with the development of tuberculosis, the lipolytic activity of liver, pancreas and of blood serum is considerably lowered. The results are given in the following table.

Lipase Content (Titrated Lipase Units) per 1 gm. of Fresh Material

	Liver	Pancreas	Lungs	Serum
Infected guinea pigs,	396 (117–566)	425 (191–733)	85 (48–130)	28 (22–36)
Controls,	1140 (898–1410)	832 (488–1391)	85 (46–107)	40 (34–46)

Each group consisted of five animals. The infected animals were killed 2–10 days before the expected natural death. The figures in brackets indicate the variations in respective series.

In certain series, when the bacterial strain used did not produce general tuberculosis, the lipase contents of liver and pancreas were not lowered, a decrease being noted only in blood serum.

The cause of the decrease of lipolytic activity of different organs during tuberculosis is still problematic. It might be assumed that the destructive action of the tubercle bacilli on the tissues also destroys the lipases. This assumption is supported by our observation that in the sound portions of liver the lipase content is considerably higher than in the portions infected by tuberculosis.

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[1] *Acta Chemica Fennica*, B, **5**, 28; 1932. *Z. physiol. Chem.*, **219**, 1; 1933.

The Third Vitamin D

A SHORT time ago[1] we reported that vitamin D found in ether extract of meadow hay had the same properties as described by Kon and Booth[2] for vitamin D in butter, in that only one fifth of this vitamin after saponification is again found in the unsaponifiable fraction. We have since examined butter and have been able to confirm Kon and Booth's results as regards its vitamin D content. We considered it of interest to investigate whether the missing four fifths of the anti-rachitic vitamin might possibly be found in the saponifiable fraction of the ether extract of butter or hay. For this purpose, a small excess of acetic acid was added and the free fatty acids taken up with ether and isolated. It was then found that the missing four fifths of the original vitamin D were among the free fatty acids. Thus with alkali it gives a water-soluble substance; deprived of alkali, it is again soluble in ether.

As certain difficulties were involved in giving daily doses of natural butter, we tried to concentrate vitamin D in butter by shaking with a similar quantity of warm ethyl alcohol the melted butter fat which had been dried with sodium sulphate[3,4]. It proved that four per cent of the butter fat dissolved in the alcohol. This four per cent had an anti-rachitic strength 15 times as great as natural butter, inasmuch as it was active in curative daily doses of 20 mgm., as shown by Poulsson and Løvenskiold's method[5]. The product which was obtained was twice saponified and yielded 11·09 per cent unsaponifiable matter. Of this unsaponifiable matter it was necessary to give daily doses equivalent to 100 mgm. of the original extract in order to obtain an anti-rachitic result corresponding to 20 mgm. of this. Of the isolated free fatty acids, 25 mgm. per day produced the same effect as 20 mgm. of the initial material. Thus, it will be seen that about a fifth of the anti-rachitic vitamin has accompanied the unsaponifiable matter and about four fifths the saponifiable fraction. We obtained a similar result with ether extract of meadow hay. Here the daily doses of the hay powder extract were 4 mgm. Of the unsaponifiable matter they corresponded to 20 mgm. and of the fatty acids to 5 mgm.

It was of interest to investigate whether the vitamin D from cow's liver behaved similarly. Ether extract of cow's liver showed a suitable anti-rachitic effect in daily doses of 40 mgm. The unsaponifiable matter showed a corresponding effect in daily doses equivalent to 200 mgm. and the free fatty acids had a similar effect in daily doses of 60 mgm. In other words, vitamin D in extract of hay, cow's liver and butter has the same properties. With ether extract of the human liver, two thirds of the vitamin D is in the unsaponifiable matter and only one third among the free fatty acids. These conditions vary somewhat in the human being in the individual cases, a circumstance which is probably accounted for by the fact that the human being obtains sustenance from the products of both land and sea, and thus has a stock of the various D vitamins.

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[1] NATURE, **133**, 255, Feb. 17, 1934. In this letter an error appeared. At the end of the second paragraph, for 0·25 units read 10 units.
[2] Kon, S. K., and Booth, R. G., *Biochem. J.*, **27**, 1302; 1933.
[3] Shipley, Kinney, McCollum, *J. Biol. Chem.*, **59**, 177; 1927.
[4] Zucker, *Amer. J. Publ. Health*, **23**, 10; 1933.
[5] Poulsson, E., and Løvenskiold, H., *Bioch. J.*, **22**, No. 1; 1928.

Effect of a Meteoric Shower on the Ionosphere

OF the various agencies responsible for producing and maintaining ionisation of the ionosphere, bombardment of the upper atmosphere by meteors has been suggested as one. Skellett[1] has carried out a calculation of the energy received by the earth due to impact of the meteors and finds that during a meteoric shower it might be so high as a fourteenth of that due to ultra-violet light from the sun. He therefore concludes that meteoric showers might be one of the factors disturbing the ionisation of the upper atmosphere. In order to find if any correlation exists between the occurrence of the two phenomena, Schafer and Goodall[2] measured the height of the *E*-region during the Leonid meteoric shower of 1931. They found that on some nights the ionic density attained high values. Unfortunately, their observations were vitiated by a magnetic storm which was in progress at that time. Though they were unable to draw any definite conclusion regarding the correlation, they summarise their observations by saying that there is reason to believe that the presence of meteors in unusual numbers can cause increased ionisation of an intermittent nature in the region of the lower layer.

Considering the importance of the subject, we thought it worth while to take records of the ionisation content of the *E*-layer during the Leonid shower of 1933. The method employed was the well-known one developed by Appleton[3] and consisted in determining the frequency at which upwardly directed radio waves pierced the region under investi-