Figures in the last column of Table II suggest that "Phosphorus Factor" may be of the order of one-fifth that of the "Nitrogen Factor" (Richards and Norman)[4] assuming nitrogen factor to be unity for most plant materials. This figure agrees with that of Jenkins[5] who has observed in his studies on the biological oxidation of carbohydrate solutions that the proportion of phosphorus for efficient utilization of nitrogen lay between 0·12 and 0·31 parts per part of nitrogen. In other words, on an average, the phosphorus requirements of microflora are nearly one-fifth that of nitrogen. From the figures recorded by Sing Chen Chang on cellulose decomposed and the amount of inorganic phosphorus assimilated in 121 days at different levels of mineral phosphorus, the average phosphorus requirement of organisms for bringing about the decomposition of 100 gm. of cellulose works out to 0·26 gm.

It is thus reasonable to suppose that since the phosphorus requirements are nearly a fifth of their nitrogen requirements, the amounts of mineral phosphorus initially present in plant residues are thus quite enough for a satisfactory rot and that phosphorus therefore does not become a limiting factor for decomposition.

Further detailed experiments are in progress on this important problem.

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November 9, 1948.

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A NOTE ON "THERMOCHOR"

AFTER Sugden's *Parachor* and Friends's *Rheochor* comes another property 'Thermochor' (Carvalho[1]) which may prove to be a useful tool in physico-chemical research although it is too early to judge its potentialities. The property is associated with molecular volume V_m of the substance at the boiling point and is defined by

$$\text{Thermochor} = [T] \approx [M/D]^{5/6}\, T_b^{1/4} = [V_m]^{5/6}\, T_b^{1/4}$$

where T_b denotes the boiling point of the liquid on the absolute scale at normal pressure. It is proposed to examine the above relationship in various types of compounds where V_m is either known (Kopp,[2] Lossen[3]) or can be calculated from temperature-density formula possessing sufficient degree of accuracy.[4] The following table contains the values of [T] for $-CH_2$ group in various types of compounds:—

TABLE I

Compounds		Min. and Max. limits in [T]	Average [T]
Nature	Number examined		
1 Hydrocarbons (aliphatic and satd.)	9	39·4–42·7	41·2
2 Hydrocarbons (aliphatic and satd.)	6	40·1–41·8	41·2
3 Hydrocarbons (aromatic)	5	38·9–42·1	41·0
4 Cycloparaffins* ..	5	34·6–39·0	34·9
5 Alcohols ..	8	35·8–40·7	39·7
6 Fatty acids ..	8	39·5–44·5	41·2
7 Esters (formates) ..	8	38·4–42·1	40·9
8 ,, (acetates) ..	8	40·3–42·8	41·4
9 Alkyl chlorides ..	5	38·7–42·3	39·8
10 ,, bromides ..	6	40·0–41·5	40·9
11 ,, iodides ..	8	39·8–43·5	41·5
12 Ethers ..	7	39·2–43·0	41·3
13 Nitriles ..	5	37·5–41·6	39·8
14 Thio-Compounds* ..	5	37·9–39·1	38·6
15 Amino Compounds*	3	35·3–38·5	37·3
16 Aldehydes* ..	4	36·1–37·2	36·7

From Table I it appears that the value of [T] is comparatively lower in compounds marked with an asterisk specially cycloparaffins. Further, by the usual method as adopted in the case of Parachor, the value of [T] for H_2 has been found to be 19·5 ($C_nH_{2n+2} - nCH_2$) from paraffins. From this result the atomic thermochors for various elements have been calculated and are given in Table II.

TABLE II

Elements :	H	C	F	Cl	Br	I	S	N (amines)	O (ethers)	O_2 (Esters)	P	Si	As	Sn
[T] :	9·8	21·8	16	48	61	84	62	22	20	43	46	41	55	49

It has also been observed that just like Parachor the values of [T] for isomeric substances of similar constitution are almost the same as may be seen from the following two examples:

Isomeric compounds	[T]
1 Butyl formate ..	251·0
2 Propyl acetate ..	251·3
3 Ethyl propionate ..	250·0
4 Methyl butyrate ..	249·0

Isomeric compounds	[T]
1 Amyl formate ..	292·6
2 Butyl acetate ..	292·5
3 Propyl propionate ..	290·5
4 Ethyl butyrate ..	290·5

Other compounds containing different types of linkages are being examined from this point of view and a detailed paper will appear elsewhere.

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November 21, 1948.

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ON THE BIONOMICS OF THE FOWL TICK, *ARGAS PERSICUS*

LITTLE work has been done in India on the bionomics and life-history of the fowl tick, *Argas persicus* and there is a good bit of variation in the results obtained by different workers abroad [Sories (1922),[1] Newman (1924),[2] Salisbury (1938),[3] Rovida (1940)[4]] regarding the period of hatching of eggs and the survival of the larvæ in the absence of a host.

All observations both on the hatching of eggs and the survival of larvæ were made by me at room temperature, mainly during the months of July, August, September and October when the average temperature ranged from 82 to 97°F and the average percentage of humidity ranged from 73 to 83.

It has been generally observed that reproduction in this tick depends directly on the ingestion of food. I have never come across pairing or oviposition when the ticks were kept starved in tubes. Within a couple of days after these ticks, under varying periods of starvation, were allowed to feed on a fowl, the female started laying eggs in batches of 20-60.

The eggs are round and a little smaller in size than a pin-head. They are laid in irregularly shaped clusters and when fresh are of a bright fawn colour. The colour is a good index of age and gradually fades away from a bright fawn to pale-grey as the eggs grow older. After a couple of days of incubation the eggs become slightly flattened dorso-ventrally. Between the 3rd and 5th day a few dark spots (stumps) or tubercles appear towards the margin and these develop into appendages on the 5th or 6th day. Most of the eggs hatched after 7 days although the range of incubation period was from 6 to 9 days.

For the first two days after hatching the larvæ remain sluggish; later on they become very active as if in search of food (host). In the beginning they are quite plump, bulging out dorsally, till about the twentieth day when they become weaker and thinner. By this time the body juices have dried up and ultimately the larvæ become thin and leathery with well-defined margin and disinclined to crawl about. Some of the freshly hatched larvæ were kept under starvation when moulting took place as was evident from the cast off skins found in the tubes. Regarding the period of survival of the larvæ my observations reveal that a period from 56 to 113 days under varying climatic conditions is possible.

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November 25, 1948.

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PREPARATION OF AMYLOSE BY THYMOL PRECIPITATION METHOD

A number of methods have been suggested from time to time for the preparation of amylose component of starch. The more recent one is that of Haworth, *et al.*[1] and the principle of the method is that amylose can be precipitated as a water insoluble complex by thymol. This method is stated to be free from certain difficulties encountered in the earlier methods. We followed this method and found that the purity of the sample was not as good as the one prepared by Hassid's method, *i.e.*, by precipitation with Methanol.[2] By a slight modification of Haworth's method described in this note, we obtained amylose of purity comparable to that prepared by Hassid's method.

The effect of temperature and duration of heating on the extraction of amylose from starch without rupturing the granules was studied and the optimum conditions for the maximum extraction of amylose were established.

Starch was dispersed in water and poured into water at 80 C. (to make a 1% solution) and kept at that temperature for 1½ hours, with frequent stirring. The solution was allowed to cool down to room temperature and centrifuged. To the clear water extract of the amylose thus obtained, are immediately added sodium chloride to make a 0·1% solution and then thymol to saturation. The precipitation of thymol amylose complex starts almost immediately and is complete in about 24 hours. The precipitate was centrifuged off, washed with thymol water, absolute alcohol and ether. The yield and purity of the amyloses prepared as above and by Hassid's method are showing the following table. The

Method followed	Blue value	Yield %
Present modified method ..	252	13–15
Hassid's method ..	250	10–11

purity of the amylose samples are expressed in terms of blue units, determined according