the concentration of ash on the fourteenth day of development in the allantoic liquid is almost exactly the same as it was on the ninth, although a 550 per cent increase in the concentration of uric acid has taken place. (3) The uric acid cannot be combined as ammonium urate, for there is not enough ammonia present in the allantoic liquid. About ten times as much as what is found there [2] would be required to form ammonium urate. (4) The slimy masses of uric acid in the allantoic liquid towards the end of development, when washed in distilled water and ashed, give an ash content of only 3·9 per cent. Sodium urate would require 12 per cent and potassium urate 18 per cent. (5) The *p*H of the allantoic liquid, which is about 6·3 during the last week of incubation [3] also strongly suggests that the uric acid is not present as urate.

It seems justifiable, then, to conclude that the uric acid which accumulates in the developing chick's allantoic cavity is free. It may enter the allantois in the form of the sodium or potassium salt, and the cation may then be reabsorbed as carbonate or in some other way, but such an absorption of base might presumably take place just as well in the developing kidneys or cloaca. However, it is known that the allantoic blood-vessels absorb water from the allantoic liquid after the tenth day, and, as they certainly take part in a circulation of water, they may take part in a circulation of base as well.

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[1] *Zeit. f. physiol. chem.*, **171**, 101; 1928.
[2] Needham, *Jour. Exp. Biol.*, **4**, 114 and 145; 1926.
[3] Aggazzotti, *Archives Ital. de. Biol.*, **59**, 305; 1913.

The Slow Combustion of Acetylene.

IN a recent paper, Bodenstein [1] has propounded a theory of the slow oxidation of acetylene, which accounts extremely well for the observed [2] kinetic phenomena. However, he considers the chain length to be of the order of one link, contrary to the generally accepted mechanism of hydrocarbon oxidation. That acetylene and oxygen form a reaction chain of considerable length is evident from the following experiments, carried out at 320° C. in a circulating apparatus of the same design as that described by Spence and Kistiakowsky.[2] Using an unpacked pyrex glass furnace of 75 c.c. volume, with an internal diameter of 20 mm., and circulating a mixture of 276·6 mm. of acetylene and 147·2 mm. of oxygen, 51·4 mm. of acetylene reacted in one hour. When, however, a furnace packed with pyrex glass tubing of 2 mm. internal diameter and having a total free gas volume of 75 c.c. was substituted for the unpacked vessel, using the same initial amounts of acetylene and oxygen, less than 1 mm. of acetylene had reacted after one hour. Also, a much slower reaction was observed when the surface of the unpacked vessel was coated with potassium chloride.

There can be no doubt, then, that under the conditions stated the amount of reaction taking place upon the glass surface itself is insignificantly small, while it seems most probable that reaction chains originate upon the surface, undergo considerable branching in the gas phase, where some deactivation by oxygen occurs, and finally are broken at the walls of the vessel. Chain reactions of this type have been discussed by Semenoff [3] (see also Bursian and Sorokin [4]), who shows that they are accompanied by an induction period the duration of which depends upon the concentration of active centres, that is, upon the nature of the surface, upon the total probability of forming another link, and upon the time necessary for the propagation of each link in the chain. A more detailed account of other experiments bearing on this point will be published shortly. R. SPENCE.

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[1] Bodenstein, *Z. ph. Chem.*, B, **12**, 151; 1931.
[2] Spence and Kistiakowsky, *J. Am. C. S.*, **52**, 4837; 1930.
[3] Semenoff, *Z. ph. Chem.*, B, **11**, 464; 1931.
[4] Bursian and Sorokin, *Z. ph. Chem.*, B, **12**, 247; 1931.

Diamagnetism and the Colloidal State.

SOME preliminary experiments by Vaidyanathan [1] show that the diamagnetic susceptibility (χ) decreases as the size of the particle is reduced in the cases of the colloids of bismuth, antimony, and graphite. Detailed and careful experiments by me with much stronger fields have in general confirmed this result. The quantitative variation of χ with the diameter d of the particle has also been studied. The results for bismuth and antimony are affected by oxidation, but in the case of graphite there is no such trouble. A graph drawn between χ and $1/d$ for this element gives a straight line. The inverse of the diameter is a measure of the surface or boundary area of a number of spherical particles in unit mass of the substance. It is thus found that χ decreases proportionately as the boundary area of a given mass is increased.

The results for bismuth and antimony are equally interesting. The curves between χ and $1/d$ are such as could be explained on the basis that the decrease of χ is due to two causes, namely, oxidation and the genuine fall on account of the reduced particle size.

It is interesting to note that as the boundary area is increased the orbits of a large number of *structure electrons* postulated by Prof. O. W. Richardson [2] will decrease in size. This, on the orbital theory, may account for the decrease in the diamagnetic susceptibility value as d is reduced. The fact that χ decreases proportionately as the boundary area is increased seems to lend considerable weight to this view.

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[1] *Ind. Jour. Phy.*, **5**, 559; 1930.
[2] *Proc. Roy. Soc.*, A, **128**, 41; 1930.

The late Mr. Herbert Tomlinson, F.R.S.

THE obituary notice of Mr. Herbert Tomlinson in NATURE of July 11, p. 58, reminds me that, about a year ago, I came across what appears to be a complete collection of his published work for sale in a second-hand bookseller's shop in Worthing.

This collection consists of three thick octavo volumes which were evidently bound for his private use, as the pamphlets and articles are interlined with letters to and from the secretary of the Royal Society, the Editor of NATURE, etc., and there is an index in his own handwriting.

It contains, in addition to his formal scientific papers, many cuttings of letters to the *Times*, and articles which were printed in chemical journals and in North London papers. There are also quite a considerable number of literary articles, mainly on the subject of Italian poetry; and several metrical versions of Dante and Tasso which indicate that the author was no mean poet.

The volumes are now in the library of King's College, Strand, W.C.2, where they are available for reference by anyone interested.

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