there seems to be nothing at present known that could account for it.

An examination of the probability of such a peak occurring by chance showed that it was very unlikely, but of course it cannot be a matter of certainty without further supporting evidence, which is being sought. It may, however, be said that Mr. F. E. Dixon examined the reported occurrences of aurora in Great Britain for about eighty years, and finds a tendency to periodicity in about 27·3 days[1].

Greenwich records go back long before 1847, but the barometer was not then read on Sundays and holidays; this introduces a further factor of uncertainty, and it was not considered that results obtained in these circumstances would be of sufficient value to justify the work involved.

The near approach of 2,731 days to a definite factor of 274 months makes some relation with Dr. Abbots' work a possibility, and from internal evidence, such as occurs when carrying out an extended analysis of this kind, I believe that there is some probability that further examination of the data, and other meteorological phenomena, may show that it is not another manifestation of the vagaries of chance.

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Condensation of the Hexapeptide Ester of Glycine into the 96- and Higher (3×2^n) Peptide Esters

FOR a long time it has been known that heating under various degrees of the ester of glycine[1], glycyl-glycine[2] and diglycyl-glycine[3] results in the formation of certain condensation products with liberation of alcohol. If the hexapeptide ester of glycine would undergo the type of condensation exhibited by the dipeptide ester, then the simplest model of a 'cyclol 6' postulated by the Wrinch theory[4] could be prepared. The formation of such 'cyclo-hexapeptide' of glycine could then be considered as evidence for the hexagonal folding by hydrogen bonds of the polypeptide chains.

Experiments were carried out by heating the pure hexapeptide ester at a constant temperature (102° ± 1°) and samples were withdrawn for methoxyl estimation at certain intervals of time. It was found that, instead of cyclization, the hexapeptide ester underwent the type of condensation characteristic of the tripeptide ester in a series of subsequent bimolecular reactions yielding the 12-, 24-, 48-, 96-peptide (3×2^n peptide) ester of glycerine with a calculated methoxyl content of 4·33, 2·21, 1·12, 0·56 per cent and (0 per cent), respectively. When n was limited to 4 (OCH_3, 1·12 per cent) the average rate of the reaction, with the hour as the unit of time, was $10^4 K = 150$, calculated from the methoxyl content of the samples. At a temperature 10° higher, the rate of condensation was 3·7 times faster, corresponding to an activation energy of about 38 kcal. When the hexapeptide ester was heated at 130° ± 1° for six days, the methoxyl content (0·58 per cent) indicated the presence of the 96-peptide ester of glycine with the empirical formula of $C_{193}H_{293}O_{97}N_{96}$ and a molecular weight of 5504. From the nature of this type of condensation reaction, it follows that the reaction products necessarily represent a mixture of polypeptide esters. Such mixtures cannot be separated by chemical or simple physical methods.

In order to prove, first, that a hexapeptide ester does not combine with a tripeptide ester, and secondly, that the reaction products do not consist of mixtures of 'cyclol 6' and unchanged starting material, samples of diglycyl-glycine methyl ester were heated at 100° for different lengths of time and then analysed. The methoxyl content of the insoluble residues clearly indicated that, after two hours of heating, the tripeptide ester gave rise to almost pure dodecapeptide ester (found, OCH_3, 4·1 per cent; calc. OCH_3, 4·3 per cent) as the highest condensation product, and neither nonapeptide ester nor 'cyclol 6' was formed during the reaction.

All the polypeptide esters of glycine obtained in the present work are colourless substances of amorphous appearance, insoluble in alcohol but slightly (0·1–0·5 per cent) soluble in cold water. They all give the biuret reaction very strongly and dissolve completely in cold concentrated hydrochloric acid, but only partly in dilute alkali solution. They are strongly reminiscent of denatured proteins, and like many of the latter substances they are soluble in concentrated urea solution.

Although the inability of the hexapeptide ester of glycine to form a 'cyclol 6'-peptide by this method would seem strongly to favour the conception of unfolded polypeptide chains, yet, the important fact must not be overlooked that the tetrapeptide esters do not undergo[5] any type of condensation at all. This would indicate a fundamental difference between the shape of the molecules of the mono-, di-, tri- and 3×2^n-peptide on one hand, and that of the tetrapeptide and probably of the penta-, hepta-, etc., peptide on the other.

An extensive investigation by application of both chemical and physico-chemical methods is being started in this laboratory. A detailed account of the present work will be published elsewhere.

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Catalase

Sumner and Dounce[1] have recently observed that on splitting with acids crystalline ox liver catalase yields a 'blue substance', which remains in the aqueous acetone mother liquor after the hæmin crystals have come out. This mother liquor contained approximately the same amount of iron as the hæmin crystals. The authors concluded from these observations that catalase has two bile pigment hæmatin groups in addition to two protohæmatin groups in a molecule of the weight 248,000, and that the blue substance, though not identical with the original prosthetic group in catalase, still contains iron and differs from biliverdin.