mangolds, hay or straw, cake or linseed, corn or oats, just as the one or the other came handiest.

Thanks, however, to the labours of our friends the analytical chemists of Europe there will be, for the future, no excuse for such empirical work, as the process of fattening is now thoroughly worked out, and the value and office of the different constituents of the food, generally given, thoroughly understood.

It is clear that the successful feeding of animals must depend upon two things; first, what food is administered to them, and, secondly, in what state that food is when they receive it. To judge wisely upon these two points, we must study the chemical composition of the materials, the functions of the digestive organs, and the way in which those organs are affected by the various states in which they find the substances on which they are required to act.

It is evident to any thoughtful mind that a full grown annimal cannot require the same sort of food as an immature one. Its boncs and teeth are already formed, its skin and hair want little support, and there remain only the muscle, animal economy. First, the mouth receives the food and,

the fat, and the fuel to be provided for. I mean, of course, by fuel that part of the food necessary to supply the ingredients which the respiratory organs convert into the heat of the animal body. During its youth the growing beast demands a sufficient quantity of proper materials to be furnished it to build up its bones, &c.; but fat is hardly a requisite, though, of course, heat is.

Now, modern agricultural chemists have divided the constituents of food in a different and a simpler manner to that of their predecessors, inasmuch as the separation of the flesh-forming from the fat-forming and heat-giving matters is much more easily understood, by the man of average reading than the protein compounds, &c. of the past.

The flesh-forming ingredients have only one function to perform-the laying on of muscle or lean meat; but the fatformers have a double duty-after having furnished warmth to the body they expend the remainder of their wealth in laying on fat.

Let us see how the process of digestion is carried on in the



Dairy Cow " Maiden."

with the aid of the teeth, masticates it- the act of mastication evolving the saliva; the stomach macerates the food by means of the saliva and the gastric juice; the intestines still further, by the help of the bile from the liver and the chyme from the pancreas (sweetbreads), work up the whole into a porridge like mass which is taken up by the absorbents into the blood, and circulated through the body; while the useless remainder is sent on by the rectum and ejected in the form of dung.

Now, by various experiments, made on a large scale but most carefully conducted, it has been shown that the proper proportion of fat and heat-givers to flesh-formers should be, in a perfect food mixture, as $3\frac{1}{2}$ to 1.

Experiment No. 1 .- An ox, live weight 1400 lbs., taken up from grass-food, 8 lbs. crushed linseed cake - 13 lbs. cut clover hay, and 47 lbs. of turnips. Increase of weight, 20 lbs a week, or nearly 3 lbs. a day; equal to 400 lbs. during an average fatting time of 20 weeks-a pretty fair and profitable business.

The ingredients of this mixture are as follows:

Oil cake, 8 lbs, $= 128$ oz		·
Flesh-formers	22.14	0/0
Heat givers	51.00	<i>"</i> "
Ash (mineral)	7.25	"

Clover-l Flesh-formers Heat-givers A sb	hay, 13 lbs. = 208 oz.	2.00/0 5.7 " 8.0 "		
Turoi	ps. 47 lbs. $= 752$ oz.	- • •		
Flesh-formers	E 7	1.2 0/0		
Heat-givers		6.2 "		
Ash		1.5"		
The sum of these ingredients is as follows :				
Flesh-for	mers. Heat-givers.	Ash.		
Oil cake. 28.3	65.00	9.27		
Clover hav. 25.0) 119.00	16.64		
Turnips, 9.0	46.62	11.28		
62.3	3 230.62	37.19		

These last figures are arrived at by a sum in simple proportion : e. g. as oil-cake holds 22.14 0/0 of flesh formers,

> oz. oz. then 100 : 22.14 :: 128 : 28.3 Flesh formers. 100 : 51.00 :: 128 : 65.0 Heat-givers. 100 : 7.25 :: 128 : 92.7 Ash.

Thus it seems that oil-cake gives a large proportion of fleshformers (28.3) and little more than double heat-givers (65);