

in our system during life. When food is masticating, it is mixed in the mouth with saliva (2), and, by the act of deglutition, is passed into the stomach; where, by the action of the gastric juice (3) it is formed into a soft pap or paste, called *chyme*, which passes through the pylorus (4) of the stomach into the duodenum (5); it there mixes with the bile and pancreatic juice, and forms *chyle*, which is absorbed by the mouths of the lacteal vessels, and becomes incorporated in the left subclavian vein, with the venous blood; this is carried to the right ventricle of the heart, and from thence propelled to the lungs, where it becomes *arterial blood*, receives vitality, is fitted for nutrition, and being charged with caloric which enables it to maintain the temperature of the body) it is then conveyed to the left ventricle of the heart, and ultimately discharged into the aorta, and distributed through the arterial system of the body in general, to nourish and support it. It is the source from which every secretion of the body is separated.

"Gentlemen, we see now the use of food producing chyle, as it is that fluid substance from which the blood is formed.

"We shall now proceed with the calculations:—

1st. For persons of moderate health and constitution, but using little exercise or exertion, daily allowance of food 12 to 18 ounces—in nutritive matter equal to an average daily of 10 ounces.

2nd. Persons of good health accustomed to moderate labour (as sailors or soldiers on ordinary peace duty, or agricultural laborers or mechanics at their usual work, daily allowance of food 18 to 24 ounces—in nutritive matter equal to an average of 16 ounces.

3rd. Persons subject to hard labour or violent exertion, in good bodily health, 24 to 30 ounces of food—equal to 22 ounces of nutritive matter. Therefore the average food for an adult is 21 ounces, and the average nutritive matter 16 ounces. Twelve millions of adults allowed the average amount of nutritive matter, and four million the one half, with the exception of ale, which is improper to be given to children.

"The aborigines of Britain used an infusion of barley for their ordinary liquor, and it was the favorite drink of the Anglo Saxons and Danes. When well fermented it is a wholesome beverage, and seems only to disagree with those subject to asthma, or any disorder of the respiration, and when used dietically, contributes to the production of animal eat, by yielding a large quantity of oxygen to burn the carbon in the lungs—notwithstanding, a cheaper fuel might be used in the vital lamp.

"Several writers have endeavoured to form a scale of equivalents, the value of which, if accurate, will be universally admitted. Boussingault has suggested one, founded on the quantity of nitrogen contained in foods

Scale of nutritive equivalents.

Substance.	Equivalents.	Substance.	Equivalents.
Wheat flour ...	100	White haricots ...	56
Wheat... ..	107	Lentils... ..	57
Barley-meal ...	119	White Garden Cabbage	810
Barley... ..	130	Ditto dried at 212 deg.	83
Oats	117	Potatoes	613
Rye	111	Ditto kept 10 months...	894
Rice	177	Ditto dried at 212 deg.	126
Buck-wheat ...	108	Carrot... ..	757
Maize or Indian corn...	138	Ditto dried at 212 deg.	95
Horse-beans ...	44	Jerusalem artichoke...	539
Peas	67	Turnips	1335

"As flour, meat and ale, are not alone the articles of food used by man in this country, there is an allowance made of one drachm of nutritive matter for food that may be consumed not enumerated: the proportions of course will vary according to the price of the article, taking into connexion, other circumstances.

"The foregoing are the data on which I have grounded my calculations, and I am humbly of opinion, it is the only method that can be adopted to approximate the quantities

necessary to nourish and keep up the body to a healthy standard. They are here given in tabular form:—

Quantity necessary for each person per day.	Contains Nutritive Matter.	Quantity necessary for the whole population per day.	Quantity necessary for the whole population per year.
Flour. 12 millions... 13oz. 4dts. 4 ditto 6 10 Butcher's Meat (sorted) 12 millions... 6oz. 4 ditto 3 Ale. 12 millions... 20oz. 4 ditto none. Allowed for any other food not enumerated	oz. dts. 12. 12 2 1 1 2 0 1 16 0	11,593,750 lbs. of Flour. 5,250,000 lbs. 1,500,000 gallons. 547,500,000 imp. gallons.	11,020,100 qrs. of wheat (6) 1,016,250,000 lbs. 547,500,000 imp. gallons.

"It would require 3,673,366 acres of land to yield the 11,020,100 quarters of wheat at 24 bushels per acre, and 1,710,937 acres at 32 bushels per acre to grow 49,579,166 bushels of barley to make 60,833,333 bushels of malt to brew the 547,500,000 imperial gallons of ale. Total 5,384,803 acres."

After several nights' discussions, Mr. Anderson's plan was carried.

FIRE DETECTOR.—Among the latest additions to the Royal Polytechnic Institution is a most useful invention, called Taylor's Patent Fire Detector and Alarm. In size it is little larger than two fingers, and is perfectly harmless. In one form (for there are two) it consists essentially of a glass cylinder about three inches long, filled, or nearly filled, with mercury, and hermetically sealed. By a nice and somewhat difficult operation in the manufacture, it is arranged that the volume of mercury introduced should so nearly fill the cylinder that, on a slight increase above an ordinary temperature, it fills it completely. The point at which this takes place can be at any part of the scale; but the one usually adopted in the construction of the instrument designed for general use is 95° (Fah.) Below this point the mercury expands and contracts freely, as in the thermometer; but should the temperature ever exceed it by a few degrees, the immense force of the expanding mercury quickly overcomes the cohesion of the glass, and fracture inevitably ensues. The peculiar form of the cylinder, which has a bulb in its middle, insures that it shall break transversely and separate end from end. In the other form, the union is effected by