acts the part of a varnish, without injuring the igniting qualities of the gun cotton. The same quality as granulation in gunpowder is obtained by forming the cotton into twisted strands of different sizes, and making it into cords, which are cut to form charges for cartridges. Batteries of guns in which gun cotton is used now form part of the Austrian milltary equipment. The guns are shorter and lighter than those of the same caliber for which gunpowder is employed. A military commission appointed to examine into this subject has reported that the weight of Baron Lenk's gun cotton, to produce effects either in heavy ordinance or in small guns, is to the weight of gunpowder as 1 to 3. In 1860, trials were made with it in a bronze 4-pounder, and after firing 2,000 rounds the gun was not in the least injured. In 1861, fifty tuns of this substance were made with out the occurrence of any accident. It leaves but a very slight residuum in firing, and the smoke which results from it is not so disagreeable as that of gunpowder. Some of this gun cotton was sunk under water for six weeks, then it was lifted and dried, and was found to be as powerful in projectile force as before it was submerged. These advantages stated to have been obtained from the improved Austrian gun cotton deserve general attention, for if this explosive agent can be substituted for gunpowder, of course saltpeter may be dispensed with, as the nitrate of soda is used to manufacture the nitric acid that is employed in making gun cotton. Flax will answer as well as cotton, if the latter cannot be obtained.

HUMAN VEGETATION.

The power of vegetation seems to be almost universal and perpetual. The stone taken fresh from the quarry soon becomes covered with grey lichen and green moss, and the very bread that we use becomes coated with vegetable floss when exposed for a few days in a warm damp atmosphere. Not only the face of the earth, but every object upon its surface, seems instinct with vegetable life. In some situations it springs up so suddenly and unexpectedly that many persons suppose it to be endowed with spontaneity. In its growth and development its domain is not confined to inanimate creation, but it is also extended over animal life. Bees may frequently be seen flying, with plants, nearly as large as themselves, protruding from their heads; silk worms are sometimes affected with a vegetable moldiness called muscardine, and gold fish may oftentimes be seen covered with a white vegetable mold. Insects, reptiles, fowls, fishes, and animals of the higher grades are subject to parasitic vegetation; and man himself is not exempt from the same influences. The scald head, the ring-worm, and dandruff are vegetable growths. Some forms of it attack the children of the poor almost exclusively, where sufficient attention is not paid to cleanliness; while other forms of it occur at all ages and are found in all ranks and conditions of society. The vegetable growth of scald head is described in the Bible (13th chapter of Leviticus), and it is one of the unclean diseases of the Hebrews. It appears in patches of yellow scales; the hair becomes dry and brittle, and disorganized. Examined with the microscope, the scales are found to contain masses of seeds. A very formidable type of this disease occurs frequently in Poland, and is called *plicapolonica*. The parasitic plant which causes diseases of the human scalp is called *acarion schönleinii*, and is the frequent cause of baldness. It has been noticed that baldness is almost unknown among a barbarious people. American Indians, Africans, Malays, and Chinese have all bushy heads; and it is asserted by the Rev. H. Macmillan, F.R.S., in an essay on this subject in *Macmillan's Magazine*, that baldness was unknown among the primitive inhabitants of the British Isles. Baldness has increased with civilization, but whether owing to increased intellectual activity, or vegetable parasites developed under favorable conditions from modern habits, is not a settled question.

There is also a special hair-plant called the chinwelk, which revels in the beard. It is distinguished by a red eruption of tubercules of various sizes, and it frequently destroys the hair. It was very common among the Jews of old, who, according to the Levitical law, enforced very arbitrary measures for its extirpation. Where long hair is much prized in the East, the common salutation is "May your shadow never be less, and the hairs of your head never decrease!"

There is a singular vegetable growth peculiar to the human body which has a prediliction for those parts which are habitually covered with clothing. It is called *microsporon furfur*, and consists of an efflorescence of small circular spots, which gradually coalesce and produce irregular patches, accompanied with dry scales, which are constantly renewed. These scales, when examined with a microscope, are found to contain oval seeds, tubes and knots, similar to those of miniature bamboo canes. This vegetable parasite is very common and occurs at all ages and on both sexes.

The diseases called the yaws, which is common in the West Indies; and the elephantiasis, which disfigures the Egyptians, are vegetable growths. It is also well known that in hospitals, especially during warm weather, white flocculent filaments are found on removing the bandages from wounds and sores. These are developed with wonderful rapidity in a very few hours, and are vegetable formations called mycoderms, which are similar to the spawn of mushrooms.

Vegetable growths are sometimes found in several of the internal parts of the human system, such as parasites on the teeth, and the thrush or whitish crust which frequently lines the membrane of the mouth and throat of infant children. The same vegetable growth is common with persons in the advanced stages of pulmonary consumption.

It has been proved that all these vegetable growths are due to seeds, most of which are so minute as to be almost invisible to the naked eye. They float in the atmosphere everywhere; dance in the air currents of every house; and they but await the proper conditions for their development wherever they alight. It is easy to account for parasitic affections of vegetable origin being highly contagious. Malaria fevers may be of cryptogamic origin, due to the diffusion of the seeds of these plants in the atmosphere. Several physicians have entertained such views. Formations closely resembling them have been found in the blood and kidneys of persons affected with typhus, and probably there is some connection between such plants and most epidemic diseases.

PAYING WORKMEN WITH ORDERS.

In very many parts of the country, it is the custom with manufacturers to pay only a fraction of the wages earned by their workmen in money; the residue is given in the form of an order upon a store kept by the manufacturer or those in collusion with him. This custom originated in a natural and sensible way. Whenever any capitalist desired to locate himself in a new neighborhood—one where water power was plenty or where timber was cheap, he was compelled from the force of circumstances to carry a stock of groceries and dry goods with him in order to supply the wants of his men. Of course, as the settlement increased and became a village, the trade was generally abandoned to the proper parties. This custom of giving orders in lieu of cash has been abused to an alarming extent; long after the necessity which occasioned the practice had ceased to exist. Workmen earning ten dollars per week will receive three dollars of that sum in money, while the balance is only to be obtained through an order for goods, of one kind or another, on the company's store. By this practice the mechanic is charged two or three prices for what could be procured at less rates were the business unmonopolized. The remedy is not clear, when avarice and chicanery combine to defraud the workmen of their rights. There would seem to be but one resource, and that one is for the workmen to move away from the scene of extortion. But this remedy is quite as bad as the disease. In too many cases men are lured to new villages by promises of large wages. The sums paid them are nominally high, but when the equivalent the workmen is obliged to give the manufacturer for articles of necessity is proportionately greater, it is difficult to see what is to be gained in undergoing the hardships and discomfort incident to settling in new places. Workmen as a rule are desirous of escaping from the noise and tumult of large cities, and they will gladly work a little harder provided they can be assured of comfortable houses in the country for their wives and children. When, however, they are obliged to submit to the wrongs aboye alluded to, there is no other resource but to bear it patiently; unless indeed the law steps in and either abolishes the system of orders wholly or else so limits the tender of them, as compensation for services, that they will be useless to the unjust capitalist as a means of profit.

SURFACE CONDENSERS OF MARINE ENGINES.

In the condensing engines of steamboats and ships, the common method of condensing the exhaust steam, and thus obtaining a vacuum before the piston in the cylinder, is by injecting cold water into the interior of the condenser among the steam. This is undoubtedly the most simple mode of condensation, and for steamers running in fresh water it is the best. For sea-going vessels, however, the warm condensed water which is employed to feed the boilers, and thus economize some of the heat that would otherwise be lost, such condensers do not provide a supply of fresh water to the boilers. The result of this is, that as salt water is fed to the boilers, the brine becomes saturated as the steam is evaporated, and this has to be run off from the boiler. A loss of about thirty-three per cent of hot water from the boilers and about the same quantity of fuel, compared with the use of fresh water in boilers, is asserted to be thus caused by the interior condensation system in salt water. To obviate these evils, surface condensers in which the steam is condensed inside by cold salt water applied to the outside surface have been proposed and used on many occassions, and they are now used to some extent in sea-going steamers. Two faults have been attributed to these. One consists in their liability to get out of order and leak by the expansion and contraction of their metal, arising from their complicated construction, they being usually formed of a great number of tubes to obtain a large cooling surface. The other fault consists in an unlooked for chemical action of the water obtained from condensed steam upon the metal of the boilers whereby they are soon destroyed. It will be understood that the same fresh water obtained from this condenser is used over and over again in the boilers, thus obviating blowing-off as in the case of brine in the boilers. The cause of this chemical action of the condensed fresh water on the boiler is not well understood, and it is not generally admitted to be due to surface condensed water, but some other cause not yet discovered. Some interesting facts relating to this question of surface condensers are given in a recent number of *Newton's London Journal of Arts*, by Edward Humphreys, from a paper read by him before the Royal Institution, London. He states that in 1859 he designed a set of marine engines of 400 horse-power for the Oriental and Peninsula Company's ship *Mooltan*; and believing that great benefit would result from the use of surface condensers, he therefore had a pair of surface condensers built for the engines of the *Mooltan*. The boilers of the vessel contained 4,800 square feet of heating surface; the condensers 4,200 square feet. The air-pumps of the condenser were the feed pumps of the boilers, and the air which leaked into the engines was allowed to escape by an open stand-pipe connected to the highest point of the feed-pipe, thence it was carried up inside of the mast, which was a tube of iron. Each condenser contained 1,178 seamless copper tubes of $\frac{5}{8}$-inch outside diameter; five feet ten inches in length, and the thickness was .050 inch or No. 18 wire gage. The tube plates were of gun metal, and the tubes were set apart one inch from center to center. Linen tape, $\frac{7}{16}$ths of an inch in width, was used for the packing of the tubes. The salt water supplied to cool the condenser was furnished with a centrifugal pump—a new feature in marine engines. Mr. Humphrey stated that at the time he prepared his paper—about the middle of 1862—the engines of the *Mooltan* had run 42,000 miles, and he examined them after they had run 30,000 miles, when they were found quite clean on the outside, but there was a slight coating of grease inside, resulting from the escape of the tallow employed in the cylinders. The boilers were also examined, and there was no appearance of deterioration in them. But it was noticed that the lubricating material found its way from the cylinders into the condensers and thence into the boilers, and it was often obtained in large lumps at the bottom of the water