rabbits lowers the blood calcium. The character of the response of the blood calcium level is the same as I previously found to be the case for extracts of bovine ovaries, namely, a lowering of blood calcium of about 30-35 per cent usually in twenty-four hours and a return to normal in about forty-eight hours. In all respects the type of response was exactly the same as that recorded in the case of ovarian extract.

It would thus appear that the substance which has the anti-calcifying action has the same action on the blood calcium as the ovary. One can therefore assume that the mode of action of this 'anti-vitamin' is simply by reducing the blood calcium; hence the observations of previous investigators that this action of cereals can be counteracted quantitatively by administering either calcium salts or vitamin D, both of which act by raising the blood calcium. From the work of Robison and his associates we know that the bone enzyme or phosphoric esterase occurring in ossifying bone is quite adequate in rickety bone, but faulty ossification in rickets is apparently due to insufficient concentration of calcium or phosphorus or both in the blood.

The implications of this finding are many and varied and are fully discussed in the paper appearing shortly, which contains a full report of this work. The most important result is that rickets cannot be conceived to be purely a vitamin deficiency condition, but is primarily and ultimately due to a lowering of the blood calcium. This lowering of the blood calcium (and a low blood phosphorus is most probably secondary to it) can be produced by lack of vitamin D, by the administration of cereals, or by a faulty calcium to phosphorus ratio in the diet. Actually, rickets may yet prove to be a manifestation of hypoparathyroidism in young growing animals. If that is the case, our present conception of the rôle of vitamin D and probably of the other vitamins will have to change very appreciably.

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Vitamin B.

IN recent work Dr. Vera Reader (*J. Soc. Chem. Ind.*, **47**, 1247; 1928) has found that at least two thermolabile vitamin B factors are necessary for the nutrition of the rat, in addition to the factor or factors supplied by alkaline autoclaved marmite. Proof of these three 'B' factors has been made possible by the use of concentrates prepared from baker's yeast by the extended method of Kinnersley and Peters (*Bioch. J.*, **22**, 419; 1927), in which the process was carried through to the alcohol stage. These concentrates contain B.1, and are highly curative to the pigeon, but when given to rats in large amounts (up to 8 pigeon doses per diem), they do not supplement completely alkaline autoclaved marmite (pH = 9·0 for 1 hour at 120° C.). The latter contains the thermostable so-called anti-pellagra factor. These facts dispose of any objections raised in a recent paper (Aykroyd and Roscoe, *Bioch. J.*, **23**, 493).

The three factors in question are present in fresh marmite. I have found that fresh marmite in the presence of casein and cod liver oil does not lead to resumption of maximum weight in adult pigeons fed upon polished rice. As I have confirmed the finding of Williams and Waterman (*J. Biol. Chem.*, **78**, 311; 1928), that increase to a maximum weight readily takes place upon a whole wheat diet, the factor discovered by Dr. Reader is not the same as the thermolabile factor of Williams and Waterman. In so far as it is thermolabile, it would also appear to differ from that of Hunt (*J. Biol. Chem.*, **79**, 723; 1928).

I am directing attention to these facts here because of their importance to workers in this field. It should be realised that *at least* five 'B' factors have now been described: (1) the original thermolabile, anti-neuritic, curative to pigeons; (2) a second thermolabile (V. Reader); (3) a thermostable factor present in alkaline autoclaved marmite (anti-pellagra, Goldberger, etc.); (4) a second thermostable factor described by Hunt; together with (5) the 'Williams and Waterman' factor. The importance of the latter has at present been demonstrated only in pigeons. According to the exact conditions of the tests, some of these factors must have been included as either B.1 or B.2 in much of the previous work.

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Adsorption of Water by Wool.

IN the current number of the *Transactions* of the Faraday Society (**25**, 451; 1929), Mr. A. T. King discusses the changes produced by stretching in the hygroscopic capacity of single wool fibres. Although of a different nature and carried out for a different purpose, the following independent experiments seem to provide an answer to some of the inquiries raised by Mr. King's paper.

I have shown in previous papers that when wool fibres are held stretched in water, the fibrillæ within the cells undergo plastic flow and take a permanent set. It seemed probable that the affinity of the fibrillar structure for water would be increased by the disorganisation of its crystal structure and the question was examined in the following manner. Two consecutive 5-centimetre lengths were cut from a single wool fibre, one of these being kept stretched 30 per cent of its length in water at 25° C. for twenty-four hours, so as to occasion the maximum possible plastic flow of the fibrillar structure. At the end of this time the fibre was released and allowed to return to its original length. The other 5-centimetre length of fibre was simply immersed in water at 25° C. for twenty-four hours without stretching. A sufficient number of fibres were treated in this way to provide ultimately about 30 milligrams of both types of material. I have shown that no rupture of fibrillæ occurs in single wool fibres if these are not stretched beyond 30 per cent of their length, so that the only difference between the two samples was that in one case the fibrillæ had undergone plastic flow, whereas in the other case they remained completely unaltered.

The amounts of water adsorbed by the two samples were determined at a number of different humidities

Relative Humidity (per cent).	Percentage of Water adsorbed by:	
	Untreated Wool.	Stretched Wool.
63·3	14·31	14·44
92·5	24·92	25·77
100·0	..	..
75·0	17·92	18·95
34·2	9·53	10·24

by suspending them from a quartz spiral balance over sulphuric acid solutions of the required strength in a constant temperature room (22·2° C.). Each sample was taken from absolute dryness up to saturation in stages, and then in the reverse order to dryness, so that the values given in the accompanying table correspond