

sound laws of navigation; and, wishing to imply how good a skipper he should make, endeavours to persuade such as are credulous that a more ill-used company never sailed beneath the British flag. The ship's crank, her spars touched, her cotton tender, and her "old man" less respectable than a negro-driver.

Finally, Yankee Ben, heading a weak deputation of one man, whom he has rendered as quibbling as himself, in representing some petty grievance with more than usual vigour and impudence, is placed in irons and under arrest. The solitary deputation, disconcerted by this reception, glided ignobly into the shadows, and Yankee Ben, subjected to wholesome restriction, found "his occupation gone," and, before the voyage was over, gave no more trouble to Captain Capstan.

The Fo'castle Lawyer is no imaginary character, and, sailing to the east or to the west, to the north or to the south, you may meet him. He is of all latitudes, and as dangerous in the Black Sea as the Red Sea, amongst icebergs as beneath the tropical sun. Far north or far south, where daring men disturb the great leviathan in its native depths, you may find him amongst the crew of the whaler; or outward-bound to a far shore, on the crowded decks of the passenger ship, you may detect him setting many persons by the ears, and prodigally sowing mischief. At length, either patriotically inspired, or disgusted with the merchant service, he joins a Queen's ship, and, should her commander regard the "cat" as an animal ordained for better purposes than long naps or a retiring pension, you may anticipate the spectacle of the Fo'castle Lawyer receiving some fine morning, in presence of his comrades, such a fee from the hands of the boat-swain's mate, as will probably suggest to him the propriety of immediately relinquishing a practice productive of "more plague than profit."

Should you meet him at any time in your travels seaward, you'll say, with my old friend Marlinspike, "neither rats nor cock-roaches are worth mentioning in comparison."

#### AERATED BREAD MAKING.

AMONG the many favourable features of the age may be enumerated the general application of science to practical uses; and the simple teaching of the philosophy of common things—the "air we breathe," "the clothes we wear," and "the food we eat," now command our intelligent thought. Of the latter class stands in indisputable pre-eminence our daily bread. We all are interested in it. The light of the sun falls in but few places where cereal crops are not cultivated. These plentiful fruits of the earth—which ripen alike by the broad waters of the Nile, and clothe the plains of the West—which cover like a golden sea our English vales, and crowd the "clearing" of the Australian emigrant—are the life of the world. There is much similarity, too, in the way bread has been made in all ages and lands; whether the grain has been ground between two stones, turned by the hands of some Rachel and Rebecca of the East, or

by a fifty-horse steam-engine, as at a city flour-mill, by a quiet stream and ponderous water-wheel, or by the four-armed windmill.

But here we must remark that breads are divisible into two great classes—the one light and sponge-like, full of small cells or air-holes, the other close and heavy. The Scriptures speak of them as leavened and unleavened; but we may illustrate their difference as that between a "cottage loaf" or "notched brick," and a navy biscuit. The unleavened was the earliest form of bread; and in Sweden hard cakes, composed of rye and kept months after baking, are much eaten, and the barley bannocks of Scotland are akin to them.

Now, there is a mysterious process of nature called fermentation, and to it we owe this variety. In the loaf it has taken place, in the biscuit it has not. The principle of fermentation is not yet very clearly understood, and to examine the theories on the subject would be departing from our subject. Suffice it to say that by it carbonic acid gas is evolved, and when occurring in dough, it heaves up the mass and distributes throughout it an abundance of little cells; as the chemist calls it, giving it a vesicular texture, but in humbler phrase, making it when baked to become "crummy." If paste be left under certain conditions, it will of itself decompose and evolve gas. This, probably, led to the introduction of fermented bread in early times, and is thought to have been employed regularly; but for ages past the result has been attained by mingling with the bread a gaseous body, identical with that which gives the foaming appearance to ale and the sparkling appearance to champagne. Many different substances have been used for this purpose, in various lands and periods. The ancients used leaven; in the East India toddy, or the juice which flows from the cocoa-nut tree when its branches are wounded; and in the West Indies dunder, or the refuse of rum distillation; while in England, good old Saxon ale yeast is our recognised fermenting fluid.

These processes are slow, and entail a large amount of labour of human muscles in kneading, to disseminate the gas throughout the dough. In order to save time, to economize labour, and to render bread as wholesome and nutritious as possible, a variety of plans have been proposed: some purely mechanical, for kneading simply; others embodying some chemical principle capable of giving to bread its light texture without fermentation. They have been attended with different degrees of success. The latest is that of Dr. Daughlish of Malvern, which is termed the "aerating process," or making bread with "fixed air."

We recently visited some works where it is in operation, and saw things novel indeed in connection with the baker's trade. Whatever the merits of the system may be, it is at least evident that it has rendered it possible that the waving crops of the harvest field should be converted into loaves without the admixture of anything less pure than air and water; and that the series of operations, from the reaping of the corn to the drawing of the loaf from the oven, should be carried on without the touch of human hands. To practise this sys-



tem, there are employed at the works we visited, a powerful steam-engine, intricate machinery, a gas generator, and a gasometer. The gas here made, however, is a very distant relation of the noxious vapour which is prisoned up in the great round cylinders of the gas works, and to the escape of which we have such an aversion. It is indeed that pure body which, present in all spring and well water, gives it its sparkling character, which we wire up in our bottles of soda water, and which, liberated from its crystal captivity, causes such water to dance and frisk with effervescent freshness. It is called carbonic acid gas; and this, with the flour of wheat, a little salt and fresh water duly mingled by machinery in manner following, yields the bread of which we speak.

From the yard, containing these miniature gas-works, we pass into the bread-room; and here our attention is first called to a huge machine rising to the height of twenty feet, perhaps, looking very ponderous and powerful for so peaceful a purpose. This is an "aerating" machine, and is intended to accomplish all that has hitherto been done by the tedious process of fermentation. Resting on a heavy metal frame-work, and about ten feet from the ground, is a large iron globe, three feet in diameter. Its appearance is that of a huge bomb-shell. It is in this globe that the dough is made. Within it is a sort of paddle-wheel moved by heavy gearing outside, which acts in place of human hands, and is termed the "mixer." Round the globe is a stage or gallery for the use of the baker's man, and rising from it to a considerable height is a pillar which contains the water.

When operations commence, the air-tight cover is pushed off the iron globe, and the mouth of a canvas bag descending from the ceiling being untied, a whole sack of flour is allowed to fall into this cavernous receptacle. On goes the cover, and so far the shell is charged. But flour lies loosely, and the globe is not quite full, therefore there is present a good deal of air, which must be disposed of. An ejection is accordingly served on it by the force-pump, and we have a perfect vacuum.

The gas which we saw making at first, is next about to be used. Our floury demonstrator "turns it on," and we are told that it is streaming into the globe, and taking possession of the space from which the common atmospheric air was so forcibly ejected by the pump. And now, though we cannot peer into the mysterious depths of the iron shell, we know that at the bottom lies the flour, and at the top a quantity of highly condensed gas. Another cock is turned on, and water, frisky and brilliant, rushes in. It has become fresh and dancing by the passage of the gas through it when in the pillar. It is soda water without the brackish mineral taste, or the water which wells up from the sand and rocks under the influence of a laughing gas, which makes it tumble and leap in beautiful brilliancy. It is such water which now bounds into the globe amongst the flour and gas; round go the arms of the mixer, as splash, splash go the blades of the steamboat wheel; and flour, salt, water, and carbonic acid gas lose their identity and become dough.

We wait eight minutes, listening to the whirr of wheels and hands on every side, and then descend from the gallery to see the dough drawn from the globe. A spout is opened at the bottom; light and spongy it comes forth, and is caught in moulds of the shape of the future loaf. In twenty minutes the whole sack of flour has thus been drawn off.

This is the working of Dr. Daughlish's patent. He aims at the abolition of the fermenting process by at once introducing into the dough, and forcing throughout it, the pure gas, instead of engendering it by yeast and working it in by kneading.

We must not, however, leave the loaf in incipency while we discuss the patent; so a word or two on ovens. There have been a considerable variety. The kind employed here, and at most wholesale bakeries, is called a "traveller;" and a very unwearied traveller it is. The floor is composed of iron plates hinged together, and forming an endless band, traversing on rollers, arranged to move at a pace which admits of the nicest regulation. The dough which has issued from the globe is caught in moulds by boys, and passed to others who stand at the mouth of the oven. The tins are placed on the moving plate, and immediately commence a slow journey through this tropical region. The ovens are about twenty feet from end to end, and the exit is in another room from the entrance or mouth. After an hour's journey over this scorching desert, the loaves arrive in parties, like overland passengers, considerably burned and regularly baked, and drop into baskets, to be hoisted away to another department.

We forbear to express any opinion on the bread thus manufactured, but may say that the principle is a beautiful application of chemistry to common things. As a system it is very interesting. It will gratify all who require to see science employed for the weal of mankind. Too often her large resources are not well applied, and not unfrequently her sons dig into her depths and soar her heights but to gratify curiosity. It is well, then, to note any instance where the wonderful knowledge of man is made to minister to the welfare of the race.

#### OLD MODES OF ADVERTISING.

We had the curiosity the other day to tot up the total of the advertisements contained in a single number of the "Times," with its double supplement, and found them to amount to little short of 2000. This suggestive fact set us speculating on the possible means by which people in old days, when there was no "Times" or any medium of that sort, made their communications to the public. Admitting that the desire of publicity has grown prodigiously with the means of obtaining it, there must always have been the desire, and some contrivances or other for gratifying it. In towns and cities, and wherever communities dwell together, the thing could be done by the blowing of ram's horns or the blast of a trumpet, and by *visá voce* appeals to the multitude thus assembled; but where population was sparse and scattered, however great the necessity for communication, such a plan would not do. Hence