THE MANUFACTURE OF SOFT FELT HATS.

Before the general introduction of machinery into the trade, the various processes involved in making hats, from the forming of the bodies to the trimming and lining of the finished article, were performed exclusively by manual labor Then, the manufacture of a hat was a slow and tedious operation, requiring a large amount of expensive, skilled labor, thus making a good fur hat a luxury entirely out of the reach of the laboring classes. Now, by the use of efficient machinery, the process is short and the cost reduced to a small percentage of that previously charged for the handmade article.

The finest quality of felt is made from the fur of small soft haired animals, especially the Russian hare or cony, the fur of which is imported into this country in immense quantities. It is shaved close to the pelt in order that the hair may be as long as possible, and shipped to the hat formers in small bundles of a few pounds weight each.

The quality of felt desired being determined upon, various grades of fur are thrown together and passed through a "mixer" as it is technically called. The fur is fed into this machine by an attendant, and is brought in contact with a toothed cylinder, revolving rapidly, which tosses it into a large box covering the machine, and thoroughly mixes the different qualities. It still contains, however, a great many impurities, bits of pelt, and matted fur, which are to be removed by "blowing." The "blowers" are contained in a long wooden case having a cover of fine wire netting, in order to allow the dust to escape. The mixed fur is fed between two rollers upon a cylindrical picker, which, making several thousand revolutions a minute, throws the heavyimpurities down upon a screen and sends the light fur up in the cover, from which it falls upon a moving apron only to be delivered to another pair of rollers, when the operation is repeated. Each case contains several blowers, and when the fur finally emerges, it is perfectly uniform and exceedingly light and soft. It is now ready to be made into hat bodies, and is carefully separated by weighing into equal amounts, each of which is sufficient for one hat.

The forming machines consist of a large sheet copper cone, two feet long, with a hemispherical top, pierced full of small holes, and standing upon a slowly revolving circular table. This cone is covered by a hinged case of the same shape, but with an open top and of such size as to leave a space between it and the cone. The fur, falling through the opening, is sucked tightly down upon the cone by a powerful exhaust far under the revolving table. The case is thrown open, cloths wrapped around the felt body, and a tight fitting perforated tin case placed over the cone. The whole thing is now immersed for about two minutes in a tank of boiling water, which "felts" the fur sufficiently to allow the body to be stripped off and wrung out, after which it is folded and dried. At this stage the "form" is a long funnel shaped bag, thin and very slightly tenacious. These are delivered to the hat manufacturers, who turn out the finished article.

The first process in these establishments is to felt the bodies by manipulation, which shrinks the felt one half, doubles its thickness and makes it tough and resisting. Six men stand around a hexagonal table called a "battery," rolling and working the bodies until they have acquired the proper dimensions, frequently immersing them in a bath of boiling water set in the middle of the table. They are then placed in a vat of weak vitriol, which draws the fibers of hair together and makes the felt compact. After remaining some time in this bath, they are dried and the thin rough edges trimmed off.

That part which is to form the brim of the hat must now be stiffened. This is done by dipping it carefully into a solution of shellac and soda, afterward passing through a pair of wooden rollers which remove the superfluous liquid. While in this moist condition the body is machine blocked, which gives the general shape of the hat. The blocking machines consist of a frame holding a set of radial arms over a movable upright, which is capped by a circle of radiating pieces and worked by a treadle. The body being placed upon this block, is pressed into the upper mould, the operator changing its position until it is of the proper shape. Separate machines are used for blocking the crown and brim.

They are now colored by immersing for a short time in a vat of hot dye and then washed thoroughly in cold water. After being dried, each body is fitted tightly upon a felt covered block, which is then placed upon a slowly revolving spindle. The attendant fits a cone of fine sand paper upon a tapering plug, sets it in rapid revolution and presses it upon the hat. This process, called "pouncing," removes the projecting ends and irregularities of the hair and gives the belt a smooth, even appearance. In this operation as in blocking the body and brim are "pounced" separately, the machines differing slightly in construction. The hats are now taken by the finishers, who block them and give the perfect shape and smoothness of felt by ironing and hard pouncing. The linings and trimmings are sewed on by girls, and the hats are ready for market.

England Taking a Hint.

The *British Trade Journal* thinks "the late Paris Exhibition has developed some startling proofs of the ability of Continental and American rivals to produce articles equal to and in some cases surpassing those produced by this country, notwithstanding even that such manufactures have been regarded as our own specialties, and have hitherto been thought to be unsurpassable. Our manufacturers have brought back with them the knowledge that we have no insignificant rivals. Both master and workmen have been too prone to consider that 'a parcel of foreigners' could never turn out anything even approaching English goods; but our eyes are being rapidly opened, and if the lesson is taken to heart the Paris Exhibition may partly be credited with having taught us to respect the workmanship of other nations."

New Agricultural Inventions.

Messrs. Thomas J. Lindsay, David A. Lindsay, and William J. Miner, of Windfall, Indiana, have invented an improved combined Seed Drill and Corn Planter for drilling seed or planting corn in two or more rows at once. The machine may be used for drilling or for planting in hills at will, without changing the parts.

Mr. Curtis H. Warrington, of West Chester, Pa., has devised an improved Machine for Marking Land, which is so constructed that it may be readily adjusted to make the marks at any desired distance apart, which will allow the plows to be readily raised from the ground for convenience in turning around and in passing from place to place.

Mr. David Englar, Jr., of Avondale, Md., has devised an improved Guano Distributer, which consists in a cam-grooved cylinder, located and revolving in the hopper of the machine, and a clearer and discharge regulator, which project up through the bottom of the hopper, and are reciprocated horizontally as they follow the cam groove. The guano is removed from the cam groove by means of the clearer, and falls into the tube or spout, which conducts it into the furrow in rear of the hoe or shovel.

Mr. Washington H. Tucker, of Stone Fort, Ill., has devised an improved Trough for Feeding Hogs with any desired kind of feed, and which is so constructed as to prevent the hogs from wasting their food, from getting into the trough with their feet, or interfering with each other while eating.

Mr. David F. Hacker, of Kempton, Ind., has patented an improved Horse Hay Rake, which is automatic in its action, the teeth being raised by the wheels through a movable ratchet sleeve placed on the axle.

An improvement in the class of Force-feed Seeders and Planters having a gauge or regulator for increasing or diminishing the flow of seed at will, has been patented by Mr. Alonzo Runyan, of Catawba, O. In this machine the regulator can be easily set to any desired amount of feed, and it always indicates the amount of seed the wheel is delivering.

An improvement in Hay Elevators has been patented by Mr. Joseph W. Higgs, of Sharon, Pa. The object of this invention is to furnish a device for moving hay from the wagon to the mow in the barns. It is simple in construction, convenient and reliable.

Machinery.

The never-ending invention of mechanical and other contrivances for minimizing manual labor leads to the supposition that, by-and-by, the latter will be dispensed with altogether, and that human existence will become a state of sinecurism. If this consummation were ever to be obtained, however, it is pretty certain that life would become unendurable, and that mankind would soon cease to exist altogether. We have no apprehensions, says an English writer in the *Foreman Engineer and Draughtsman*, as to the arrival of either of the contingencies in question. Machinery will ever be the handmaid of humanity, but never its destroyer, and every real improvement made therein being only a new application of the forces of Nature, must be advantageous to the human family. No machine of any kind can possibly create power, and no combination of wheels, pinions, levers, belts, or cranks, however ingeniously arranged, will raise a single foot pound of power, or even one ounce. Suppose a watch be taken by way of illustration. In order to set it in action the spring must be bent and contracted by means of a key, and this imparts power from the muscles of the fingers. When the spring has given off the muscular force put into it the wheels and hands of the timekeeper come to a standstill. Again, in winding up an eight day clock you lift a weight of, say, 6 pounds, through 4 feet. In doing so you perform 24 foot pounds of muscular power. These 24 foot pounds will serve the clock eight days, and unless more power be applied the machinery will stop. The same principle applies to mechanical contrivances of every kind, whether impelled by steam or by sentient bone and muscle. In fact all work is derived from sources of Nature, which in turn have derived their present existence and form from the workings of Nature, or, to be more explicit and exact, from the heat of the sun, which has developed and is developing all the natural laws by which we are surrounded. There is no fear, then, of our getting beyond Nature, nor of machinery of any kind ever adding one iota to the stock of power, latent or active, in Nature's arcana. We may modify and adapt, but we can neither create nor destroy, and may rest assured, therefore, that all discoveries in science and in mechanism will tend eventually to the good of mankind and the glory of the Creator of all things.

New Metals.

In a communication to the Paris Académie des Sciences, read on the 14th of October, M. Delafontaine announced the discovery of the oxide of another new metal, to which he has given the name of Philippium (Pp), in honor of M. Philippe Plantamour, of Geneva, a friend and pupil of Berzelius. M. Delafontaine describes the new element as forming a fourth member of the yttria group of earths. It is yellow, and assuming provisionally that the philippia obtained is in the state of protoxide, its equivalent would be 90 and 95. Its concentrated solution examined with the spectroscope showed a rather broad and very intense magnificent characteristic absorption band in the indigo.

On the 28th of the same month the same gentleman made known to the Academy another new metal, which he calls Decipium, found like yttrium and its cogeners in the samarskite and gadolinitefrom the United States. At present very little is known about decipium, but its oxide is white, while, as before remarked, that of philippium is yellow. In giving the chemical equivalents of some of these new metals of the same group, such as yttrium, terpium, philippium, and decipium, M. Dumas remarked that chemists find themselves in the presence of new bodies whose series offer some gaps, but if researches are continued we shall soon have more precise and complete data.

Is Science Benevolent?

Faraday had an idea, it is said, that it would be well if the secret of the decomposition of water were not discovered, as the power so gained might not be wisely used; and though the story may be nonsense, any power that, requiring skill and self-restraint for its use, was yet placed in the hands of all men would probably not be beneficial—would certainly not tend to that elevation in comfort which the popular mind permanently expects from science. Imagine the power of firing water discovered, made public from excellent motives, as in a patriotic war, and so becoming the property of a world in which one man in a thousand is probably a crypto-lunatic, anxious, above all things, for a supreme sensation. A discovery, quite possible, of the means of dissolving brick or stone within a definite area into pulp would materially interfere with the security of all property, as would for a time the realization of the Middle Age alchemists' dream. All these discoveries would, of course, to do mischief, require the aid of human malignity, in a consciously malignant state, but others are quite conceivable over which will would have no control. Suppose, for example, Sir G. Airey were to discover that a change had occurred in space, which within, say, a century or two would affect our universe, and inevitably draw the world out of its orbit, thereby pulverizing it to atoms; the effect of that discovery, fatal as it would be to foresight, to patriotism, to that long series of good impulses which have for their unconscious motor the belief that the human race will last, could be nothing but evil. Half the motives to energy and to self-restraint would disappear at once, while the temptation to use up the world, its forests, coal mines, and resources generally, would be enormously exaggerated. Humanity would realize its mortality, and make the best—that is, the worst—of its time. Not one of these suggestions, however, or many other much better ones which might be offered, will come in the least home to the minds of men taught by a few years' experience that science is kind, that knowledge is beneficial, and that every victory over the forces of nature tends to the comfort of man.—*The Spectator.*

The Volatile Oil of Hops.

If steam is passed through hops it carries away a substance which, when condensed, forms an oil that swims on water and has been called hop oil. According to Kühnemann, this oil is not a simple hydrocarbon, but a mixture of a hydrocarbon with several other compounds of oxygen, hydrogen, and carbon. If the so-called hop oil is treated with metallic sodium, the sodium dissolves in the oil without any great evolution of heat, and a substance is produced which is for the greater part soluble in absolute alcohol. If the oil is made from hops that have been treated with sulphur, a strong odor of sulphureted hydrogen is evolved upon the addition of phosphoric or other acids, and can be proved to be such by its reaction with lead test papers. By this reaction sulphured hops can easily be detected. Further researches have shown that this hop oil is a very complicated mixture of a hydrocarbon with oxygen oils. The specific gravity and boiling point of this hydrocarbon is still uncertain, depending upon the purity. The oxygenized bodies separated by sodium have the properties both of alcohols and acids. The product obtained by distillation in vapor of water varies in mixture and composition according to the quality and age of the hops very greatly. Kühnemann is engaged in determining the boiling point, vapor density, and specific gravity of the oxygenized compounds, after which he will make an ultimate analysis to determine their formulas.—*Poly. Notizblatt.*

Toad Poisoning.

The following singular account of the action of toad poisoning on the human body, is reported in the last number of the London *Chemist:*

A child of six years old followed a large toad on a hot summer's day, throwing stones at it. Suddenly he felt that the animal had spurted some moisture into his eye. There suddenly set in a slight pain and spasmodic twitching of the slightly injected eye, but two hours after coma, jumping sight, desire to bite, a dread of food and drink, constipation, abundant urine, great agitation manifested themselves, followed on the sixth day by sickness, apathy, and a kind of stupor, but with a regular pulse. Some days later, having become comparatively quiet, the boy left his bed; his eyes are injected, the skin dry, the pulse free from fever. He howls and behaves himself like a madman, sinks into imbecility and speechlessness, from which condition he never rallies.