PHYSIOLOGY OF REPRODUCTION.

A late number of the *Westminster Review* contains the following interesting article on the above topic:—

The student of nature wonders the more and is astonished the less, the more conversant he becomes with her operations; but of all the perennial miracles she offers to his inspection, perhaps the most worthy of admiration is the development of a plant or an animal from its embryo. Examine the recently laid egg of some animal, such as a salamander or a newt. It is a minute spheroid in which the best microscope will reveal nothing but a structureless sac, inclosing a glairy fluid, holding granules in suspension. But strange possibilities lie dormant in that semi-fluid globule. Let a moderate supply of warmth reach its watery cradle, and the plastic matter undergoes changes so steady and purpose-like in their succession, that one can only compare them to those operated by a skillful modeler upon a formless lump of clay. As with an invisible trowel, the mass is divided and subdivided into smaller and smaller portions until it is reduced to an aggregation of granules not too large to build withal the finest fabrics of the nascent organism. And, then, it is as if a delicate finger traced out the line to be occupied by the spinal column, and molded the contour of the body; pinching up the head at one end, the tail at the other, and fashioning flank and limb into due salamandrine proportions, in so artistic a way that, after watching the process hour by hour, one is almost involuntarily possessed by the notion that some more subtle aid to vision than an achromatic glass would show the hidden artist, with his plan before him, striving with skillful manipulation to perfect his work.

As life advances, and the young amphibian ranges the waters, the terror of his insect contemporaries, not only are nutritious particles supplied by its prey, by the addition of which to its frame growth takes place, laid down, each in its proper spot, and in such due proportion to the rest, as to reproduce the form, the color and the size characteristic of the parental stock; but even the wonderful powers of reproducing lost parts possessed by these animals are controlled by the same governing tendency. Cut off the legs, the tail, the jaws—separately or all together—and, as Spallanzan showed long ago, there parts not only grow again, but the redintegrated limb is formed on the same type as those which were lost. The new jaw or leg is a newt's, and never by any accident more like that of a frog. What is true of the newt is true of every animal and plant; the acorn tends to build itself up again into a woodland giant such as that from whose twig it fell; the spore of the humblest lichen reproduces the green or brown incrustation which gave it birth; and the other end of the scale of life, the child that resembled neither the paternal nor the maternal side of the house would be regarded as a kind of monster. So that the one end to which in all living beings the formative impulse is tending—the one scheme which the Archæus of the old speculators strives to carry out—seems to be to mold the offspring into the likeness of the parent. It is the first great law of reproduction that the offspring tends to resemble its parent or parents more closely than anything else.

BREAD.

MESSRS. EDITORS:—I am glad one of your correspondents from Ohio has recently started the subject of bread; and if you find anything new or useful in the following lines, I would feel highly gratified if you should publish it for the benefit of your numerous readers.

The fermenting agents which we use in the making of bread have, or should have, a two-fold aim; the first is to lighten the bread by introducing a gas (always carbonic acid) in the dough and thus throw its particles asunder by mechanical action. This object is attained by all known fermenters. But the second aim is only reached by two fermenters—the sour dough (dough in a state of acetic fermentation and used by the Germans in the making of their rye bread) and the well-known yeast. These two bodies seem to act directly on the granules of starch and burst them. Bread made properly with these two agents ought to be more nourishing than bread fermented by other means; and experiments made on regiments of soldiers, convicts, &c., in Saxony, have shown its advantage to be about 35 per cent. Besides this, bread raised by yeast or sour dough has an agreeable flavor, and retains its moisture longer than bread raised by alkalies. Mineral alkalies (saleratus or bi-carbonate of soda) used in the fermentation of bread have, besides disadvantages in an economical point of view, a most hurtful and pernicious influence on the human system. Introduced into the system, they seem to take the place of lime and its phosphates in the blood; and I am often inclined to think that the use of saleratus and soda in our bread and cakes has more to do with the thin bones, rotten teeth and flabby, soapy looks of our children—large and small—than many would imagine. Justice and common sense should banish mineral alkalies to the soap manufactory; but bakers should be compelled to eat the alum and sulphate of copper which they use to make bread white and their customers sick.

L. K.

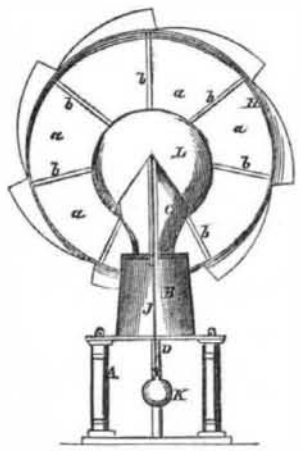
New York, July 12, 1860.

"THE AMERICAN WINDMILL."

The accompanying engravings illustrate an ingenious mprovement in that class of wind-wheels which are commonly termed "portable," and which are more especially designed for driving light machinery; the object of the invention being to simplify and economize in the construction of such class of machines, and at the same time render the same more efficient than hitherto. The invention consists in the use of a deflecting cone placed over the gearing and so arranged, relatively with the wheel, that it may serve as a vane, and keep the former facing the wind; the cone serving the triple purpose of vane, cover or protector to the gearing, and deflector to cause the wind to act in the most efficient manner against the wheel.

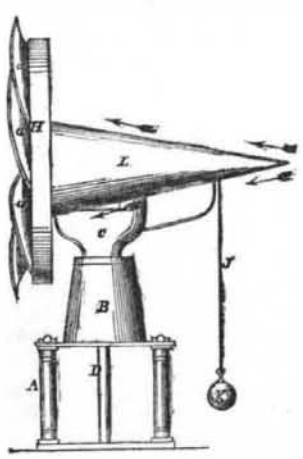
Fig. 1 represents a back elevation of the wind-wheel; Fig. 2 is a side elevation; and Fig. 3 is a side sectional view. A is a suitable framing on which a block, B, is

Fig. 1.



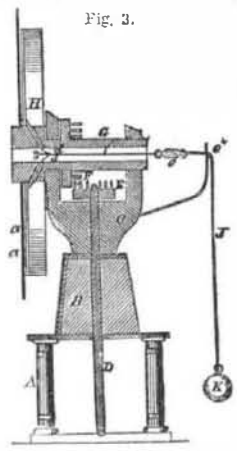
secured, and C is a cap placed on the block, B, and allowed to turn freely thereon, a vertical shaft, D, serving as a center for the cap; the shaft, D, passes through the cap, C, and block, B, and is allowed to turn freely in both. The upper end of the shaft, D, has a pinion, E, on it, and this pinion gears into a corresponding pinion, F, on a hollow shaft, G, which is fitted in proper bearings on cap, C. To one end of the hollow shaft, G, the wind-wheel, H, is attached. This wheel is formed of a series of sails or wings, *a*, attached to radial arms, *b*,

Fig. 2.



the inner ends of which are fitted in the shaft, G, and the outer ends fitted in a ring or bend, *c*. The arms, *b*, are allowed to turn freely in their bearings, and to each sail or wing a cord or rope, *d*, is attached at the lower end of the side opposite to that where the sail or wing is attached to its arm. The cords or ropes of the several sails or wings are all connected, within the hollow shaft, G, to a common cord or rope, I, which is connected by a swivel, *e*, to a rope, J, which passes through a guide, e*, and has a weight, K, attached to its lower end. The weight, K, is the exponent of the power of the wheel, for in consequence of being connected to the sails or wings as described, the latter are rendered self-regulating and are allowed to yield or give in accordance with the gravity of the weight. This self-regulating mechanism, however, is quite common and well known, and therefore does not require a minute description. L is a hollow cone which may be constructed of wood or metal. This cone has a section removed or cut out from one side, so that it may be fitted horizontally over the gearing, E F, and on the cap, C; the larger end of the cone being next to the wheel, as shown clearly in Fig. 2. The point of the cone projects some distance beyond the cap, C.

Fig. 3.



It will be seen that the cone serves as a covering or protector for the gearing, E F, and also serves to deflect the wind towards the outer part of the wheel, as indicated by the arrows in Fig. 2, thus rendering the wind-wheel more efficient than it otherwise would be. The cone also, for the above reason, serves further to render the turning of the wheel quicker with the changes of the wind.

The designer of the above-described improvement is E. F. M. Fletcher, of Georgia Plains, Vt., who patented the same on April 17, 1860; the patent is now jointly owned by the inventor and James M. Edney, who manufacture (at 432 East Tenth-street) and sell (at 147 Chambers-street) these wind-wheels at the following rates:—With sails of 12 feet diameter, $100; and 16 feet, $125. Wheels of these sizes will work all ordinary light machinery with great regularity and ease. Mr. Edney has a few State rights for sale and will be happy to furnish further information.

GAS-BURNERS.—A patent has just been taken out, in London, by Mr. Johnson, of Glasgow, for a gas-burner of the following simple construction, designed to prevent the flickering of the light. It consists of a tubular cap of thin cast iron or other metal, having a wide internal diameter, so as to fit by its open lower end upon or over an existing burner. The top of the burner is in the form of a solid convex end, through which a vertical slit is made to form the actual burner aperture for the gas, and produces a thin, broad, flat flame. When such a tubular cap is fitted upon or over an ordinary burner, the gas is received into the reservoir of the tubular cap, and it thence passes slowly off through the burner slit. The reservoir intervening between the common burner beneath and the burner slit in the top of the cap above, acts as a pressure-regulator, to prevent flickering and inordinate forcing of the gas, whilst the broad flat flame insures the production of a brilliant light.

WESTERN CROPS.—A correspondent states that wheat in Wabash Valley, Indiana, is light, but the grain is splendid. Corn is as fine as could be wished for, and an immense amount is planted. Oats are poor; hay, in some places, excellent and heavy. Vegetables are superior in quality and quantity. Fruits, on the average, are abundant. Wild fruits—blackberries, gooseberries, raspberries and plums—are plentiful. The present prospects for the edible comforts of mankind was never greater. The forest trees are covered with an extraordinary heavy foliage—leaves large and deep green. Animals are fat, and there is a cheering prospect for an abundance of heavy hogs and beef cattle.

THE sum paid out of the public treasury for cattle killed in Massachusetts, by order of the commissioners, on suspicion of having the *pleuro-pneumonia*, or for having been exposed to it, is between $22,000 and $23,000. That branch of the expenditure on this subject is probably now closed.