pelled to accelerate the waste of the organized tissues by incessant motion, in order to furnish the matter necessary for respiration, so, the savage, for the very same object is forced to make the most laborious exertions and go through a vast amount of muscular exercise. He is compelled to consume force merely in order to supply matter for respiration.

Cultivation is the economy of force. Science teaches us the simplest means of obtaining the greatest effect with the smallest expenditure of power, and with given means to produce a maximum of force. The unprofitable exertion of power, the waste of force in agriculture, in other branches of industry, in science, or in social economy, is characteristic of the savage state, or of the want of cultivation.

If we now compare the capacity for increase of mass, the assimilative power in the graminivora and carnivora, the commonest observations indicate a very marked difference.

A spider, which sucks with extreme voracity the blood of the first fly, is not disturbed or excited by a second or third. A cat will eat the first, and perhaps the second mouse presented to her, but even if she kills a third, she does not devour it. Exactly similar observations have been made in regard to lions and tigers, which only devour their prey when urged by hunger. Carnivorous animals, indeed, require less food for their mere support, because their skin is destitute of perspiratory pores, and because they consequently lose, for equal bulks, much less heat than graminivorous animals, which are compelled to restore the lost heat by means of food adapted for respiration.

How different is the energy and intensity of vegetative life in the graminivora. A cow, or a sheep, in the meadow, eats, almost without interruption, as long as the sun is above the horizon. Their system possesses the power of converting into organized tissues all the food they devour beyond the quantity required for merely supplying the waste of their bodies.

All the excess of blood produced is converted into cellular and muscular tissue; the graminivorous animal becomes fleshy and plump, while the flesh of the carnivorous animal is always tough and sinewy.

If we consider the case of a stag, a roe-deer, or a hare, animals which consume the same food as cattle and sheep, it is evident that, when well supplied with food, their growth in size, their fattening, must depend on the quantity of vegetable albumen, fibrine, or caseine, which they consume. With free and unimpeded motion and exercise, enough of oxygen is absorbed to consume the carbon of the gum, sugar, starch, and of all simular soluble constituents of their food.

But all this is very differently arranged in our domestic animals, when with an abundant supply of food, we check the process of cooling and exhalation, as we do when we feed them in stables, where free motion is impossible.

The stall fed animal eats, and reposes merely for digestion. It devours in the shape of nitrogenized compounds far more food than is required for reproduction, or the supply of waste alone; and at the same time it eats far more of substances devoid of nitrogen than is necessary merely to support respiration and to keep up animal heat. Want of exercise and diminished cooling are equivalent to a deficient supply of oxygen; for when these circumstances occur, the animal absorbs much less oxygen than is required to convert into carbonic acid the carbon of the substances destined for respiration. Only a small part of the excess of carbon thus occasioned is expelled from the body in the horse and ox, in the form of hippuric acid; and all the remainder is employed in the production of a substance, which, in the normal state, only occurs in small quantity as a constituent of the nerves and brain. This substance is *fat*.

In the normal condition, as to exercise and labor, the urine of the horse and ox contains benzoic acid (with 14 equivalents of carbon ;) but as soon as the animal is kept quiet in the stable, the urine contains hippuric acid (with 18 equivalents of carbon.)

The flesh of wild animals is devoid of fat; while that of stall-fed animals is covered with that substance. When the fattened animal is allowed to move more freely in the air, or compelled to draw heavy burdens, the fat again disappears.

It is evident, therefore, that the formation of fat in the animal body is the result of a want of due proportion between the food taken into the stomach and the oxygen absorbed by the lungs and the skin.

A pig, when fed with highly nitrogenized food, becomes full of flesh; when fed with potatoes (starch) it acquires little flesh, but a thick layer of fat. The milk of a cow, when stall-fed, is very rich in butter, but in the meadow is found to contain more caseine, and in the same proportion less butter and sugar of milk. In the human female, beer and farinaceous diet increase the proportion of butter in the milk; an animal diet yields less milk, but it is richer in caseine.

If we reflect, that in the entire class of carnivora, the food of which contains no substance devoid of nitrogen except fat, the production of fat in the body is utterly insignificant; that even in these animals, as in dogs and cats, it increases as soon as they live on a mixed diet; and that we can increase the formation of fat in other domestic animals at pleasure, but only by means of food containing no nitrogen; we can hardly entertain a doubt that such food, in its various forms of starch, sugar, &c., is closely connected with production of fat.

In the natural course of scientific research, we draw conclusions from the food in regard to the tissues or substances formed from it; from the nitrogenized constituents of plants, we draw certain inferences as to the nitrogenized constituents of the blood; and it is quite in accordance with this, the natural method, that we should seek to establish the relations of those parts of our food which are devoid of nitrogen and those parts of the body which contain none of that element. It is impossible to overlook the very intimate connection between them.

If we compare the composition of sugar of milk, of starch, and of other varieties of sugar, with that of mutton and beef suet and of human fat, we find that in all of them the proportion of carbon to hydrogen is the same, and that they only differ in that of oxygen.

Whatever views we may entertain regarding the origin of the fatty constituents of the body, this much at least is undeniable, that the herbs and roots consumed by the cow contain no butter; that in hay or the other fodder of oxen no beef suet exists; that no hog's lard can be found in the potato refuse given to swine; and that the food of geese or fowls contains no goose fat or capon fat. The masses of fat found in the bodies of these animals are formed in their organism; and when the full value of this fact is recognized, it entitles us to conclude that a certain quantity of oxygen, in some form or other, separates from the constituents of their food; for no fat could possibly be formed from any one of these substances.

FLAX.

We have frequently recommended the cultivation of flax, but as yet, a very small quantity is grown in Canada, and that of inferior quality, in consequence of the very defective manner of preparing the soil for that crop, which, above all others, require most careful cultivation. It is considered in Holland, and Belgium, that the soil should be cultivated by trenching with the spade, to such a depth as would admit of the roots of the flax to go down into the soil from twelve to eighteen inches. Hence the straight root of the flax plant is generally half the length of the stem over ground. If we would prepare our soil in this way for flax, we have no doubt it would grow here as well as in the Netherlands. The growing of flax and hemp must be made a regular business, or we cannot succeed in making it profitable. As we have