus been able to separate diplogen from ordinary hydrogen. I am at present repeating these experiments under the most suitable conditions so as to confirm these results. The importance of such a method is obvious since, apart from the theoretical interest, it furnishes us with an easy method of obtaining diplogen in a pure state and in a short time.

A detailed account of these experiments will be shortly published. I have already communicated a note on these observations to Professor F. G. Donnan, C.B.E., F.R.S., (London) and to Professor The Svedberg (Upsala) two months ago. Owing to several interruptions in my work I have not been able to complete it earlier.

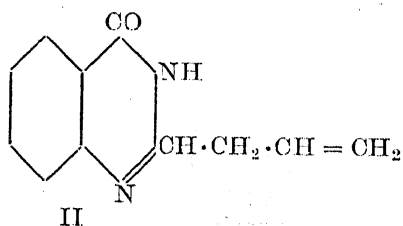
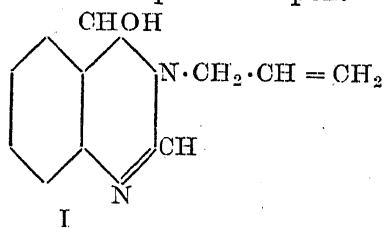
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Vasicin and Peganin.

In a recent paper (*Ber.*, 67, 45, 1934) Späth and Nikawitz have advanced the constitution-I for an alkaloid, peganin,

isolated from *Peganum Harmola* which bears a striking resemblance to vasicin II. Späth and Nikawitz have drawn attention to the possibility of peganin being identical with vasicin but since peganin could not be isomerised by alkali (as vasicin can be), they have left the question open.



The main evidence on which the Späth-Nikawitz peganin formula rests is its oxidation to 4-oxyquinazoline 3-acetic acid whilst vasicin furnished 4-oxyquinazoline under similar conditions.

A sample of vasicin which was left for 2 years on examination has been found to have been considerably lowered in m.p. due no doubt to oxidation. Therefore, the question arises whether a similar partial oxidation could not have occurred in the isomerisation experiment described by Ghosh *et. al.* (*J.* 1932, 2740). Against this we have to contend the fact that *iso* vasicin does give a *hydrochloride* m.p. 222° considerably higher in m.p. than vasicin hydrochloride and a mixed m.p. also shows considerable depression. However, we are investigating this point further.

The structure for peganin was also considered by us for vasicin but was rejected on the following grounds:—

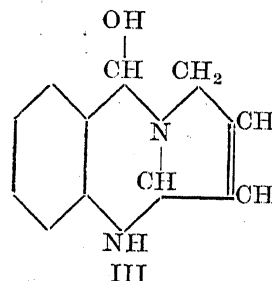
(a) Vasicin like many 4-oxyquinazolines remains dissolved in alkaline solution and is not precipitated till acidified with acetic acid. This is incompatible with structure I.

(b) Vasicin on interaction with acetic anhydride gives an acetyl derivative which is formed with the loss of a further molecule of water. On the basis of structure I such a dehydro-acetyl derivative cannot be formulated.

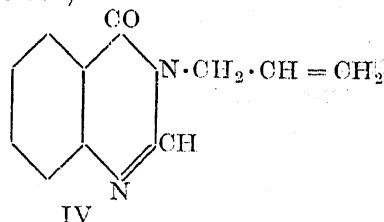
It is worthy of note that the acetyl derivative of peganin has been found to be an oil (*cf.*, Späth and Nikawitz, *loc. cit.*). This fact also points to the two alkaloids being

different. If so, then it is most interesting to note how closely allied they are.

But on the basis of structure II, the formation of 4-oxyquinazoline 3-acetic acid can be explained if it is assumed that oxidation takes place *via* the intermediate III.



In order to verify the structure for peganin (I) we have recently prepared the substance IV, m.p. 67°,



by the interaction of allyl iodide with 4-oxyquinazoline in alkaline medium. Following Bogert, the substance has been formulated as a N-alkyl and not an O-alkyl ether because it is undecomposed by boiling hydrochloric acid at 110° and also is non-volatile in steam (*cf.*, Bogert and May, *Jour. Amer. Chem. Soc.*, 31, 508, 1909). Moreover another low melting substance is formed in the reaction which undoubtedly is the O-ether. The low m.p. of the substance is against the structure I for peganin.

Moreover, if peganin had been identical with vasicin, then the oxidation of this substance with hydrogen peroxide in acetone should give the two products, m.p. 168° and 212° isolated from vasicin under the same conditions. We have found that IV can be isolated entirely unchanged when oxidised by hydrogen peroxide in acetone under the conditions described by Ghosh *et. al.* (*loc. cit.*).

The reduction of the substance IV with amyl alcohol and sodium has given a substance B.P. 105-110°/3 mm. but unlike the very similar product from peganin (m.p. 69°·5) we have not yet been able to obtain it in a crystalline condition. Therefore, again, it seems that it is doubtful if peganin can be represented as I. We must state that the substance has a very characteristic odour reminiscent of the mother liquors in

the purification of crude vasicin which probably is also what Späth and Nikawitz mean by 'a characteristic odour'.

Our investigation would be published elsewhere in a more detailed form.

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The Effect of Germination on the Reducing Power of *Phaseolus mung*.

SINCE the discovery that Szent-Györgyi's hexuronic acid or ascorbic acid is identical with vitamin C, the reducing property of ascorbic acid has been sought to be used as a measure of the vitamin C-content of natural food-stuffs.¹ The presence of other naturally occurring reducing substances like glutathione might be supposed to interfere with the specificity of this method of chemical assay. But substantial evidence¹ has been brought forward to show that this method is a fairly accurate one for nearly all the food-stuffs studied. It is known that vitamin C is produced during germination and that germinated *mung* (*Phaseolus mung*) is rich in vitamin C.² We have found that germination does indeed cause a six-fold increase in the reducing power of *mung*, calculated on the basis of dry weight.

¹ Harris and Ray, *Biochem. J.*, **27**, 303, 1933; Birch, Harris and Ray, *Biochem. J.*, **27**, 590, 1933.

² Wats and Eyles, *Ind. J. Med. Res.*, **20**, 89, 1932.

The reducing value was determined by titrating trichloroacetic acid extracts of the germinated and ungerminated *mung* against 0.01 N Iodine as well as against the oxidation-reduction indicator 2:6-dichlorophenol indophenol (0.01 M). Harris and Ray³ have also observed an increase in the reducing power of peas on germination. Johnson⁴ has observed, however, that this increase in the reducing power of germinated peas is out of proportion to the increase in anti-scorbutic potency and concludes that a reducing substance besides ascorbic acid is produced during germination.

In estimating the reducing power by means of the indophenol indicator according to the technique of Tillmans, as modified by Birch, Harris and Ray,¹ it has been found that even dilute trichloroacetic acid (0.5%) by itself decolorises the indicator. This decolorisation can be inhibited by the addition of glacial acetic acid to the indicator solution prior to titration by the trichloroacetic acid extract. By means of this titration technique, a sample of red chillies has been found to have a reducing power of at least the same order as Hungarian paprika.

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³ Harris and Ray, *Biochem. J.*, **27**, 580, 1933.

⁴ Johnson, *Biochem. J.*, **27**, 1942, 1933.

Current Science and the Indian Academy of Sciences.

IN view of the recent publication of certain disputatious statements in the press regarding the institution of an Indian Academy of Sciences and the totally unexpected and embarrassing trend which the affairs have assumed, the Board of Editors, *Current Science*, desire to announce that the Journal, having taken the initiative in the proposal to establish such a foundation, now stands aside in a spirit of detachment. It will not lend its support to any movement which is apt to produce a factious spirit among the scientific workers, which must be absolutely fatal to the fundamental cause of progress in India. The policy of the Journal is to follow and promote peace, and in pursuance of this declared object, it will seek for oppor-

tunities to establish good understanding in all endeavours calculated to advance the higher destinies of science.

This policy of the Journal does not, however, impose restraints on the freedom of action on the part of the individual members of the Editorial Board as also those of the Board of Editorial Co-operation who may desire to participate in any particular movement and if and when they do so, they act either in their own private capacities or as members of some one or other of the scientific institutions favouring such a movement. The public utterances of such members or their action in the committees in which they choose to function, do not reflect the official views of the Journal.—Ed.