phosphorus. On further chromatography this fraction separated into a fast-running fraction which contained mostly ethanolamine, while serine predominated in the slow-running fractions. (3) Chloroform containing 10 per cent ethanol eluted material with $\lambda_{max.}$ at 345 mμ (light petroleum). The molar ratio of dinitrophenyl groups to phosphorus was low (less than 0·5) and further chromatography showed that this material was a mixture. Fractions were obtained with 8–100 per cent amino-phospholipid. The specific radioactivity varied considerably and bore no simple relation to the dinitrophenol absorption, indicating that both the cephalins and lecithins present varied in specific radioactivity. (4) Ethanol slowly eluted material with little or no absorption due to the dinitrophenyl groups, and this fraction, which was not always recovered quantitatively, contained predominantly choline-phospholipids.

The specific radioactivity tended to be highest in the fraction with $\lambda_{max.}$ at 328 mμ; but some fractions with $\lambda_{max.}$ at 345 mμ were nearly as high. The final fractions had the lowest specific radioactivity, which was about a quarter of the highest value obtained.

Dinitrophenyl-octadecylamine has $\lambda_{max.}$ (light petroleum) at 330 mμ, but in ethanol it is 347 mμ. The dinitrophenyl-lipids (not treated with diazomethane) all absorb at 345 mμ. It is unexpected that some of the dinitrophenyl-lipids, after treatment with diazomethane, should still absorb at 345 mμ. The explanation of this is as yet unknown. The proportion of dinitrophenyl-lipid with $\lambda_{max.}$ at 328 mμ and at 345 mμ varies; in liver lipid there is more material absorbing at 345 mμ than at 328 mμ, whereas in brain lipid the opposite is the case.

In conclusion, it may be said that an examination of the results of several recent investigations[2], together with the present results, shows that phospholipids cannot be a simple mixture of phosphatidyl choline, phosphatidyl serine and phosphatidyl ethanolamine, together with small amounts of sphingomyelin and inositol phospholipids. It now seems likely that additional molecular species are present.

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[1] Atherton, F. R., Howard, H. T., and Todd, A. R., *J. Chem. Soc.*, 1106 (1948).

[2] Lea, C. H., and Rhodes, D. N., *Biochem. J.*, **54**, 467 (1953). Cole, P. G., Lathe, G. H., and Ruthven, C. R. J., *Biochem. J.*, **54**, 449 (1953). Lovern, J. A., *Biochem. J.*, **54**, 126 (1953). Lovern, J. A., and Olley, J., *Biochem. J.*, **54**, 128 (1953). Olley, J., and Lovern, J. A., *Biochem. J.*, **54**, 559 (1953).

Muscle Sodium

It was recently considered[1] that the sodium content of the frog sartorius muscle may be constituted as follows:

	m. equiv./kgm.
Total mean sodium	24
Interspace	13–14
A special region sodium	6–8
General fibre sodium	2–5

It could be inferred from the evidence that the special region referred to above was either a special group of fibres into which sodium entered much more rapidly than into the fibres in general, or it was the sarcolemma of each fibre. Strong evidence has now been obtained by extensive potential measurements in the single fibre of the sartorius, using the microelectrode technique, that the region in question is not a group of fibres, and it may therefore be inferred that it is the sarcolemmas of the fibres in general[2].

It may be assumed that 2–5 m. equiv. sodium/kgm. of sodium exist within the fibres in general. The following evidence therefore leads to the conclusion that the greater fraction of this moiety is not free, but is in some way firmly held and prevented from mixing with sodium-24 during twenty-four hours.

(*a*) It was noticed that when frogs were injected with sodium-24, the sartorii removed the following day and then immersed in isotonic glucose solution containing 5 m.mol. potassium sulphate/litre, 99 per cent of the labelled sodium emerged from the muscle in 90 min. But 10 per cent of the total muscle sodium, as measured by the flame photometer or by a uranyl acetate method, remained up to two hours or more. This was confirmed in a series of experiments using the purest chemical substances and with suitable blank experiments.

Fig. 1 shows the average values obtained where the original values for the labelled sodium and for the total sodium are both regarded as 100. There is no such difference between the exit of labelled and total sodium apparent with liver.

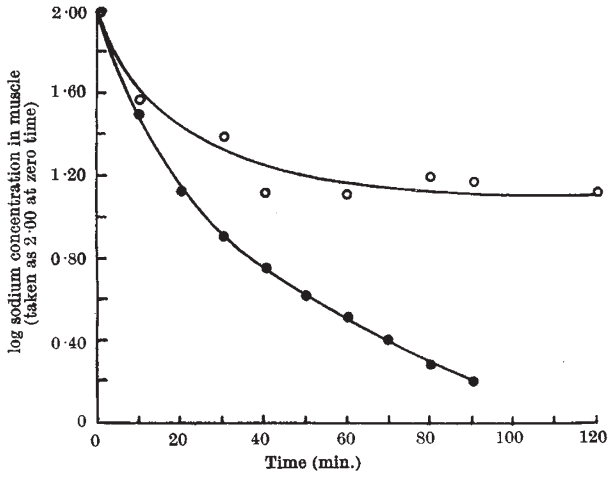

Fig. 1. Curves showing exit of total sodium (circles) and labelled sodium (dots) from sartorii into isotonic glucose containing 5 m.mol. potassium sulphate/litre

(*b*) After this, a series of observations on the ratio of labelled sodium to total sodium in the muscle and in the plasma was made. From the results obtained, there were 19·7 ± 1·0 m. equiv. labelled sodium and 24·5 ± 0·9 m. equiv. total sodium per kgm. muscle, showing a difference of 4·8 ± 1·3.

The difference would seem to indicate an even greater amount of unlabelled sodium than the immersion experiments; but the statistical variation is relatively wide and such divergence is not significant.

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[1] Carey, M. J., and Conway, E. J., *J. Physiol.*, **125**, 232 (1954).
[2] Conway, E. J., and Kernan, R. (unpublished experiments).