too dull, the muzzle is dry, or the milk is lessened, or rumination is irregular, or there is a fondness for remote corners of the field or yard—little things, we admit, but wonderfully significant when taken in connection with the prevalence of the disease in the neighborhood. All this time the breathing remains undisturbed.

After a while, the deposit advances sufficiently far to diminish the respiratory surface, and then, as a natural consequence, the animal is compelled to breath more quickly: and be it observed that the frequency of the respirations will be in proportion to the amount of obstruction. From the irritation and oppression the pulse becomes now excited, the digestive functions are impaired, the blood in the lungs is only partially purified, and general emaciation follows, until, at last, the animal is a living skeleton.

During the whole career of the affection, we find no sudden changes—everything is gradual, the breathing and pulse are gradually quickened, the body gradually wastes; in short, nothing like acute disease can be perceived, and one is unwittingly lead to wonder how it could have been confounded with inflammation for so long a time after its appearance.

Passing from these considerations to the question of liability, we discover that the subjects are very diverse. Animals in weak condition, milking cows, and fatting oxen, seem alike its victims; and, in one county or other, either of these classes is occasionally specially selected. The animal most secure is, without doubt, the one in the highest state of health. Working animals that have been well fed, and possess what is called hard condition, are the most exempt. On the other side, all those exposed to debilitating influences, whether referring to food in excess or defect, to disproportionate work or bad stable management, are in a condition favorable for the attack, should the specific cause reach their neighborhood.

An important question occurs as to the contagious nature of the malady. Much difference of opinion exists on this point; but, certainly, no exact evidence can be advanced to show that it can be transmitted from one person to another, in any way, not even by direct inoculation. Still, we would be understood as advocates for precaution; no good can result from allowing the contact of healthy and diseased subjects. So should the farmer act, as though every affection among his stock was infectious in its nature.

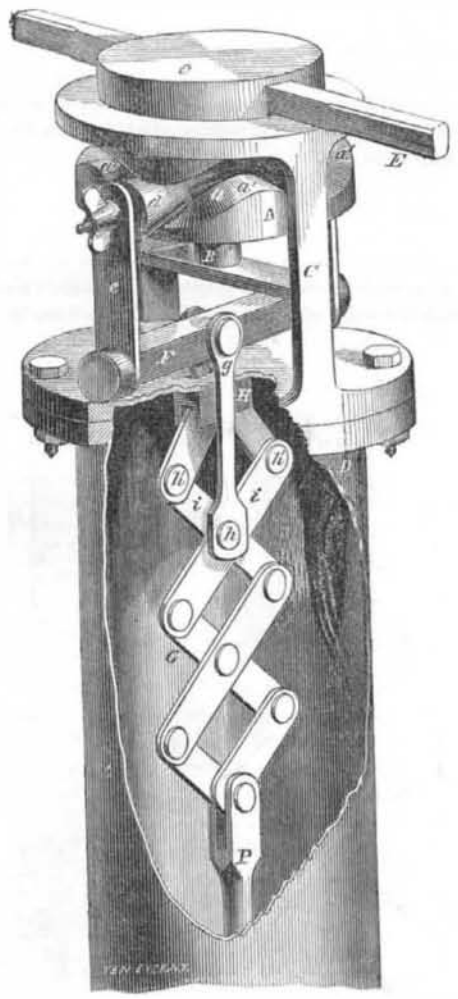
Treatment: On this point we must of necessity be concise. Confining ourselves to the consideration of the principles, and leaving the practice to the discrimination of the attendant, our conclusion as to the positive nature of the affection will decide our system. We have admitted the presence of a highly fibrinous blood, with a sluggish circulation through the lungs, as the principal evils. The indications obviously are, then, suggestive of measures calculated to dissolve and lessen the fibrin; and, to keep the blood in motion, any agents which, alone or in combination, will do this, recommend themselves. Ammonia in any of its active forms is among the best; it seems to have a particular power to keep the blood fluid, and combines the property of a stimulant. The use of this drug externally and internally we have found most successful; we do not suggest it as a universal cure, but we claim for it the importance belonging to it as an alkali and stimulant. Fancy may be allowed some play, and any plan which shall include the use of alkalines, stimulants and tonics, with counter-irritants externally, is, at least, founded on correct principles.

Prevention is proverbially to be sought before even cure; but, unhappily, we can only have recourse to generals in speaking of it as applied to this disease. At one time inoculation was thought to be as valuable as the vacine disease in its preventive influence. Among the Germans the belief even now obtains in its favor, but more extended experiments have demonstrated that pleuro-pneumonia cannot be transmitted by inoculation, nor any immunity obtained by the performance of the operation. As we have hinted, attention to the general health, the use of every measure calculated to promote good condition, will do much; beyond this it seems we possess no control over the attacks of the malady or the susceptibility of the system.

THE *Atlas* steamship, belonging to Messrs. Burns & McIver, of Liverpool (England), has all her interior iron-work, even to her tanks, coated with zinc.

IMPROVED PUMP MOTION.

The most common motion that is applied to the pistons of upright cylindrical pumps is a vertical reciprocating one—up and down alternately. The engraving illustrates an entirely different motion applied as the first effort, although the piston has the usual up-and-down action. The invention consists in the arrangement of a horizontally rotating cam disk in combination with a rising and descending yoke, and with a series of lazy-tongs (expanding and contracting cross levers), in such a manner that, by rotating the disk, a rapid reciprocating motion is imparted to the piston.



A represents a disk provided with a cam groove, *a*, and it is attached to a vertical shaft, B, which has its bearing in a frame, C, that is firmly secured to the top of the pump barrel, D. The shaft is rotated by the levers, E, and they are inserted into proper sockets, as represented. The cam groove, *a*, forms the guide for friction rollers, *d*, which are secured to the upper ends of arms, *e*, and project from the yoke, F. The shape of the cam groove is such that, on rotating the disk, the yoke is made to rise and descend several times during each revolution of the shaft. The cam groove has four projections, *a'* forming a uniform wave line, causing the friction rollers, *b b*, to rise and descend. Any number of such elevations and depressions may be employed to give such a number of strokes as may be required during each revolution. The yoke, F, connects by rods, *g*, at the side, with the second pair of links, *i*, of the lazy-tongs, G, through a pivot, *h*. The ends of the first links of the lazy-tongs pass through a bracket, H, and the ends of the lower links are embraced in the fork of the piston rod, P, and held with a pin, as shown in the open section of the pump barrel. By moving the yoke, F, up and down by the horizontal rotation of the plate, *c*, of shaft, B, the whole series of lazy-tongs are extended and contracted alternately, and this moves the piston rod, P, up and down in the barrel, and also the piston which is attached to the lower end of it.

It is believed by the inventor that pumps can be operated in this manner with much greater ease than by the common up-and-down lifting motion that is usually applied.

A patent was granted for this invention on June 12, 1860, and further information may be obtained by addressing the inventor, Edward Wade, of Norwich, Conn.

NATURAL PRODUCTS AND MANUFACTURES OF VIRGINIA.

MESSRS. EDITORS:—I ask a small space in your columns, as I am otherwise unable to answer the numerous inquiries of your readers in relation to the minerals of this State, since the publication of my note on "American Manganese" (page 338, Vol. II, SCIENTIFIC AMERICAN), and this letter, I propose, shall give such information as most of them seek.

I am as much surprised at the present manifestation of interest and inquiry in relation to our minerals and their development as I have been surprised that the most promising mineral, mining and manufacturing portion of this State or, in fact, this continent, has been so long neglected, and its great value and importance so little known. I will not pretend to give a geological description of Virginia. I will only say, in a few words, no State or no country in the world can be richer than this in the useful minerals, and particularly coal and iron. Even the great manufacturing State of Pennsylvania is behind us in natural resources. Your readers need no other proof of this than a reference to a map of this State or the country, with such geological knowledge as we must suppose most of your readers to possess. We see the great Appallachian chain of mountains rising from the lakes of the North and disappearing below the alluvial of the Gulf States. This great mineral range reaches its climax in the heart of Virginia, and her rivers, running from the summit of the Alleghanies, cut a geological section from the highest or latest formations down to the lowest and oldest. We may say all the strata of every geological formation lie opened like the leaves of a tablet, and the riches of the mineral kingdom lie temptingly exposed. Every mineral peculiar to this country must here exist. I cannot point out the many coal fields and mineral deposits; but I wish to call attention to one magnificent region where the mineral wealth of Virginia seems centered, and where all the lavish gifts of bountiful Nature are represented. See where the great Kanawha enters the Ohio; trace it up through those vast deposits of coal and salt. More fuel and oil and gas lie beneath the mountains that cast their vast shadows over its dark waters than would supply the world for hundreds of ages. But do not be satisfied with these small items; further up it cuts the mighty Alleghanies to their base, with all the lower ranges of accompanying mountains that rise like steps on either side. Here we have the coal, iron, limestone, lead, manganese and most of the minerals from the carbonaceous down to the lowest silurian. Above this, we enter the great limestone formation peculiar to the valley of Virginia, and which extends, with the same characteristics, from Tennessee to New York. But here it is higher than at any other point, and is surrounded by resources of natural wealth not found in such close proximity at any other spot known.

Where the Virginia and Tennessee Railroad crosses this river (here known as the New River) seem centered all the availabilities that the miner and manufacturer could desire. The river descends from the mountains of North Carolina and Virginia through inexhaustible deposits of iron, copper and lead. The iron ores are almost as plentiful and profuse as the common rocks, and are not now more noticed or valued. The copper has recently attracted much attention and has been extensively developed in quantity and quality beyond doubt or speculation. Lead has been mined in the neighboring county of Wythe for one hundred years, and still the "Old Wythe Lead Mines" are actively worked with a profit of over fifty per cent to the operators!

Limestone is the most plentiful rock and forms the bed of the river for some sixty miles, and the bed or grade of the railroad, crossing the river, between two and three hundred miles; altogether forming one of the richest agricultural regions in the world, I believe, without exception. A coal field of considerable extent crosses the river some ten miles below "Central," or the point of reference where the railroad crosses the river. It has been sufficiently developed to demonstrate its great practical value, and contains anthracite, semi-anthracite and bituminous coal. It is now used extensively on the line of the railroad and found to be pure and durable in character.

In the center of a rich agricultural district we find the richest mineral deposits—coal, iron ores and limestone.