spect, and it is interesting to note how correctly the experience of mankind has guided them in this matter. The articles of food which we still use in the uncooked state are comparatively few; and it is not difficult in each case to indicate the reason of the exemption. Fruits, which we consume largely in the raw state, owe their dietetic value chiefly to the sugar which they contain; but sugar is not altered by cooking. Milk is consumed by us both cooked and uncooked, indifferently, and experiment justifies this indifference; for I have found on trial that the digestion of milk by pancreatic extract was not appreciably hastened by previously boiling the milk. Our practice in regard to the oyster is quite exceptional, and furnishes a striking example of the general correctness of the popular judgment on dietetic questions. The oyster is almost the only animal substance which we eat habitually, and by preference, in the raw or uncooked state, and it is interesting to know that there is a sound physiological reason at the bottom of this preference. The fawn-colored mass which constitutes the dainty part of the oyster is its liver, and this is little else than a heap of glycogen. Associated with the glycogen, but withheld from actual contact with it during life, is its appropriate digestive ferment—the hepatic diastase. The mere crushing of the dainty between the teeth brings these two bodies together, and the glycogen is at once digested, without other help, by its own diastase. The oyster in the uncooked state, or merely warmed, is, in fact, self-digestive. But the advantage of this provision is wholly lost by cooking, for the heat employed immediately destroys the associated ferment, and a cooked oyster has to be digested, like any other food, by the eater's own digestive powers.

NATURAL HISTORY NOTES.

Fertilization of the Tulip.—Mr. W. H. Patton, writing to the *American Entomologist*, says: It has been believed that the nectar of the tulip is poisonous to bees, and that they rarely escape from the flower alive. However this may be with the yellow tulip (*Tulipa Sylvestris*), in which Kerner has described a special contrivance for excluding small insects from the nectar secreted at the bases of the filaments, it cannot be applied to our common garden tulip (*T. gesneriana*), for in this species there are neither glands to secrete nectar nor tangles of hairs to protect it, and I have never found nectar in the flowers. It is, moreover, small insects which the plant appears to attract, although the smooth cup of the perianth probably excludes crawling insects. Some of the smaller species of bees of the genus *Halticus* I have, during the past five years, observed to be frequent guests, coming for the pollen. They always alight upon either the perianth or the stigma, most frequently upon the latter, and crawling down from their alighting place to the base of the stamens, they then climb up to reach their booty. Whatever pollen they bring from other flowers has, therefore, a chance of reaching the stigma first. The perianth of the flower is red, the stigma is yellow, and the stamens—which are deeper down in the cup of the flower, and thus to a certain extent out of the line of the bee's flight—are black; and it is probable that the marked difference in the color of the stigma serves to attract the bees to the proper and most convenient landing. There appears to have been no direct observations hitherto made upon the fertilization of the tulip by insects. It may be that in the native home of the plant large insects are concerned in its fertilization, or that *T. sylvestris* thus differs from *T. gesneriana;* but Kerner's supposition that the trichomes on the filaments of *T. sylvestris* are intended to exclude small insects from the nectar, is open to doubt, in view of the observations upon the visits of small bees to the other species. A similar structure for protecting the nectar in *Geranium sylvaticum* was believed by Sprengel to serve as a shield against rain, and it may be that this is the real purpose in the tulip. Whether the supposition that the nectar of the tulip is poisonous is founded upon authenticated facts is also worthy of further investigation.

English Birds Compared with American.—Mr. H. D. Minot, in an interesting article in the August *Naturalist*, claims that after a residence of over four summer months in England, he found birds less abundant there than with us; but that, on the other hand, their companionship is more readily obtained abroad, and the naturalist need not seek for birds so often as he must in the United States, for the "respect and consideration" shown them there gives some of them, at times, almost a social ease with man, while the English public at large are more reasonable in their instincts and customs than the free and thoughtless American, who must fire his gun whenever he gets a chance, regardless of the true interests of all concerned. Wild pigeons, though heavier than ours, have a more than correspondingly slower flight; and it is curious to observe how heavy the English atmosphere seems to British birds, and how general it makes this difference in speed. The English snipe seemed to the author less quick and dashing than his American cousin, as is also the grouse; While English birds are inferior to those of New England in variety, so are they, on the whole, in coloration and in song. Among English song birds none correspond to our hermit thrush, house wren, water warbler, song sparrow, or solitary vireo. "To all England's song birds that I have heard, on the contrary, except two or three," says Mr. Minot, "we have singers corresponding; and to all absolutely, I may say without prejudice, equals or superiors, as well as I can judge." The nightingale, says he, has a voice of most wonderful compass, and is the greatest of all bird vocalists, but with a less individual and exquisite genius than our own wood thrush. The wood lark is an exquisite songster, while the note of the song thrush is exceedingly pleasing." As for the English sparrow, Mr. Minot was delighted, almost on his first day among British birds, to meet a genuine old English woman, who assured him that the year before she was "nigh heat hout of 'ouse and 'ome by them sparrows."

Vegetable Wax.

In the island of Java a species of wax is obtained from *Ficus gummiflua*, probably by drying the pith. This wax is used for lights, and is manufactured in hard lumps of a chocolate color; it becomes soft in heat, melts at 60°–70° C.; loses in boiling water its brown coloring matter, and becomes nearly white. It is partially dissolved in boiling alcohol, about one-third of it entering into solution and being deposited on cooling in a mammillated form. When treated with cold ether it separates into two parts, which are unequally soluble. These can be isolated by means of solutions in ether and by fractional precipitations after repeated and numerous additions of alcohol. The least soluble part melts at 62°, and, by analysis, it is found to have a composition which is expressed by the formula $C_{54}H_{56}O_2$. With perchloride of phosphorus it gives a chloride which is insoluble in water. The most soluble part crystallizes in a mixture of ether and alcohol, and melts at 73°. Its composition seems to be $C_{30}H_{30}O_2$. The decolorated wax, if submitted to a dry distillation, yields, among other products, a crystalline substance and an oil. The first one, if crystallized in petroleum ether, forms beautiful clusters of crystals, which melt at 67°, and form a liquid, the boiling point of which is 250° ($C_{12}H_{12}O_2$); nitric acid transforms it into a crystallizable nitrate.

Inversion of Gelatine Negatives.

M. Isard's method consists in making two layers of caoutchouc dissolved in benzine; when the first of these layers is dry he interposes a film of ordinary collodion containing about 1·5 per cent of pyroxyline, and covers it with the second layer of caoutchouc, this latter being itself again coated with a film of ordinary collodion. When this is finished, strips of the peculiar black paper called *papier à aiguilles* are glued all round the plate, so as to form a frame of the required dimensions, and the whole is then allowed to become thoroughly dry. If now it be desired to at once transfer the negative, it is only necessary to cut through the layer along the outer edge of the paper frame, and by raising one of the corners of the pellicle with the point of a knife the whole may be stripped off in one continuous movement. Provided care has been taken to let the paper get perfectly dry, the pellicle is sure to come off without its dimensions being in any way distorted. It will be seen that by nearly all similar processes we are enabled to get films which are so thin that we can, by inverting, print on either side. We can, therefore, in case of necessity, prepare for the inversion, while leaving the pellicle adherent to the glass plate on which a negative image has been taken; and when we wish to invert the negative, we have only to cut through the edges of the film as above described, and to strip it off the plate.

Moistening the Air in Mills.

To the Editor of the Scientific American:

On page 135, No. 9, current issue, Mr. L. E. Bicknell suggests the plan of moistening cotton mills with jets of steam running under the rows of looms for the purpose of moistening the warps, etc. This method has been in operation for many years (thirty years at least) here, and was always considered a success until recently, when a better plan has been adopted, which consists of pipes arranged overhead on the floor beams, and supplied with small glass sprinklers, through which, by means of an air pump (force pump), air mingled with water is forced at about twenty pounds pressure, and forms a very fine spray, which is all evaporated before it reaches the floor. This plan gives a better atmosphere for the operatives to breathe by supplying a proper quantity of oxygen to take up and purify the deadly carbonic acid gas given off their lungs. It also sweetens up the room, and there is not a foul sickening smell that steam always gives off, and the operatives are more cheerful, and there is less sickness among them since its introduction.

J. J. I.

A False Meteoric Report.

The Cleveland *Leader* states that at midnight on Saturday, August 16, Caledonia, Marion county, was visited by a terrific thunderstorm, accompanied by hail and the most vivid lightning, flash following flash in quick succession. There had been a political meeting there that evening, and the people from the neighboring villages and surrounding country were detained by the storm. Suddenly the sky appeared as bright as noonday, in fact fine print could easily have been read, so great was the light, but strange to say the light was steady, not flash after flash, as it would have been had the light been caused by lightning. A deafening roar was heard, continuing to become louder as the light became brighter. Gradually the roaring changed to a hissing, sparkling sound. It is needless to say that the people were frightened, and upon running into the street a ball of seeming fire came moving through the air from the northeast. The ball seemed to be at least twenty-five feet in diameter. As it neared the earth the heat could be plainly felt. The body struck the earth just north of the village and buried nearly one-half of itself in the ground. Good judges estimate the weight at three to five tons, but the heat is yet so great that it is uncomfortable to go nearer than thirty or forty feet. It looks like a mass of pig iron. It was visited by hundreds yesterday. The gentleman who owns the land on which it fell has been offered $300 for it.

We learn from the editor of the Caledonia (O.) *Argus* that the above statement of the Cleveland *Leader* is untrue.

ENGINEERING INVENTIONS.

Mr. Samuel L. Marsden, of New Haven, Conn., has patented an improvement in that class of crushers which operate with a reciprocating moving jaw or jaws. The invention consists in constructing a vertical jawed ore crusher with an adjustable pitman, friction driving pulleys, toggle lever, toggle, and jaw plates, arranged so as to increase the efficiency, durability, and convenience of the machine.

Messrs. Alvin R. Bailey and James B. Glass, of East Somerville, Mass., have patented packing for the piston rods of pumps, and of compressors for compressing air or chemical gases for refrigerators and ice-making, and for other uses. It is so constructed that it will not lose its pliability and usefulness from long use, and which will require only a light pressure to keep it tight, so that the piston rod may work free and cool.

An improved apparatus for increasing the production from oil wells has been patented by Mr. Charles S. Shoup, of Franklin, Pa. The object of this invention is to increase the production of oil wells by inducing and stimulating the flow from the oil rock when it falls. The invention consists in a return pipe connected with the tubes of the pump and the casing head of the well and fitted with cocks, whereby the oil may be passed to the tanks or directed through the casing head, and thence conducted down between the casing and the pump tubing alongside of the steampipe to the oil rock at the bottom of the well, for the purpose of clearing the well of paraffine.

Mr. Conrad H. Matthiessen, of Odell, Ill., has patented an improved road scraper which may be used for scraping and planing roads, and for ditching and other similar purposes. It consists in a novel arrangement of devices for raising and lowering the blade, and for adjusting it to different positions.

Ancient Man in Missouri.

The finding of numerous relics of a buried race, on an ancient horizon, from twenty to thirty feet below the present level of country in Missouri and Kansas, was noted in this paper a few months ago. The St. Louis *Republican* gives particulars of another find of an unmistakable character made last spring in Franklin county, Missouri, by Dr. R. W. Booth, who was engaged in iron mining about three miles from Dry Branch, a station on the St. Louis and Santa Fé Railroad. At a depth of eighteen feet below the surface the miners uncovered a human skull, with portions of the ribs, vertebral column, and collar bone. With them were found two flint arrow heads of the most primitive type, imperfect in shape and barbed. A few pieces of charcoal were also found at the same time and place. Dr. Booth was fully aware of the importance of the discovery and tried to preserve everything found, but upon touching the skull it crumbled to dust, and some of the other bones broke into small pieces and partly crumbled away, but enough was preserved to fully establish the fact that they are human bones.

Some fifteen or twenty days subsequent to the first finding, at a depth of twenty-four feet below the surface, other bones were found—a thigh bone and a portion of the vertebra, and several pieces of charred wood, the bones apparently belonging to the first found skeleton. In both cases the bones rested upon a fibrous stratum, suspected at the time to be a fragment of coarse matting. This lay upon a floor of soft but solid iron ore, which retained the imprint of the fibers.

Overlying the last found bones was a stratum of what appeared to be loam or sod from two and a half to three inches thick, below which was a deposit of soft red hematite iron ore, lying upon two large bowlders of hard ore standing on edge, standing at an angle of about forty-five degrees, the upper ends leaning against each other, thus forming a considerable cavity, which was filled with blue specular and hard red ore and clay, lying upon a floor of solid red hematite. It was in this cavity that the bones, matting, and charred wood were found, intermixed with ore.

The indications are that the filled cavity had originally been a sort of cave, and that the supposed matting was more probably a layer of twigs, rushes, or weeds, which the inhabitants of the cave had used as a bed, as the fiber marks cross each other irregularly. The ore bed in which the remains were found, and part of which seems to have formed after the period of human occupation of the cave, lies in the second (or saccharoidal) sandstone of the Lower Silurian.

WE have received a finely illustrated 70 page catalogue of wood-working machinery issued by Messrs. Rowley & Hermance, of Williamsport, Pa. It describes a large variety of improved wood working machinery adapted to almost every imaginable use. One of the machines made by this firm is described in another column.

POSTAGE STAMP MUCILAGE.—Gum dextrin, 2 parts; water, 5 parts; acetic acid, 1 part; dissolve by aid of heat and add 1 part of spirits of wine.