

STATIONARY ENGINE WITH ADJUSTABLE CUT-OFF VALVES.

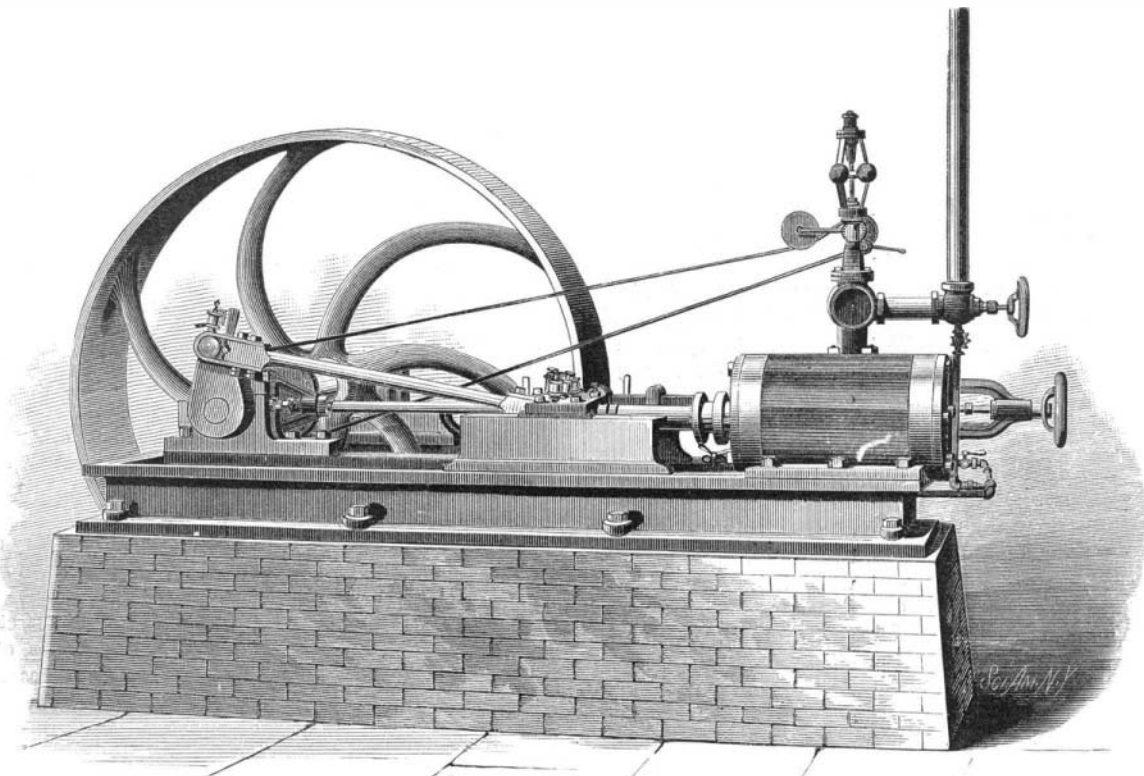
We give engravings herewith of a twenty-five horse-power engine, a representative of a line of engines manufactured by the Taylor Manufacturing Company, of Westminster, Md., and ranging in power from 12 to 250 horse power. For simplicity of construction and quality of workmanship and material employed, they are equal to any other make of engine. This engine is superior in the arrangement of valve gearing, which is shown in Fig. 3. This view represents the cylinder with the steam chest open, showing the main valve and cut-off valves with their connections; B is the main slide valve resting on its seat, showing port openings in each end; A A are the two cut-off valves resting on the back of the main valve; these valves are provided with brass nuts, having a solid collar on one end and two jam nuts on the other, for the adjustment of the nut in the valves and providing against wear. These valves are moved by stems, E and C, upon which are turned right and left hand threads: one end of stem E is secured to slide piece F by two locked collars, set to permit stem E to revolve in adjusting the valves; the end of stem C, that passes through the hand wheel, D, is provided with a key, so that by revolving the hand wheel the stems, C, E, revolve in the cut-off valves and spread

them apart or draw them together according to the requirements of the cut-off; the pointer, I, indicating by a figured scale at what part of the piston travel the steam is being cut-off. The bottom edge of the valves rests upon an inclined or beveled surface that keeps the valves to their proper seats and prevents them falling off and clattering when at work. The valves are driven by two eccentrics, the rods of which connect to the wrist pins, G and H.

The advantages gained by using two eccentrics are important, as the adjustment of both main and cut-off valves is independent of each other. The main valve, B, has a lap lead and exhaust closure appropriate to the value of the maximum cut-off, and permanently retains these relations throughout every variation in the point of cut-off brought about by the separation of the valves. The range of cut-off is from zero to six-tenths of the stroke, while the main valve acts in the interval and cuts off at eight-tenths of the stroke. It will be seen by the arrangement of the valves, A, that by closing them together they will be thrown out of gear and the control of engine left to the action of the main valve. The decided advantage in this cut-off is the positive results obtained, and the range of cut-off fixed upon while the engine is in motion, and the introduction of the steam to the cylinder positively fixed according to the requirements of the power. The variation of load is met by regulation of steam through a very sensitive governor, that is fitted with a double valve, and is also provided with a stop motion and speeder for varying speed of engine as desired without change of pulleys. With this combination of governor the valves are relieved of a considerable portion of the boiler pressure, but when a sliding cut-off is

the sole agent in the regulation it has no such protection, but must carry the full unrestrained boiler pressure constantly whether the load driven is heavy or light; and where such valves are actuated by springs or the governor, the friction is too great to be overcome by the spring, and consequently the valves are not reliable in their action. The throttling mode is preferable to the many styles of balanced valves, owing to the difficulty of keeping such valves in order and

practically the point of cut-off will not positively occur equal, or promptly in both or a repeated number of strokes, and the steam follows the piston various distances many times unnecessarily, whereas, with the arrangement as shown, a positive point of valve closure can always be obtained, and with the governor to meet the variable load it is evident that a high degree of economical performance is secured. By a careful examination of the diagram taken with



TAYLOR MANUFACTURING COMPANY'S STATIONARY ENGINE.

insure their perfect balance under all circumstances. The waste of steam that occurs from imperfect balanced valves is greater than the power required to overcome the friction of the valves as arranged in this engine.

The equalization of the cut-off is accomplished by adjusting the valves separately for the average position

of one hundred barrels of flour and making a large percentage of middlings. The amount of work is large for an engine of the size named, and the very highest degree of economy could not be expected, but with a greater power of one hundred horse power at least ten per cent better results in economy of fuel can be attained; but from the above results a very high degree of excellence is claimed for the engine as a fuel saver, and its simplicity of construction secures durability and ease of operation.

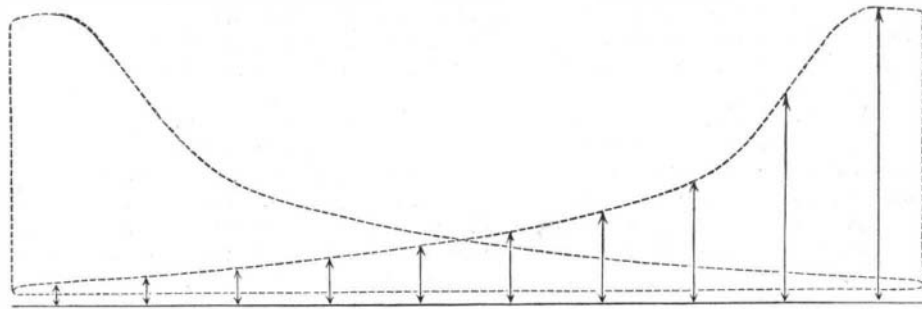


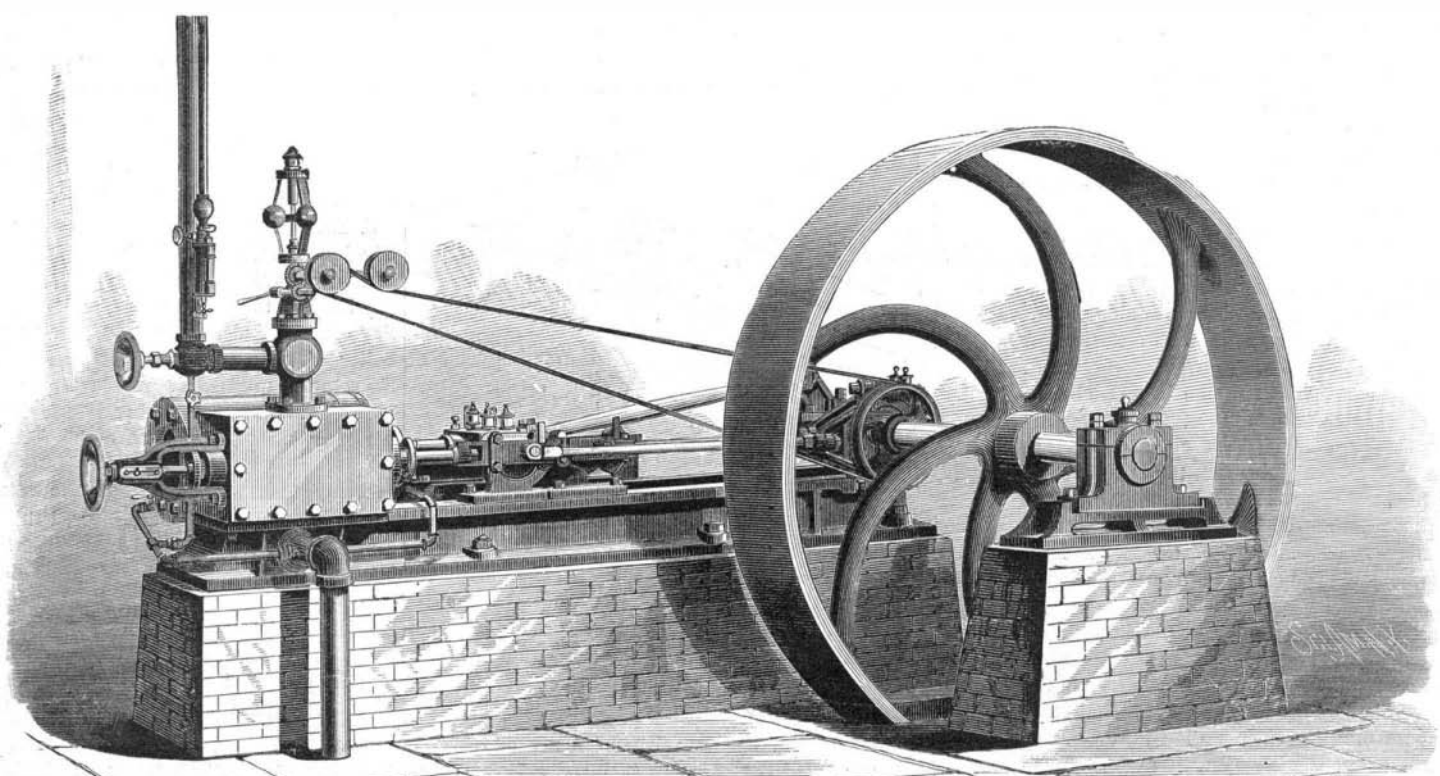
DIAGRAM FROM 14x24 ENGINE.

of the point of cut-off which will be practically equal to all points, and the closure of the steam port is necessarily equal for both strokes, whereas, with the usual automatic valve arrangement, the difference in velocity of piston travel, and actuation of valves by pendulum or spring governors, through the various connections, is so great that

their works to that city as soon as shops are completed. For further information address the Taylor Manufacturing Company, Westminster, Md.

Locusts in Angora.

Last year the village of Angora, in Asia Minor, was devastated by locusts, and, in order to avert a repetition of the calamity which had laid waste several productive agricultural districts, the governor of the province decreed that every able-bodied peasant should, during a certain period preceding the ensuing locust-hatching season, collect locust eggs at the rate of two pounds weight per diem, and deliver them in person to the nearest local authorities. His Excellency fixed the minimum quantity of ova to be gathered in this manner at 1,400,000 lb.



25 H.P. STATIONARY ENGINE BUILT BY THE TAYLOR MANUFACTURING COMPANY.

weight, and furthermore prescribed that a daily fine of two piasters should be levied upon each peasant who should fail to fulfill the duty thus imposed upon him in the general interest of the province. The practical results of this wise and prudent decretal were as follows: During the first day or two of the period appointed for the collection of the ova, a few rustics brought in their quota of eggs, but the large majority of the peasantry, far too indolent to take the trouble of digging them up, compounded with the powers that be by privily purchasing the necessary quantity of eggs from the officials at one piaster per kilogramme, and then making public delivery of the quantity to the employes empowered to receive it. Thus the two or three hundred kilogrammes of eggs really collected and delivered by law-abiding peasants were sold over and over again to the malingerers. These tricksters saved half the amount of their fines, the officials pocketed a piaster by each transaction, and the crop of locusts for the coming season will, in all probability, turn out even finer than that which all but ruined the Angora vilayet last year.—*London Telegraph*.

Dyestuffs from Salicylic Acid.

We are not surprised to learn that salicylic acid, now so cheaply prepared from carbolic acid, has been called upon to yield a dye, which will no doubt give a fresh impulse to its manufacture, as hitherto the consumption has been limited to medicinal and antiseptic purposes. A so-called salicylic-acid-yellow can be made from it, which is distinguished by its resistance to weak alkalis, and threatens to replace picric acid, which latter is known to be explosive and easily washed off from the fiber. According to the process employed in Schering's works sulphosalicylic acid is nitrated by treatment with nitric acid, sp. gr. 1.35, for a long time at 40° to 50° C. (100° to 120° Fah.). Or a mixture of sulpho acid and barium nitrate is treated with concentrated sulphuric acid. The nitrosulphosalicylic acid, as well as its salts of the alkalis and alkaline earths, is very soluble in water. The solution dyes silk and wool yellow without any mordant. If the nitric acid acts very energetically on the sulphosalicylic acid the sulpho group will be split off entirely. Bromine can also be introduced into it, forming either a mono or dibromo nitrosalicylic acid, which dyes still more intensely yellow. We should suppose that it would be advantageous to introduce the bromine first directly into the salicylic acid and afterward nitrating with care, since it is said that hot nitric acid converts bromosalicylic acid into picric acid. Sulphosalicylic acid also forms dyes with the phenols; thus resorcin produces a bronze red, strongly fluorescent when in alkaline solution. With diamidobenzole it yields a Bordeaux red, with diazometaxyline a fuchsine red, and with diazoamidonaphthaline a violet dye.

P. N.

IMPROVED PLOW.

The annexed engraving shows an improved device for preventing plows from choking with weeds and stalks in plowing, patented by Mr. Fernando Gautier, of Pascagoula, Jackson county, Miss. In this device the arrangement of stationary cutters and oscillating cutter is such that when the cutters are ground away by sharpening they may be readily adjusted so as to work as at first. The oscillating cutter is connected with an eccentric at its rear end, the eccentric being operated by the toothed driving wheel through gear wheels, which are inclosed in a suitable case to prevent clogging with soil or weeds. When the plow is drawn forward the drive wheel is revolved, and by means of the gear wheels and the cam, the oscillating cutter is moved vertically, passing the stationary cutters and cutting weeds or stalks that would otherwise choke the plow. The plow beam is made of cast metal, and at its forward end has an enlargement containing a vertically flaring recess, of sufficient depth to receive a short T-shaped clevis, which is pivoted in the bottom of the recess by a bolt, and adjusted in a raised or lowered position by a second bolt, which is passed through one of a series of perforations in the beam and a perforation in the clevis. The clevis is simply a T-shaped bar of iron requiring but little material, and can be more easily made than any other clevis. The handles of the plow are so arranged as to be adjusted to the height of the plowman.

Fraudulent Infant Foods.

There are about twenty European preparations styled infant foods, beginning with that of Nestle, and at least twice as many American, all of which profess to furnish a complete nutrition for the infant during the first few months of its existence, while yet the conversion of starch into dextrine and sugar is beyond the capacity of the untrained digestive function. The examination of these with the microscope, assisted by such simple tests as iodine, which turns starch cells blue, and gluten (or albuminous) granules yellow, has engaged the careful attention of Dr. Ephraim Cutter, of Cambridge, and his results will startle most mothers who have relied upon the extravagant pretenses set forth in the circulars of manufacturers.

and pretense on the part of manufacturers in this field shall serve to protect mothers from further betrayal and to rescue infant life from quack articles of nutriment, his work, though giving a tremendous shock to our sensibilities and to our faith in medical certificates, will not have been done in vain.—*N. Y. Times*.

Copying Drawings.

Tilhet's method of copying drawings in any desired color is thus described in the *Polytechnisches Notizblatt*:

The paper on which the copy is to appear is first dipped in a bath consisting of 30 parts of white soap, 30 parts of alum, 40 parts of English glue, 10 parts of albumen, 2 parts of glacial acetic acid, 10 parts of alcohol of 60°, and 500 parts of water. It is afterward put into a second bath, which contains 50 parts of burnt umber ground in alcohol, 20 parts of lampblack, 10 parts of English glue, and 10 parts of bichromate of potash in 500 parts of water. They are now sensitive to light, and must, therefore, be preserved in the dark. In preparing paper to make the positive print another bath is made just like the first one, except that lampblack is substituted for the burnt umber. To obtain colored positives the black is replaced by some red, blue, or other pigment.

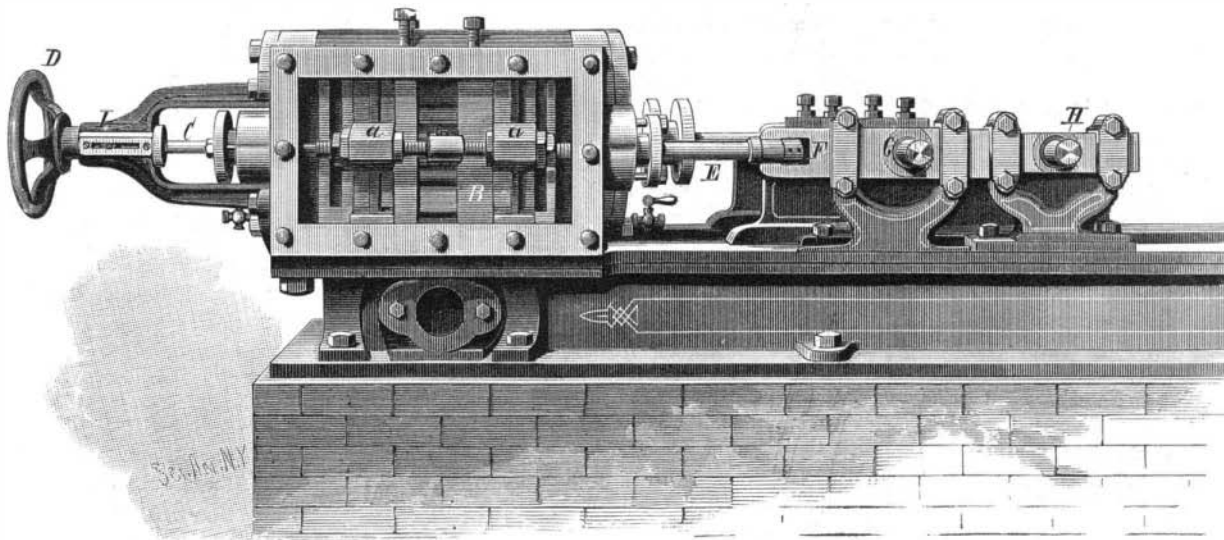
In making the copy the drawing to be copied is put in a photographic printing frame, and the negative paper laid on it, and then exposed in the usual manner. In clear weather an illumination of two minutes will suffice. After the exposure the negative is put in water to develop it, and the drawing will appear in white on a dark ground; in other words, it is a negative or reversed picture. The paper is then dried, and a positive made from it by placing it on the glass of a printing frame, and laying the positive paper upon it and exposing as before. After placing the frame in the sun for two minutes the positive is taken out and put in water. The black dissolves off without the necessity of moving back and forth.

Pasteurization of Beer.

In other countries, notably in Germany and America, this system of preserving beer has been extensively adopted, and very favorable results have been obtained. Pasteur's investigations proved that a temperature of 131° Fah. is fatal to diseased ferments, but that yeast cells are capable of withstanding this temperature. In his celebrated work on beer, Pasteur describes the following experiment:

"A number of bottles of beer which had been heated on October 8, 1871, were compared with those of an equal number of bottles of the same beer which had not been heated. The examination took place on July 27, 1872. The beer which had been heated to 131° Fah. was remarkably sound, well flavored, and still in a state of fermentation. As a matter of fact, we have proved by exact experiments that alcoholic ferments, heated in beer, can endure a temperature of 131° Fah. without losing the power of germination; but the action is rendered somewhat more difficult and slower. Diseased ferments, however, existing in the same medium, perish at this temperature, as they do in the case of wine. The beer which had not been heated had undergone changes which had rendered it quite undrinkable; its acidity, due to volatile acids, was higher than that of the other beer in the proportion of five to one; the beer which had been heated contained one-half per cent of alcohol more than the other."

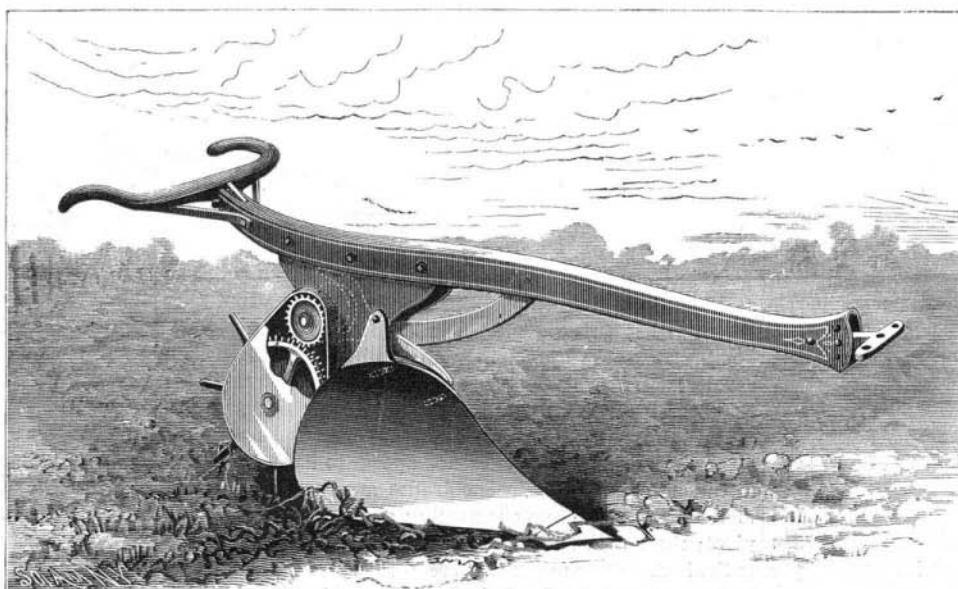
So important a result as is here described ought to be extensively applied; there can be no practical difficulties in the way of pasteurization but such as can be easily surmounted. The first objection that was raised to this process was the risk of the bottles bursting during the process, but this might be easily obviated by firmly fixing the corks in the bottles, and by conducting the process in a vessel so constructed that the pressure on the outside of the bottle is about the same as the internal pressure caused by the expansion of the contents of the bottle by heat. Another objection that has been raised to pasteurization is that it causes the beer so heated to become cloudy, but this is the case only to a very slight degree when the beer is raised very gradually to the requisite temperature; sudden heating will render



CUT-OFF MECHANISM OF THE TAYLOR MANUFACTURING COMPANY'S ENGINE.—(See opposite page.)

Eliza McDonough, who preceded Dr. Cutter in this field, has been in a measure discredited; but it appears that her assertion—that the starch, so far from being transformed into dextrine, was not sufficiently altered to render the recognition of its source difficult, whether from wheat, rye, corn, or barley—was strictly true, and that these preteyious foods are, without exception, nearly valueless for dietetic purposes. All of them consist of baked flour mainly, either alone or mixed with sugar, milk, or salts. In some cases, the baking has been very inadequately performed, and the doctor found one that consisted merely of wheat and oats whose starch cells were proximately in their natural condition.

The general result of Dr. Cutter's examination may be stated in brief terms as follows: There was scarcely a single one of the so-called infant foods that contained a quantity of gluten as large as that contained in ordinary wheat flour. That is to say, a well-compounded wheat gruel is superior to any of them, particularly when boiled with a little milk; and mothers are in error who place the slightest dependence upon them. As respects one very expensive article, professing to possess 270 parts in every 1,000 of phosphatic salts in connection with gluten, Dr. Cutter was unable to find any gluten at all. The thing was nearly pure starch, sold at an exorbitant price as a nerve and brain food and a great remedy for rickets. So all through the list. Sometimes a trace of gluten was present; more frequently none at all. In one case there were 90 parts of starch to 10 of gluten; but this was exceptional, and the majority were



GAUTIER'S IMPROVED PLOW.

less valuable, ounce for ounce, than ordinary wheat flour. Considering the semi-philanthropic pretensions that have been put forth by the manufacturers of these foods, some of them sustained by the certificates of eminent physicians, the report of Dr. Cutter is one of the dreariest comments upon human nature that has recently fallen under the notice of the journalist. But if the revelations he has made of fraud