Source of enzyme	% Mn in incub. mix.	Ascorbic acid synthesis (mgm./gm. fresh tissue)	
		Without dialysis of enzyme extract	After electro-dialysis of enzyme extract
Goat jejunum	nil	0·02	0·01
,, ,,	0·004	0·06	—
,, ,,	0·01	—	0·06
Guinea pig jejunum	nil	0·015	nil
,, ,, ,,	0·005	—	0·035

The protein fraction precipitated at *p*H 5·7 is inactive, but attempts to concentrate further the enzyme by separating the globulin fraction failed because both the globulin fraction and the albumin fraction partially retained the enzymic activity. It also appears that the coenzyme (Mn) is more firmly attached to the enzyme in animal intestines than in the germinating grains. In the latter, electrodialysis for half an hour of the enzyme extract suffices to inhibit the activity, while in the former, even an hour fails to arrest the activity completely.

The investigation is proceeding.

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Flocculation of Bacteria by Protozoa

IN view of the recent discussion[1,2] of the possible importance of certain Protozoa in the flocculation of bacteria in sewage sludge, it may be of interest to record a clear-cut instance of flocculating activity on the part of a protozoan.

The ubiquitous freshwater and soil flagellate *Oikomonas termo* Kent, when grown in two-membered culture with various bacteria, has been observed to cause a very marked flocculation of certain species, notably *Erwinea carotovora*, *Erw. phytophthora*, *Proteus vulgaris*, *Phytomonas tumefaciens* and one strain of *Escherichia coli*, to use the nomenclature of Bergey's "Manual"[3]. The medium used for these mixed cultures contained 0·2 per cent glycerol, 0·1 per cent Difco proteose peptone, and 0·02 per cent each of calcium chloride and magnesium chloride. In tubes containing 10 ml. of this medium, flocculation usually occurred within three or four days after the introduction of small inocula of the bacteria and the protozoa. Microscopically, each of the floccules was seen to consist of a large central mass of bacteria with a few flagellates attached at the periphery. The maximum diameter of these floccules was about 3 mm.

Since both the bacterial and the protozoan cultures[4] used for the inoculations were pure cultures, and since the bacteria when grown alone in this medium flocculated very slightly, and then only in old cultures, there can be little doubt of the causal significance of the protozoan. The mechanism of the flocculation has not, however, been investigated.

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Long-Chain Molecules in Aqueous Urea Solution

FRICTION between surfaces is normally either of the (*a*) continuous or (*b*) stick-slip type. Occasionally, however, as in the determination of the viscosity of ammonium oleate solution by means of the concentric cylinder method, a new type (*c*) is encountered provided the shearing-rate is sufficiently low. In this, chain-like micelles cause adhesion between the surfaces, this adhesion being then periodically broken down with violent movements.

In the course of some experiments on friction utilizing an apparatus similar in principle to that previously described[1], in which a tungsten wire attached at its two ends by springs is half wrapped round a rotating 'Perspex' wheel partly immersed in a liquid, it has been found that friction of types (*a*) and (*b*) is encountered with by far the greater proportion of the aqueous solutions so far investigated. A solution of ammonium oleate exhibiting anomalous viscosity, however, gave rise to violent periodic movements of the wire (friction of type *c*). Using this apparatus, it has been found that while 2 per cent aqueous urea gives friction of type *a*, 20 per cent gives type *c*. The violent oscillations thus caused are sensitive to *p*H changes, being completely stopped by a few drops of dilute acetic acid.

The occurrence of *c*-type friction may most readily be explained on the hypothesis that strong urea solutions contain chain-like molecules which collect together to give fibrils of considerable mechanical strength. The formation of chains is not unlikely in view of the fact that hydrogen bonding is known to occur with complex substituted ureas in monolayers and to be destroyed by acidification (Alexander[2]). It would appear that the simple apparatus used in this work, of which it is hoped to publish further details shortly, may prove of value in detecting chain molecules in solutions. A similar effect has also been observed in the case of a saturated solution of glycine.

A solution exhibiting anomalous viscosity often shows the properties of a weak solid, so that floating objects, after having been rotated on its surface, will then 'unwind' of their own accord (Hatschek[3]). Experiment has shown that small objects floating on saturated urea solution will very slowly 'unwind' up to about 15°, which again affords strong evidence of the existence of molecular chains in the solution The effect is much reduced by acidification.

Saturated aqueous urea has also been found to exhibit a strong Tyndall effect, as does also molten urea at its melting point, thus confirming the presence of large molecules.

If, as seems likely (Pauling[4]), hydrogen bonding creates a new very large dipole moment, it is possible that, bonding having once started, a chain will continue to grow in length through the solution so that finally, although most of the molecules may be monomeric, a small proportion may be very highly associated. Numerous formulæ for such chain molecules are possible, the following being, perhaps, as likely as any :