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20 years—the fecundity of the flocks showed steady diminution, ending in extensive losses of both ewes and lambs owing to difficulty in lambing time.

Investigations by Professor Underwood have established the following facts:

(a) There is dystocia due to uterine weakness, and to remarkable overgrowth of the lining epithelium or endometrium of the uterus. Uterine inversion is not uncommon.

(b) There is a regression of male organs to female type. The mammary glands become well developed, and the uterus masculinus, which is normally so small as only to admit the head of a pin, becomes in some instances as large as the clenched fist.

(c) Extracts made from the clover when injected into experimental animals produce similar changes in the sex glands.

(d) The same changes can be produced by continued treatment with the female sex hormone—oestradiol.

Here then in Western Australia, and on a lesser scale in South-East South Australia, we have diminishing fertility, and even failure of normal physiological reproductive function, on a dramatic scale, in an animal species restricted in its dietary to practically one fodder plant of the clover species. I wish at this stage to emphasise the fact that 20 generations of sheep have been necessary to demonstrate this final fact.

Intensive investigation is in progress to determine whether this result is due to a normal growth of this particular clover, or whether the influence of the clover is due in turn to a soil deficiency, but whatever may be the explanation one thing is evident.

The changes in the sheep have come about over a period of years, and the main factor has been a steady displacement of other fodder plants by subterranean clover during the period. There is some evidence that provided the sheep get some other pasture for a period, the changes mentioned do not occur, and this may indicate compensating factors in other plants, but whether this is so or not, the food of the animals is the cause of their remarkable change in fundamental physiological function.

Undertakers' Horses

It is, of course, no new discovery, this isolation of a sex hormone from plants. Nor is it news to relate the astonishing influence of the male sex hormone on the growth and development of plants. It is 12 years since I saw demonstrated the premature growth of lilies of the valley, which bloomed in one half the normal period of life.

On the other hand, it is highly important news that was given me after I had lectured upon this topic at Mil-dura recently, by Professor Lewis, of Melbourne University. As architect of the Great Western Railway, he dealt, as part of his activities, with a London market-gardener, who employed 200 men, and thus farmed in quite a big way. He had purchased stable manure from the Great Western for many years, and in course of conversation told Professor Lewis that he always used as much manure from the stables of undertakers as he could get, and that he willingly paid more for it. This apparently unscientific fact finds an explanation to-day which it could not have found 12 years ago in terms of ammonium salts and phosphates. The explanation lies in the fact that the con-

vention of the period demanded fine, sleek, high-stepping black animals to draw the hearse. These were stallions and that is the explanation of its efficacy in terms of testosterone. . . .

We have long been acquainted with the fact that the growth of legumes is associated with the growth of nodules on their rootlets—nodules containing nitrogen fixing bacteria. We are not, however, so likely to be widely informed on the details of the strange symbiosis of plant and bacterium. From 1886, when the phenomenon was identified, until 1930, it was believed that these bacteria could fix nitrogen apart from the plant. From then on, it has been known that neither host plant nor bacterium can, apart, affect this remarkable chemical change, and nothing is to-day known of the nature of their living relationship. . . .

"A Fashion of the Times"

We have already seen that science is a fashion of the times. . . . The growth of urban population increased the severity of epidemics and the consequent application of the new science of bacteriology to epidermology led to concentration upon public health and hygiene, and the development of water-borne sewage disposal. Industrial chemistry provided chemical fertilisers and the attitude towards traditional farming and the use of animal manures became frankly contemptuous.

While the advance of Public Health measures lowered the death rate from epidemic disease, and increased the expectation of life, there were increasing signs of deterioration in health, even when considered merely as absence of disease. The medical statistics of re-

cruiting for the services continued to show increasing grounds for misgiving, and with the outbreak of the 1914-18 war the rejections both in England and the U.S.A. excited concern, while recruitment for the 1939-45 war disclosed a much worse position, as I know from personal information given by the medical officer in charge of recruiting.

The Governor-General of this Dominion has more than once spoken publicly upon the evidence which he has seen as a fighting soldier, and his observations have excited comment outside the country. . . . In Australia, we have a nation-wide National Fitness Campaign, and this Government-sponsored activity aims at making youth fit by physical exercise, while on the other hand it is becoming a matter for surprise to find anyone with his natural teeth after the age of 35 years, the majority having already lost them in their teens or twenties. Yet we have school dental services. Although these activities are necessary, they are not dealing with causes. Faulty motor-car construction cannot be reasonably dealt with by increasing the number of repair stations or placing them under Government control.

Among those races who have for one reason or another retained their connexion with the soil, and where, in particular, nothing is lost from the soil owing to a closed cycle of farm operation and domestic life, the population carried per square mile reaches as much

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