consequence was, that the bellows collapsed at once under the pressure which Nathan was exerting upon them.

"There," said Jonas, "you see that when the air is kept in you cannot bring the sides together; but when I let the air out, then they come together easily."

"Yes," said Nathan; "do it again, Rollo."

So they performed the experiment again. Nathan pulled the handles apart wide, while Rollo kept his thumb over the nose, to keep the air from issuing through. Then Nathan tried to press them together; but he could not, until Rollo put his finger under, and pushed up the valve a little, and then they came together again very easily.

"The air is a real thing, I verily believe," said Nathan.

"Yes," said Rollo, "I know it is. And now for the third experiment, Jonas."

"The third experiment," said Jonas, "is this. Turn the bellows bottom upwards, and try to blow."

Nathan did so. He found that he could work the bellows easily —too easily, in fact; but they did not blow.

"Hold your hand opposite the nose, and see if any wind comes," said Jonas.

They did so; there was no wind, or rather scarcely any.

"The reason is," said Jonas, "that, when the bellows are bottom upwards, the valve hangs down off from the hole all the time, and lets the air all out through the hole in the side; and it can come out more easily there than through the nose, and so it don't blow well."

"Well, Jonas," said Rollo, "that's a pretty good experiment but what is the next? Let me try the next. Nathan, it is my turn."

"The next experiment, which is the fifth,——"

"No, the fourth," said Nathan.

"The fourth, then," said Jonas, "is to prove what I said to you—that the air, which is blown out at the nose of the bellows, really comes in through the valve. Let me see,—I want something to make a smoke."

"Will not paper do?" said Rollo.

"Yes," said Jonas, "here is some brown paper, which will do." So Jonas rolled it up, and told Rollo to set it on fire, and then, when it was well burning, to step on it with his foot, and put the flame out.

Rollo did so, and the paper lay in a heap, making a great smoke upon the hearth, just before the fire.

"Now," said Jonas, "put the bellows upon its edge, by the side of the paper, so as to have the valve near the smoke, and then hold still a minute, until the smoke comes up steadily by the valve."

When this was done, Jonas told Nathan to take hold of the nose of the bellows, to steady it, so that Rollo could blow. He then directed Rollo to lean the bellows over a little towards the smoke, so that the moving side should not rub upon the hearth, when he began to blow.

"Now," he continued, "if you work the bellows, you will see that the smoke will be drawn in through the valve, and then will come out through the nose.

AGRICULTURE.

[The following is an extract from a highly interesting and instructive article, in the last number of the *Edinburgh Review*, a periodical of the highest order of literary and scientific merit.—Ed.]

The natural progress of agricultural improvement is, in its main steps, easily traced. It is determined partly by the nature of the soil, and in part by the density of the population. At first the people are few—land therefore abundant, instruments rude, live stock thinly scattered, and manure little cared for or collected. Only where the land is dry, or of lighter quality, and easily stirred, is the natural herbage broken up. Corn is there sown, and crop after crop is taken, till the produce dwindles down to three or four seeds, when the soil is for the time abandoned, and new land broken up, to be subjected to a similar exhausting tillage. Such has been more or less the case in our time with all the older states of the American union; such was formerly the case in many parts of Scotland; and such is still the case on the plains of Russia and Poland. In this stage of agriculture, manure is almost unthought of except as a nuisance which unavoidably accumulates, and calls for labour to remove it. On the shores of Wolga, and its tributary streams, winter aids the farmer in removing his dung-heaps. They are carted on to the ice when the rivers are frozen, and the thaw sweeps them down towards the Caspian sea.

But as land becomes less comparatively abundant, corn must be raised more frequently from the same spot, and one or other of the simplest forms of rotation will be introduced. The farm is divided into three portions—one in perpetual grass, on which the live stock graze in summer, and which yields hay for their winter's food—the other two in arble culture. From the latter, in the colder countries, as was till lately the case in Sweden, a crop is taken in each alternate year. The value of manure is now, in some measure, understood, and the droppings of the cattle are collected and bestowed upon the land. We do not indeed insist upon this yearly alternating corn and naked fallow—though a rude form of husbandry found in countries where agriculture is still young—as necessarily and immediately succeeding to the system of perennial and exhausting crops of corn. It may be too sudden a transition, to pass at once from many successive crops, and many years of fallow, to a single season of each; but it must, we think, be considered as a stage through which an advancing people will pass. It cannot be the result of a high refinement in agriculture, since such refinement accompanies only an increase of population; which is generally followed by a diminution of naked fallows—which cannot in fact, afford that the land should lie idle every other year,

When a diversity of soils prevails, as is so much the case in this island, those parts are first selected for arable culture which, not being blown or naked sands, are naturally the driest,—are worked at the least cost of time and labour, and give the most sure return. Thus certain districts—certain whole counties—the surface of some entire geological formations—have been ploughed and sown from time immemorial; while others have lain as long in permanent pasture. Hence it is, that on some of the stiffest clay lands of England, the richest old grasses exist. Hence, also, in counties abounding in clayey soils, the oldest villages are usually found upon the lighter land, or on the hills or ridges of sand and gravel which here and there cover or pierce through the clay. Such a case presents itself in the eastern half of the county of Durham, in which every old village or parish church—almost without exception—between the Wear and the Tees, is situated on such rounded hills or banks, or flats of sand and limestone gravel; on which tillage is easy, the natural drainage good, and the rains of a humid climate of less hurtful influence.

Such lighter land being all in occupation, the next step the farmer is induced to take, as the demand for corn increases, is further to diminish his naked fallows—to adopt, for example, the ancient three-course shift (two crops between each naked fallow) which to the present day characterizes a very large portion of the North European agriculture. Naked fallows could not yet be abolished, even on soils from which weeds could be readily extirpated. Where manuring is little understood or cared for, they must still prevail. If we do not renovate the land by adding to it some equivalent for what we take off, we must, for a time leave our fields to themselves, to renovate their exhausted powers as they may.

But to this state of things succeeds the alternate husbandry. Instead of naked fallows, green crops—called hence fallow crops —are grown on the land, which otherwise would have been idle. To eat these green crops, cattle are kept in greater numbers. More manure is thus produced. When laid on the land, this manure causes more corn to grow on the same extent of surface, so that a larger measure of grain is carried to the market by the farmer than before; while the green crops, or rather the beef and mutton into which they have been converted, form a clear gain of food to the country, and of profit to the husbandman.

Still other benefits follow this change. Armed with this new supply of manure—a new engine, as it were, placed at her command—improvement turns now to the uncultivated lands. Light sands, and dry heaths and commons, which refused to grow corn crops alone, are brought, by means of alternate green crops, and eating off with sheep, or other forms of copious manuring, to yield continuous and profitable returns. Thus wide wastes, like those which formerly covered Norfolk and Lincolnshire, are converted into productive domains—rich in sheep and corn, honourable to the improvers, and of great value to the state.

And now the dry land of easy tillage, and at moderate elevations, being pretty generally worked up, improvement again takes a new direction. Emboldened by past success to expend