In the following table are given some of the typical results of our experiments.

Coagulation time (in sec.)

Plasma	Original plasma	After ultra-filtration	After passing CO_2 for 30 sec.	Prothrombin activity of 0·2 c.c. ultra-filtered plasma + 0·2 c.c. thrombo-plastin	
				+0·2 c.c. water	+0·2 c.c. ultra-filtrate
Bovine plasma					
Fresh	14	—	14	—	—
	19	—	19	—	—
After 24 hr.	30	22	20	—	—
After 48 hr.	28	20	—	21	51
After 72 hr.	42	24	—	27	64
Human plasma (normal)					
Fresh	12	—	13	—	—
After 5 hr.	44	17	—	20	28
Human plasma (pathological)					
Jaundice					
Fresh	15	—	10	—	—
Tuberculosis					
(*a*) Pulmonary					
Fresh	21	—	—	—	—
After 8 hr.	35	20	14	25	32
Fresh	No clotting until 420 sec.	—	46	—	—
After 4 hr.	,,	17	47	—	—
Fresh	17	—	13	—	—
After 3 hr.	25	—	13	—	—
(*b*) Miliary	No clotting until 600 sec.	—	105	—	—

These results show an interesting parallelism between the effect of ultra-filtration and carbon dioxide on the prothrombin activity of plasma.

The mechanism of the effect of carbon dioxide on prothrombin activity of plasma is under investigation.

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Influence of Cations in the Production of Citric Acid by Yeast

Succinic and citric acids were found by Wieland and Sonderhoff[1] to be products of the dissimilation of acetic acid by yeast under aerobic conditions. But whereas succinic acid was always obtained in a yield of 5 per cent, the yield of citric acid varied; it amounted to 10 per cent only when they used barium acetate.

Sonderhoff and Deffner[2] re-investigated the production of citric acid in a more systematic manner. They found a yield of 25 per cent under certain conditions by using barium acetate. They suggested, therefore, that this yield of citric acid could be explained by the insolubility of barium citrate. The insoluble barium citrate remains unaffected while sodium citrate, which is very soluble in water, can be easily oxidized further; and it is then easy to understand why traces only of citric acid are found by oxidizing sodium acetate.

Virtanen and Sundman[3] indicated that production of citric acid takes place by oxidizing magnesium acetate, although magnesium citrate is soluble in water. They did not give a complete explanation, but they assumed that magnesium and barium probably have an influence at some stage in the formation of citric acid.

In a series of experiments, we were able to demonstrate that by using cations forming easily soluble citric salts (sodium, potassium and lithium), almost no citric acid was found. We think that the citric salts of these cations can pass easily through the cell wall, and they are dissimilated in the interior. In presence of cations forming insoluble salts (lanthanum, barium and strontium) we obtained a yield of roughly 15 per cent citric acid, because the insoluble citric salts cannot penetrate to the interior of the cell.

In the case of magnesium we found that complex salts are formed. The complex anions have a big volume and they cannot pass through the cell wall. In the case of barium citrate, difficulty in penetrating the cell wall is due to the insolubility of the salt; in the case of magnesium citrate to formation of a complex.

By using ordinary yeast, we found that the citric salts of sodium and potassium are easily dissimilated; those of magnesium and barium scarcely at all. By treating yeast with liquid air[4] and thus destroying the cell wall, we found equal dissimilation of sodium, magnesium, calcium and barium citrates. However, by this method of using yeast with destroyed cell wall, we were not able to oxidize acetic salts.

A detailed account of the experiments will be published elsewhere as soon as the investigation is completed.

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Slow Cosmic Ray Mesons at Sea-Level

During the latter part of 1938, a high-pressure cloud chamber designed by the late Prof. E. J. Williams was constructed to investigate certain phenomena concerned with cosmic ray mesons. It was hoped that by using high pressures, giving a long sensitive-time, that mesons would be observed coming to the end of their range in the cloud chamber. Four such examples have been obtained[1]. A similar example was also found by E. J. Williams and G. E. Roberts using a large cloud chamber working at atmospheric pressure[2]. In each case, the meson is observed to come to rest and then to decay with the emission of a β-particle. From these results, it is estimated that the proportion of slow mesons ($\beta < 0{\cdot}25$) in cosmic radiation at sea-level is about 0·05 per cent. In these experiments, no evidence has been found of the disintegration of nuclei by mesons as reported recently by D. H. Perkins[3], and by C. F. Powell and G. P. S. Occhialini[4]. Little information concerning the frequency of such events at sea-level is available, and it was thought that it would be worth while to expose some photographic emulsions in the same room as the cloud chamber.