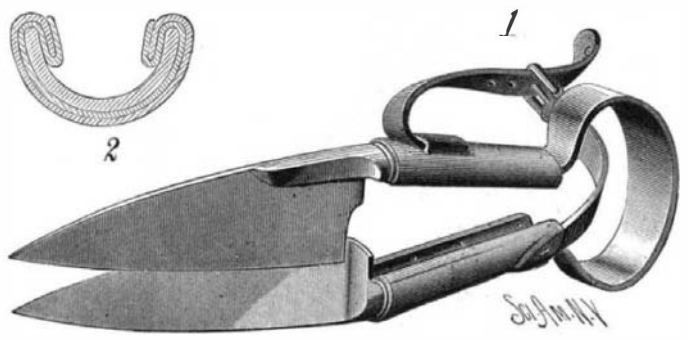
IMPROVED SHEEP SHEARS.

The engraving shows an improved sheep shears recently patented by Mr. Alfred P. Mann, of Kearney, Neb. The improvement consists of flexible padded casings, connected by a strap, and capable of being bent over the shanks of the shears. The strap is made adjustable so as to adapt it to hands of different sizes. This strap prevents the hand from slipping forward while crowding the shears into wool. It also prevents the shears from being kicked from the hand of the shearer.

The soft pad covering the handles prevents the hands from becoming blistered, and in a great measure prevents the tiring of the hand. The inventor says it enables a shearer to shear from ten to twenty more sheep per day than he can shear with the ordinary shears.



MANN'S SHEEP SHEARS.

IMPROVED FRUIT EVAPORATOR.

In properly evaporated fruit there is no loss of pleasant or valuable properties, but an actual increase of fruit sugar, from the fact that evaporation is essentially a ripening process, the development of sugar ranging from ten to twenty-five per cent in different fruits, as determined by chemical analysis. By the process of evaporation, properly conducted, in a few hours the juices are quickly maturated and the maximum development of sugar secured, and water pure and simple evaporated, the change being analogous to the transition of the grape to the sweeter raisin, or the acid green apple to ripeness, with corresponding delicacy. The cell structure remains unbroken, and the articles, when placed in the rejuvenating bath of fresh water, return to their original form, color, and consistency.

In evaporating cut fruits, such as apples, pears, and peaches, the correct method is to subject them to currents of dry heated air, so as to dry the cut surfaces quickly, preventing discoloration, forming an artificial skin or covering, and hermetically sealing the cells containing acid and starch, which yield glucose or fruit sugar. This principle is demonstrated in nature's laboratory, in the curing of the raisin, fig, and date, which are dried in their natural skins—a process not applicable to cut fruits—in a tropical climate, during the rainless season, by natural, dry, hot air, in the sun; though a crude and slow process, the development of glucose or grape sugar is almost perfect.

The annexed engraving shows a practical, economical, and inexpensive fruit drier made by the American Manufacturing Company. In this evaporator separate currents of dry, heated air, automatically created, pass underneath and diagonally through the trays and then off and over them, carrying the moisture out of the evaporator, without coming in contact with the trays of fruit previously entered, and already in an advanced stage of completion. The greatest heat is concentrated upon each tray or group when it first enters the machine, and each tray or group subsequently entered removes or shoves the previous one forward into a lower temperature. This operation is continued throughout, being rendered perfectly practicable by the inclined, divided evaporating trunk. No steaming, cooking, or retrograde process becomes possible.

We are informed that, so perfect is the active circulation of dry, hot air over, under, and through each line of trays, any tray taken from any portion of the trunk at any time, after being in the evaporator ten minutes, will be found to contain fruit that is perfectly dry on the outside, to sight or touch, although the process of complete evaporation may be but one-quarter or one-half finished.

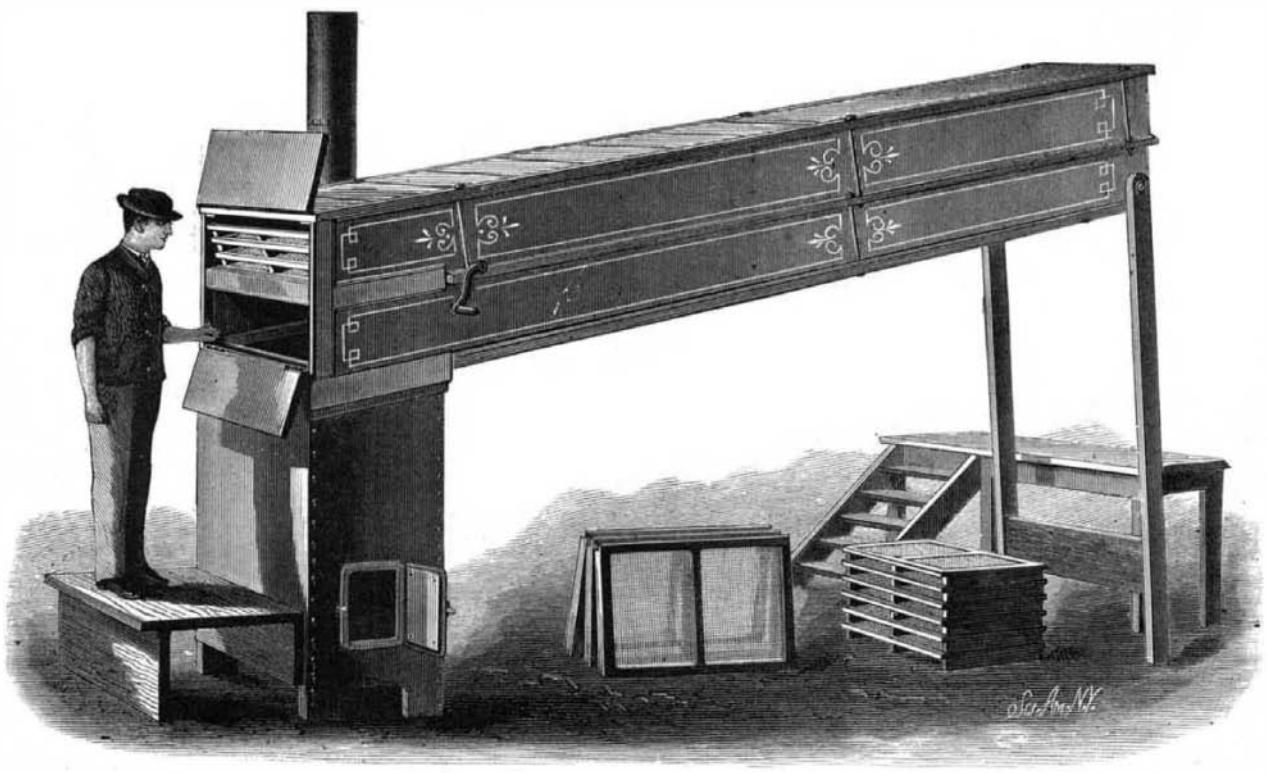
By this construction a maximum evaporating capacity per square foot of tray surface is secured, and the full benefit of fuel consumed is realized, and there is entire freedom from burning or scorching. A bright characteristic color in the product is secured, and the product is, in every way, perfect and capable of commanding the highest market price.

These evaporators are made in various sizes, adapted to home use or to the more extensive requirements of the fruit-evaporating establishment.

As the quality of evaporated fruit has been improved by the introduction of more perfect apparatus and methods, the market has increased and better prices are commanded.

The evaporation of fruits has become a profitable business even to those employing the more costly and extensive apparatus. The improved evaporator shown in the engraving has all of the advantages of the more complicated and costly apparatus with none of its disadvantages, besides being portable and perfectly adapted to its work.

For further information address the American Manufacturing Company, Waynesboro, Pa.



THE AMERICAN FRUIT EVAPORATOR.

Stanley in Africa.

The latest published letter from Stanley was written from the general camp of the expedition on the upper Congo, January 16, 1882. The explorer and now pioneer of civilization in Southwest Africa had quite recovered from the illness which came so near ending his work last year; and barring the heat, bad water, and the meagerness and monotony of his African diet, he would appear to have nothing to complain of. His party numbers 236, over 200 of whom are Zanzibaris; the rest are West Coast natives and a few whites. Fifty of the Zanzibaris were with him on the expedition across the continent. He describes them as a fine set of fellows, obedient, docile, brave, and hard working. "They will not steal because they are intelligent enough to perceive that this would ruin the peace which we have hitherto kept." Further on he says:

"As for the natives themselves, it would do your heart good to see the crowds that gaze at us while we are at work—the perfect confidence they have in us. In the midst of the best governed European capital nowhere could you see so many children in the same limited area as have been seen in my camp to-day. Not one grown person had a gun, spear, knife, or weapon of any kind within the camp. At the present time I have no cause of discontent with any living person. From the sea to this present camp our life has been peaceful and pleasant, so far as the natives are concerned. They have done much for me and I have done much for them. The first year we had some trouble with the whites, but they were not of my choosing. They were strangers to Africa, and most of them had never been out of their own country. Consequently, one slight fever damaged their African enthusiasm so much that they begged me to send them home. Neither the natives nor the Zanzibaris ever gave me so much trouble as these white men. The misery of spirit I endured in the first year culminated in that sickness. For months I have known neither trouble nor discontent, anguish of spirit, or bodily pain. Instead of looking back we are now looking forward, and this year will, I hope, see the labor accomplished which I had agreed to undertake. The worst of it is over, thank Heaven!"

This letter was written to the Paris correspondent of the Boston *Journal*, who remarks that Mr. Stanley maintains a certain reticence about the exact nature of his work in Africa, for reasons which most readers will readily understand. He is the agent of companies which have invested large amounts of capital in opening up sections of Africa, and who naturally desire to secure for themselves all the advantages which may accrue from the explorer's labors. In a few months we shall probably hear rather interesting and possibly somewhat startling news from the little camp on the Upper Congo.

New Process for Preserving Iron.

A new process for preserving iron consists in treating the casting with dilute hydrochloric acid, which dissolves a little of the metal and leaves a skin of homogeneous graphite holding well to the iron. The article is then washed in a receiver with hot or cold water, or cooked in steam, so as to remove completely the chloride of iron that has been formed. Finally the piece is allowed to dry in the emptied receiver, and a solution of caoutchouc, gutta-percha, or gum resin in essence of petroleum is injected, and the essence afterward evaporating leaves a hard and solid enamel on the surface of the ironwork. Another plan is to keep the chloride of iron on the metal instead of washing it off, and to plunge the piece into a bath of silicate and borate of soda. Thus is formed a silico-borate of iron very hard and brilliant, which fills the pores of the metal skin. As for the chlorine disengaged, it combines with the soda to form chloride of sodium, which remains in the pickle.

Is the Human Skull Becoming Thinner?

Mr. W. B. Cooper endeavors to show that it is. If, he says, we accept the tenets of evolutionists, a race adapted to certain circumstances will, if these circumstances be altered, become modified in a corresponding degree, and retrogression may result as well as improvement, and this modification may be confined to a certain part or organ. What forces, then, have exerted their influence on the casket of the brain? First, natural selection, in the case of those creatures that engaged in fierce combats, would tend to eliminate those individuals with frail craniums; and, as man comes within the category of belligerent creatures, when barbaric warfare and the dangers of the chase were common occurrences, natural selection would, of course, exercise a powerful influence in maintaining a standard of cranial strength. Then, too, in the presence of repeated violence, adaptation would undoubtedly provide a suitable armor for this delicate and important organ. In civilized man, however—at all events, in the higher grades of modern civilization—natural selection may be said to exert no influence in that direction; war is too infrequent and engages too small a portion of mankind, while the forces with which it deals are of a nature to alter the whole aspects of the case. And while adaptation undoubtedly operates upon other portions of the frame to maintain their rigidity, it is rarely that the skull is called upon to support any greater pressure than that exerted by the head gear. It is not to be overlooked that among semi-civilized people the head is often made to support considerable weights, and, except where rigid rules prevent intermarriage of classes, the joint action of adaptation and heredity disseminate the effects of this custom throughout the community. A blow that would shatter a European skull falls harmless on that of a negro. There probably never was a time in the history of the world when the skull was subjected to so little violence as since the introduction of modern methods of transportation; and, when we recall the fact that it was but a few centuries ago that the more advanced nations of the present day were barbaric, it is too soon to look for any great change. Yet it is not uncommon to hear of cases of the fracture of the skull which are ascribed to its unusual thinness. May not these be the results of the co-operation of the agencies referred to?

If the force of the position assumed by Mr. Cooper is accepted, the logical conclusion is that we are approaching a time when the human cranium will become much thinner—so delicate, in fact, that it will be easily fractured; we may then, he thinks, expect a revival of natural selection, and an increase of cases of death from violence to the head.

The Heathen Chinee Sparrow.

Passer domesticus has its place in nature; possibly monarchical Europe and monarchical individuals in other places can overestimate their worth, but in America they are out of place, and their introduction was a grievous mistake. Its disposition is very far from being republican, and its treatment of some of our native birds, which are of much more value than themselves, is tyrannical and despotic. Quarrelsome with and pugnacious toward the swallows, martins, wrens, and bluebirds, they take by force the houses put up especially for their use. Thanks for the love of liberty, right and justice, the swallow, martin, wren, or bluebird having possession of the house can, and usually does succeed in keeping it against the attack of a single pair of sparrows, but often this pair, unsuccessful in their house-breaking attempt, go off and solicit the aid of their fellows, and return with a dozen or twenty of their kind, lay siege to the place, and by united effort take it, after the rightful occupants have made a desperate defense against enormous odds.

It may be only a coincidence—it is a fact, however—that, as the sparrows have increased in numbers, the purple martins, *Progne purpurea*, have decreased in this locality.

The sparrows are essentially graminivorous and frugivorous, and are not insectivorous in the legitimate use of the term. They are very destructive to garden and flower seeds, the small grain, and no species of fruit is free from their depredations. They are more dirty around the house than any of our native, social birds, dropping *en masse* their excrements about the door. I presume they have their good qualities. I cannot agree with Mr. Minot when he says of the purple grackles that he "would not hesitate to sign the death warrant of the whole race," but I would not hesitate to sign a warrant to banish the house sparrow from the United States to the place from which they came, and furnish a liberal supply of good food and clean water for the voyage.—*Elisha Slade, Somerset, Mass., in American Naturalist.*

Cymene from Turpentine.

Naudin has pointed out a reaction by which cymene can be prepared from turpentine with great facility. If two atoms of dry chlorine are absorbed by one molecule of turpentine cooled to —15°, there is no sensible evolution of hydrogen chloride, but the liquid becomes viscous and contains $C_{10}H_{16}Cl_2$. A slight elevation of temperature produces decomposition, and cymene and hydrogen chloride distill together. If to the mixture 4 per cent of phosphorus chloride be added, and the temperature be maintained at 25°, a regular evolution of HCl takes place until the conversion is complete. Washing with water, drying over calcium chloride, and rectification over sodium, gives pure cymene boiling at 175°, the yield being 75 per cent. The author has observed that at 100° traces of zinc dust violently decompose the body $C_{10}H_{16}Cl_2$.—*Bull. Soc. Ch.*

PERUKE-HORNED DOE.

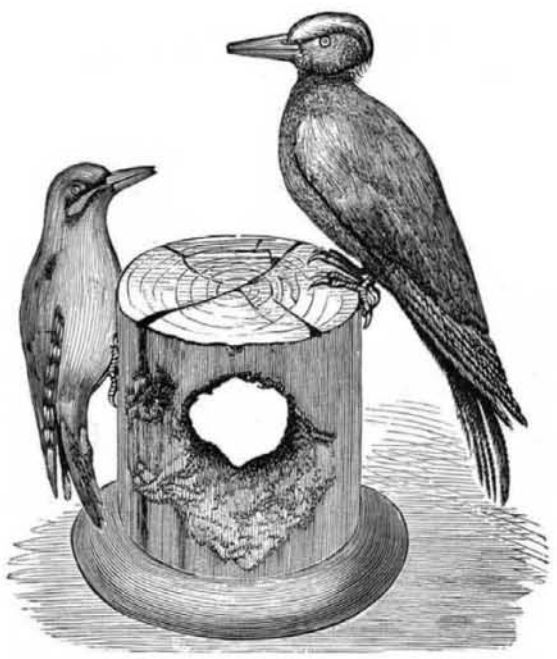
Our engraving represents the head and horns of a doe, which was killed the first of last December in the hunting grounds of Herr Hugo Pönsgen, in the district of Aix-la-Chapelle. It differs in no respect from the abnormal horn formations which make their appearance in emasculated bucks, and are represented in most collections under the name of perukes, bishop-caps, etc. The appearance of such horns in a female has, until now, been rarely observed, although in old does smaller stunted horn formations have sometimes made their appearance.

The head and neck of the doe was sent, the day after the hunt, to Düsseldorf, to the well-known taxidermist, Joseph Guntermann. The height of the longest horn was 19 centimeters. The head from the point of the nose to the rosette 15·2 centimeters. The skin on the neck was extremely thin and parchment like in quality, while in the bucks at this time of year the skin is of considerable strength and thickness.

According to the statement of Herr Pönsgen, this doe, with the exception of the horns, differed in no respect in form from the wild does. It was in good condition, its weight being 16 kilogrammes. There were no traces of an earlier wound, and the doe in its lifetime was never seen by hunters in this or adjoining districts.—*Illustrirte Zeitung.*

THE ELECTRIC TELEGRAPH AND THE WOODPECKERS.

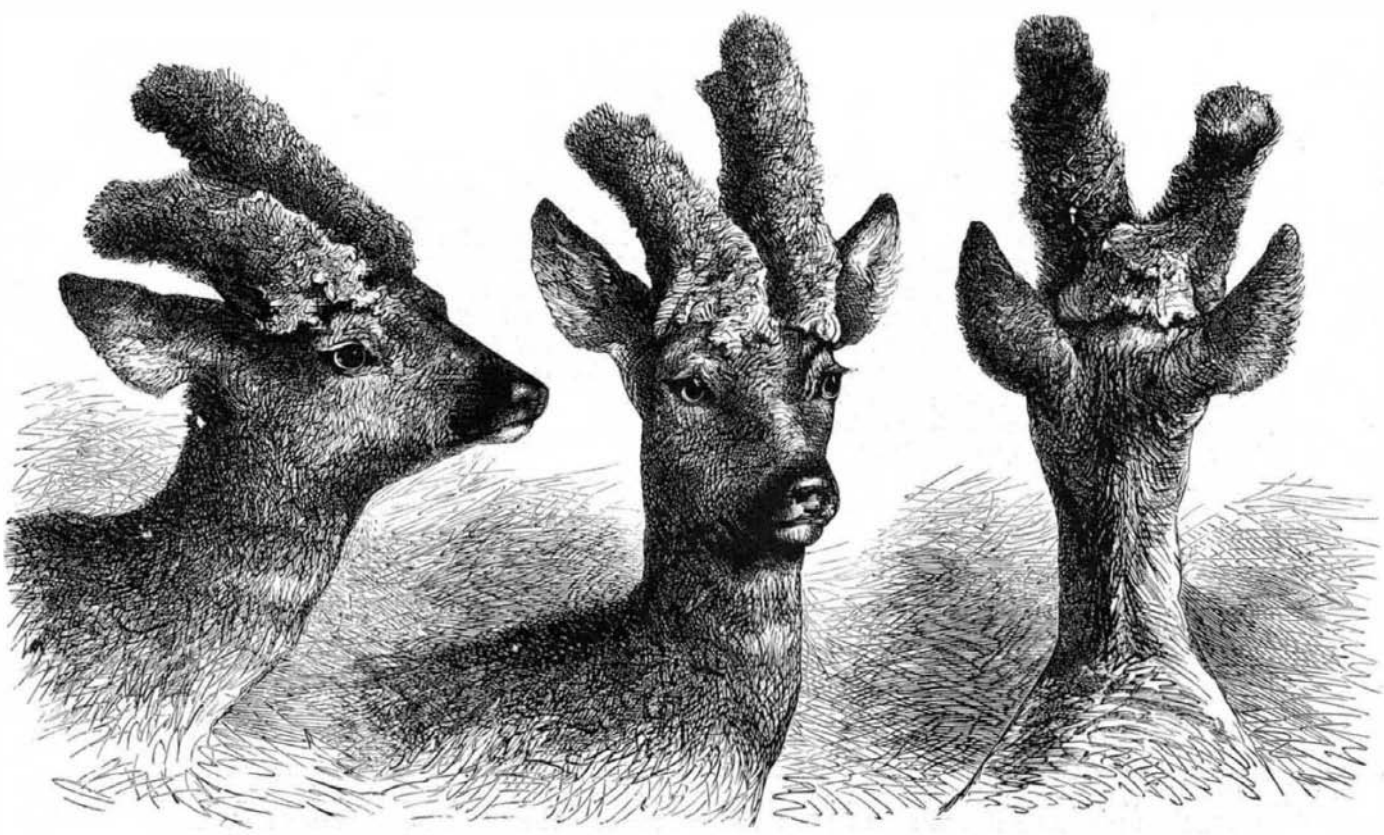
The section of wood shown in the engraving was sent by the Norwegian Government to the International Electric Exhibition at London. It was cut from a perfectly sound post impregnated with sulphate of copper. It is perforated with a hole, forming a circle of the diameter of about three inches and a half, which hole has been pecked out by the birds. Electric telegraph poles are frequently thus treated in Norway, in certain districts situated near pine woods, where the bird is found; the holes are, as a rule, at the top of the post. According to the opinion of an ornithologist, the motive should be attributed to the humming sound produced in the post by the vibration of the wire, which the



bird imagines to proceed from worms and insects working inside the post. The smaller bird depicted here is the green woodpecker (*Picus vividus*), the most common of our limited number of British woodpeckers. The larger bird is the great black woodpecker (*Picus martius*), whose native regions are the northern and eastern parts of Europe.

Pezzer's Accumulator.

This battery is constructed as follows: Narrow bands of lead, 10 to 15 millimeters broad and 500 in length, are obtained by cutting up sheets of a suitable thickness, and they are made to take a waved form by being passed between the rollers of a machine used for folding stuffs obliquely. Each of them is doubled in two, and they are placed in juxtaposition, fold upon fold. The free ends are then soldered together by the autogenous process, forming them into fringes. These fringes are introduced in place of the carbon and the zinc in a Bunsen element (Ruhmkorff's model), where some of them fill the porous vessel, and the others the interval between the porous vessel and the sides of the exterior vessel. The soldered ends are upward and the folds downward. Plates soldered to the upper part serve as electrodes.



PERUKE-HORNED DOE.

How Beeswax is Made.

I presume that the majority of people who are not bee-keepers suppose that bees gather wax from some source, in the same way that they gather honey, pollen, and propolis. I once heard even a bee-keeper remark: "We had a nice spring day yesterday. My bees had a splendid 'fly,' and I noticed that some of them came in loaded with pollen and wax." That bees do not gather wax is easily proved by confining in an empty hive or box, and feeding them honey or a sirup made of sugar, when they will immediately commence the construction of combs. During the working season wax is secreted by the bees, and forms in thin white scales, or flakes, between the rings, or segments, of the abdomen. Such renowned scientists as Prof. Agassiz and Tyndall have made some very amusing blunders (blunders which showed they had never seen bees building comb) in attempting to tell how honeycomb is built. The exact manner in which these little pellets of wax are formed into beautiful white combs is well described in the "A B C of Bee Culture," and I give a short extract:

"If we examine the bees closely during the season of comb building and honey gathering, we shall find many of them with the wax scales protruding between the rings that form the body, and these scales are either picked from their bodies, or from the bottom of the hive or honey boxes in which they are building. If a bee is obliged to carry one of these wax scales only a short distance, he takes it in his mandibles, and looks as business-like with it thus as a carpenter with a board on his shoulder. If he has to carry it from the bottom of the honey box, he takes it in a way that I cannot explain any better than to say he slips it under his chin. When thus equipped, you would never know he was encumbered with anything, unless it chanced to slip out, when he will very dexterously tuck it back with one of his fore feet. The little plate of wax is so warm from being kept under his chin as to be quite soft when he gets back; and as he takes it out, and gives it a pinch against the comb where the building is going on, one would think he might stop awhile and put it into place; but not he, for off he scampers and twists around so many different ways, you might think he was not one of the working kind at all. Another follows him sooner or later, and gives the wax a pinch, or a little scraping and burnishing with his polishing mandibles, then another, and so on, and the sum total of all these maneuvers is that the comb seems almost to grow out of nothing; yet no bee ever makes a cell himself, and no comb building is ever done by any bee while standing in a cell. The finished comb is the result of the moving, restless mass, and the great mystery is that anything so wonderful can result at all from such a mixed-up, skipping-about way of working."

In every apiary should be a box or barrel in which to throw all waste comb, and the cappings that are shaved off the combs when extracting. When much transferring or extracting is done, considerable wax can in this manner be saved, and it is as easy to save it as it is to throw it away. During the hot weather these refuse combs and cappings should be melted up into wax quite often; otherwise they will become infested with the bee moth's larvæ, and thereby destroyed. There are several methods of melting up combs and cappings into wax, but I have tried none that is more simple, or better, than to make a bag out of some coarse sacking, fill it with pieces of comb, tie it up, and put it into a wash boiler. Set the boiler on the stove and fill it nearly full of water. When the water is almost hot enough to boil, take a stick and punch, poke, and press the bag until the wax is all melted and risen to the top. Now lay a narrow strip of board across the top of the boiler, and tie it fast to the handles; then take two or three sticks that are nearly as long as the boiler is deep, press the bag down to the bottom of the boiler with these sticks, and keep it in this position by putting the upper ends of the sticks under the strip of board that is fastened across the top of the boiler. Now set the boiler off the stove, and when its contents are cold, the wax can be taken off in one solid cake. In passing through the bag the wax is cleansed from all coarse impurities, while the fine particles of dirt that do escape will be found either upon the top or bottom of the cake of wax, from whence they can easily be removed.

When the combs and cappings have all been worked up, and the cakes of wax have been scraped free from all dirt or sediment, the cakes should all be put into the boiler, melted up together, and the wax run into neat cakes.

I made twenty-five pounds of wax, last spring, in the above manner, and the nicest wax I ever saw. To clean