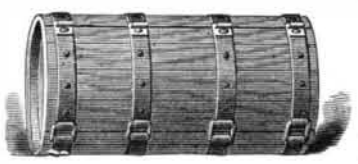
RECENT INVENTIONS.

A Novel Folding Barrel.

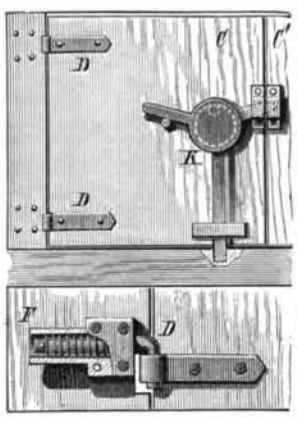
Mr. Armistead Barksdale, of Statesville, N. C., has patented a folding barrel or hogshead for transporting tobacco or other dry substances that may be folded when not in use. The staves of the barrel are straight, and the barrel is divided into three sections, the staves being secured to metal hoops or bands by rivets. The bands are hinged together by narrow links at one of the folding joints and wide links at the other. The ends of the hoops have eyes adapted to fit together and receive a locking bolt, which fastens the sections firmly together when the barrel is set up.



The heads are made in two parts, and are secured to wooden hoops by rivets, the hoops being laid edgewise against the face of the heads and flush with their outer edge. The heads are attached to the body of the barrel by thumb-bolts, which pass through the hoops and staves. To pack the barrel it is laid on its side and the heads removed. The sections of the barrel are then folded on each other, and one of the heads placed on the top and the other on the bottom, and the whole screwed together by bolts. In this form the barrel can be handled with convenience and occupies but one-tenth space of one set up.

Grain Car Door.

An ingenious device by which the closing of the doors of grain cars is insured has recently been patented by Mr. Martin Graff, of Terre Haute, Ind., and is shown in the annexed engraving. To the door posts of a grain car are hinged doors, C C'. To the outer corners of the doors are attached eye straps, D, of hinges, the shanks of the hooks of which pass through holes in the inner ends of tubular sockets, F, that are inserted in recesses in the inner sides of the door posts, where they are secured. Upon the shanks of the hooks within the sockets, F, are spiral springs, the forward ends of which rest against the end of the sockets, and at their rear ends rest pins attached to the ends of the shanks of the hooks. When the doors are unfastened the pressure of the grain causes them to swing out, and the outward movement compresses the springs. When the doors are released from outward pressure the tension of the springs closes them. A handled eccentric provided with bolts is attached to the door, by which it is locked and held to its place.



An Improved Shackle.

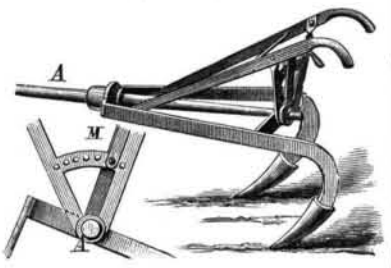
Mr. James M. Trackwell, of Skookumchuck, W. Ter., has lately patented a useful improvement in shackles, by which they are made more convenient for applying and removing, and are more secure for use than those ordinarily constructed. The improved shackle is shown in the annexed cut. The body of the shackle is made in two half ring parts, and upon the end of one of these parts is formed a projection having an eye at its outer end to receive a chain when two shackles are to be connected. In the inner side of the projection is formed an aperture or socket to receive a lug formed upon the corresponding end of the other part. Upon the other ends of the half ring parts are formed lugs which have notches in their edges for the spring catches of the lock to engage with. In the edges of the ends are dovetailed recesses to receive the corresponding projecting ends of the top and bottom of the lock, J, which has in its inside recess spring catches that engage with the notches on the ends of the half parts. The key of the lock is made in two pieces, that are pivoted to each other at a little distance from their forward ends. The forward parts of the key are made thin, and have square hooks formed upon them which project in opposite directions. When these blades of the key are brought into position parallel with each other, they are passed into a narrow key hole in the outer end of the lock, and by pressing the handles the hooks at the ends are projected, so as to press the spring catches outward and release the lugs on the shackle, and then by pulling the key outward the lock is withdrawn from the lugs, allowing the shackle to be separated.

A New Vehicle Axle.

A device for preventing wagon wheels from moving in and out on their axle spindles is shown in the annexed engraving. A is a square axle prolonged into a round spindle, and across one of its faces, a little in the rear of its shoulder, are formed several parallel grooves. B is a collar provided with a square sleeve that fits on the axle, A, and the collar extends over on the spindle, so as to come against the hub of a wheel on this spindle. When the collar and sleeve are moved out against the wheel it is held in place by a bolt passed through holes near its edge and through one of the grooves in the side of the axle. There being a number of grooves the collar may be adjusted to suit any wheel. This device is patented by Messrs. Alfred Deisher and William H. Adam, of Fleetwood, Pa.

An Improved Cultivator.

An improved cultivator, in which devices are provided for guiding and controlling the plows when using them on side hills, is shown in the accompanying engraving. To the middle part of the drawbar, A, is attached the forward end of the plow handles, the rear ends being connected and held by a round, and they are supported by braces attached to the rear end of the drawbar. The braces are connected by an arched bar, M, in which are a number of holes. In front of the handles upon the drawbar is placed a loose collar, to the opposite sides of which are attached the forward ends of plow beams that at their rear parts are curved downward and have shovels attached to their ends. The beams are connected by a cross bar which has a hole through its center to receive the rear end of the drawbar. To the center of the cross bar is attached an upwardly projecting bar that serves as a handle for adjusting the plows. This bar is held in any desired position by a spring catch pin that works in the holes of the arched bar of the handles, and can be swung to either side to bring the plows into such position that the handles shall be upright while the plows are working upon the side of a hill. This device is patented by Mr. Walter B. Cullum, of Benwood, W. Va.



Death Not Universal.

Whatever lives, we hear it said, whether plant or animal, must sooner or later die. It will, therefore, greatly shock many persons to learn that this is not strictly the case. We wish here to give room for no misunderstanding, and, if possible, for no intentional misinterpretation. All animals *may* die, but death is not in all departments of animal kingdom an inherent absolute necessity. On the contrary, in one of the two primary divisions of the animal world, the Protozoa, it is, though common enough, merely casual, the result of some accident. A Protozoon may be swallowed up by some larger animal; it may be crushed out of existence, burnt, or poisoned by "disinfectants" introduced into the water or other fluid which it inhabits. But it has no natural term of life, and, as we shall presently see, cannot be spoken of as young or old.

That this may be understood we must briefly compare the life history, and especially the reproduction, of the *Metazoa* and the *Protozoa*. In the former group—which includes all the backboned animals from man down to the humblest fish, all the insects, mollusks, as well as lower forms of life which scarcely attract popular notice—there is always a distinct difference between parent and offspring. The latter is certainly a portion separated from the body of the parent—from the female in all those forms in which there exist two sexes—but it is as compared with the parent minute in size, rudimentary in structure, and it has to increase in bulk, and still more to undergo a process of development, a series of transformations, before it reaches the normal stature and make of its species. When this point has been attained it enters upon the task of reproduction, and gives birth to one brood of young ones, or in the higher forms to several. With these it coexists for a longer or shorter time, and then dies, the matter which constituted its body passing into decomposition. If we look at these very familiar facts in the life of a Metazoon, be it a man or an oyster, we find that the ideas of birth, of growth, of maturity, of parenthood, of a natural term of life ending in death, at once suggest themselves. If we examine such a Metazoon we can, in most cases, at once decide whether it is in the immature or the adult phase of its being.

But in the *Protozoa*—as Herr Bütschli has not long ago pointed out in the *Zoologischer Anzeiger*—this is distinctly different.

Let us suppose we are watching through a microscope one of these minute single cell creatures. We see it expanding into an ellipsoidal figure, which becomes for a time longer and longer. It then begins to contract about what we may, for the sake of popular intelligibility, call its equator. It assumes the form of two nearly globular bodies, connected, dumb bell like, by a narrow neck. This neck becomes narrower and narrower, and at last the two globes are set free, and appear as two individuals in place of one! What are the relations of these two new beings to the antecedent form and to each other? We examine them with care; they are equal in size, alike in complexity, or rather simplicity, of structure. We cannot say that either of them is more mature or more rudimentary than the other. We can find in their separation from each other no analogy to the separation of the young animal or the egg from its mother, or to the liberation of a seed from a plant. Neither of them is parent, and neither offspring. Neither of them is older or younger than the other.

Or shall we try to regard them as brothers sprung from the same parent? If so, where is that parent? If living, let it be shown; if dead, where are its remains? No organic—or indeed any other—matter was separated out when the two new beings took their rise. All the substance of the body of the original Protozoon is included, and equally included, in the bodies of the two individuals before us. Thus we see that the essential ideas of the life of the higher animals—birth, growth, maturity, parentage, brotherhood, term of life, and successive generations—have, if applied to these humble and minute beings, simply no meaning.

The process of reproduction, or rather of multiplication, must, as far as we can see, be repeated in the same manner for ever. Accidents excepted, they are immortal; and frequent as such accidents must be, the individuals whom they strike might, or rather would, like the rest of their community, have gone on living and splitting themselves up forever. It is strange when examining certain infusoria under the microscope, to consider that these frail and tiny beings were living, not potentially in their ancestors, but really in their own persons, perhaps in the Laurentian epoch!

This consideration opens up another question. These beings are not wholly unconscious. They experience and retain impressions, however dimly and in however limited a sphere. But when the splitting up of one individual into two distinct personalities takes place, as we have described above, we have then the curious phenomenon of two distinct and equal beings whose past life is one, who will remember the same incidents and the same reactions to which such incidents have given rise. Here again is a phenomenon which we cannot realize—two contemporary and coequal beings possessing, up to a certain point at least, a common psychical life. Let us for a moment suppose that the propagation of the higher animals took place in a similar manner. We should see, *e. g.*, the mature man split up into two equal and similar men, each remembering, knowing, believing, and feeling up to the day of fission, all that the other remembered, knew, believed, or felt; each, too, it might be contended by moralists, equally sharing the merits or demerits of the antecedent form, and each at a loss to say when his own personality took its rise.—*Journal of Science.*

Converting Oleic Acid into a Solid Fatty Acid.

Muller-Jacobs, of Moscow, has invented a method of utilizing oleic acid for candle making, etc. The oleic acid, or any of its natural glycerides, like cotton seed oil, rape oil, poor quality olive oil, sunflower oil, and cod-liver oil are cooled to 43° Fah., or lower, and then slowly mixed with 30 or 40 per cent of strong sulphuric acid (spec. grav. 1 823 or 1·826) which has also been cooled to the same temperature. The mixture becomes heated, and when it has reached a temperature of 95° Fah., it is mixed with twice its volume of water and let stand twenty-four hours. A sulpho-acid is formed, from which the solution of glycerine and sulphuric acid is drawn off. It is then boiled some time with water until it splits up into sulphuric acid, and a mixture of fatty acids soluble in alcohol. One of these is oxyoleic acid; the other, the author tells us, is a solid fatty acid but does not state positively whether it is stearic acid, or not. He says that on cooling the alcoholic solution the solid acid crystallizes, and the liquid one can be expressed. The former can be purified by washing it with alcohol (rather costly!) or benzine or by distillation. It melts at 70·6° C. (159° Fah.), resembles stearic acid, and can be used for candles. The liquid portion is oxyoleic acid, and can be saponified with alkali and used as a mordant for Turkey red. It can also be utilized for making soap.

If the saponification with acid does not take place at a low temperature, or the sulphuric acid is too strong, a large quantity of sulphurous acid is evolved, and decomposition products of the fatty acids are formed that are of no use either for candles or for dyeing Turkey red. If a less quantity of sulphuric acid is employed than that above stated, only a part of the acid is decomposed in this way. The mixed acids do not form a perfectly clear solution in alcohol, and the solution will contain not only small quantities of the solid and liquid acids, but also the unchanged oil. In this case the separation of the oils and acids is so difficult that it does not pay to attempt it.

Water from Wood.

By thrusting the ends of green scrub wood—"mallec scrub"—in the fire, and catching the sap driven out at the other end in a bark trough, an Australian supplied himself with water and saved his life while crossing in a waterless region. He says that a dozen mallec sticks, four feet long and two or three inches in diameter, would give a pint of water in an hour, and suggests that the same device may possibly be found of vital importance to other bush rangers and travelers in arid regions.