The Milkweeds.

Milkweeds are of six or seven kinds, says F. B. Sanborn, in the Boston *Advertiser*. The ordinary one (*Asclepias cornuta*), or silk weed, is very common everywhere, but varies greatly both in the color of its flowers and the shape of its leaves. During the last century the coma of the seeds of this plant was used for wick yarn. Dr. Manasseh Cutler (1783) writes: "The candles will burn equally free and afford a clearer light than those of made of cotton wicks. They will not require so frequent snuffing, and the smoke of the snuff is less offensive." In 1833 a patent was granted to Miss Gerrish, of Salem, for a process by which the fiber of this milkweed was to be used for the manufacture of various kinds of thread, cloth, etc. But the manufactured product never got fairly into the market, any more than Dr. Cutler's milkweed candles did, and now cotton and electricity have got the start of them and of bayberry tallow, which was also a product of New England.

Mineral Wax in Oregon.

We were shown recently, by Mr. Melville Attwood, some specimens of a peculiar ozocerite from a recently discovered deposit in Southern Oregon. The mineral has a very different appearance from that found in Utah. It burns very freely, with a dense smoke but no odor. If the deposit is of any extent, the discovery is an important one, since it is found in only one other locality in this country. The Utah ozocerite began to come into the market in 1888, and the deposit is now producing about 300,000 pounds a year.

This mineral wax, or ozocerite, in its refined form is used for nearly all the purposes to which ordinary beeswax is applicable. It possesses nearly all the properties of beeswax except stickiness; but in cases where that quality is desirable, it is only necessary to wax the mineral with ordinary beeswax. Crude ozocerite, like other hydrocarbon compounds, is used to a considerable extent as an insulator for electrical wires. Ozocerite belongs to the series of hydrocarbon compounds which include marsh gas, petroleum, and paraffine, it being very similar in appearance to the latter. It is colorless to white when pure. It occurs leek-green, yellow, and brown.

This Oregon mineral wax is a yellowish-white. Its specific gravity is very small, it being exceptionally light for its bulk. From appearance it is a purer article than that produced in Utah.

We import large quantities of this material from Galicia, Austria, the amount, according to census reports in 1889, being 1,078,725 pounds. There are thirty-five companies at work in Galicia, where they have been mining the substance since 1862. They had a monopoly in the product until 1888, when the Utah deposit began to be worked. If there is much of the substance in Oregon it will be worth attention, as the demand for it is on the increase.—*Min. and Sci. Press.*

Monosulphide of Potassium as an Insecticide.

The following is a *resumé* of the essay written by M. Dubois upon the value and efficacy of the monosulphides of potassium or sodium as insecticides. It is employed in the form of a solution, the strength of which varies from 10° to 35° B., according to whether it is to be employed for destroying the eggs of the insects or the insects themselves.

Experiments made specially upon "acridenes" show that the hatching of the eggs is prevented by sprinkling them lightly with a solution of monosulphide of potassium of 10° B. The fully developed insects are likewise destroyed by a similar treatment, none being capable of resisting it, not even the vigorous horn beetle, in spite of its thick shell.

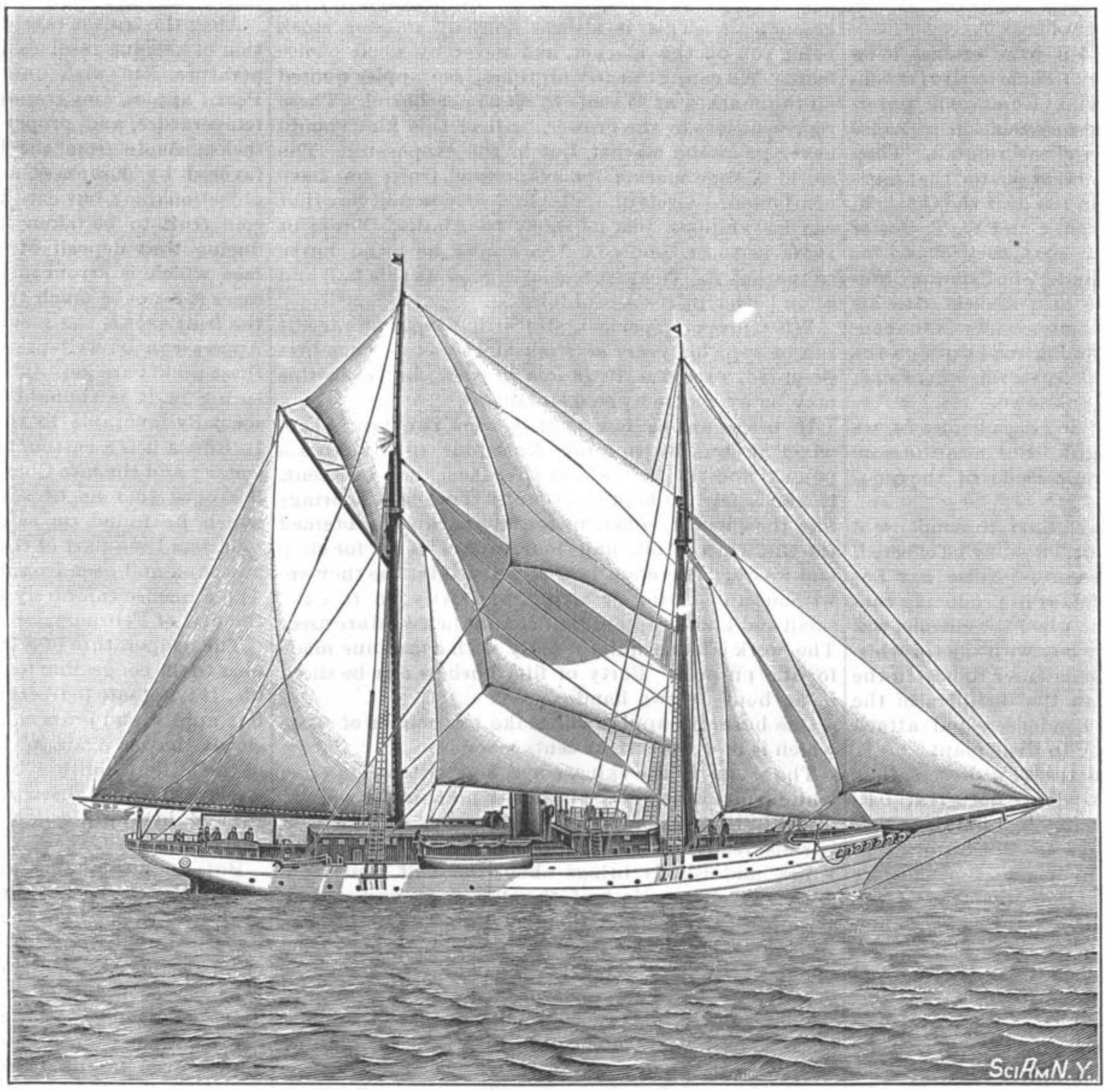
These experiments would, therefore, tend to show that these insect pests, which devastate the crops in Algeria, can be exterminated by the simple and economical process which this method affords, since for those plants which require potash it would simultaneously act as an excellent manure.

THE AUXILIARY CENTER BOARD STEAM YACHT WILD DUCK.

The designs for the yacht shown in the illustration were made by the late Edward Burgess. Our view represents the yacht under sail alone, and she has been proved to work well to windward, tacking within ten points. She was built for Hon. John M. Forbes, at the Atlantic Iron Works, East Boston.

Her length on the water line is 125 feet, and from the outside of stem to outside of rail, aft, 154 feet 6 inches; beam moulded, 23 feet 6 inches; depth from upper side of deck beam to top of keel, 12 feet 6 inches; draught 7 feet 6 inches. She is two masted, schooner rigged. The general specifications for engine, boiler, and screw were made by Miers Coryell, of New York. The hull is built of mild steel to Lloyd's rules. Deck house and lower finish of cabins and staterooms of mahogany. Ceilings of cabins are finished ivory white. The power consists of two Belleville boilers furnished with separator and automatic pump. The engines were designed by James T. Boyd, engineer of the Atlantic Works, and are of the triple expansion type, 10 inches high pressure, 14¼ inches intermediate pressure, 28½ inches low pressure, with 18 inches stroke of piston. The condenser forms part of the framing of the engine and contains 600 square feet of cooling surface. Air and circulating pump 8 inches steam, 10 inches air and 10 inches water. The propeller wheel is of the Bevis patent. The vessel is fitted with a steel center board 21 feet long, 6 feet 7¾ inches wide, hung with the Burgess hook. The smoke stack is telescopic, which, together with the center board, are worked from the top of the house. In her trial trip, under steam only, she made a speed of 10 3-10 knots without any forcing. Revolutions of engine, 208 per minute. Steam pressure at engine, 180 pounds per square inch.

For the photograph from which our illustration is made we are indebted to Mr. N. L. Stebbins, of Boston.



THE BURGESS CENTER BOARD STEAM YACHT WILD DUCK.

IF all true science is based on facts, the fact remains that no animal has ever formed what we mean by a language; and we are fully justified, therefore, in holding with Bunsen and Humboldt, as against Darwin and Prof. Romanes, that there *is* a specific difference between the human animal and all other animals, and that that difference consists in language as the outward manifestation of what the Greeks meant by *logos*.—*F. Max Muller.*

The Nature of Solution.

Some interesting experiments have been made recently, by Messrs. Wanklyn and Johnstone, upon the phenomenon of solution, from which they have deduced some facts which, if substantiated by further investigation, will be as useful as they are interesting.

Taking the solution of sugar in water as a starting point, the accuracy of the statement that the volume of a solution of sugar is equal to the sum of the volumes of the water and sugar was first established. Hence each gramme of sugar entering into 100 c. c. of solution raises the weight of the solution in a definite proportion.

This coefficient of increment has been experimentally determined, having the value of 0·371 gramme displacing 0·629 gramme of water. Moreover, this coefficient is practically constant for all degrees of concentration. Experiments made on various other bodies, such as chloride, bromide, and iodide of sodium, barium chloride, etc., confirm this statement, indicating that solution is simple and regular in its action, unless interfered with by chemical change.

It has also been observed that solution is often attended by expansion or contraction, and that the coefficient of increment determined by experiment does not, in some cases, agree exactly with that calculated. This fact is looked upon by the investigators in the following way: When a gramme of a salt enters into solution in the 100 c. c., instead of an equal volume of water being displaced and overflowing as it were, there is a chemical combination between the salt and the water, a condensation or absorption of part of the water taking place, this condensation being represented by the difference between the experimental and the theoretical increment. Experiments were made upon various nitrates and sulphates, the condensation phenomenon being observed in all cases, but in a varying degree.

The results obtained in these experiments led to the conclusion that this property of condensation constituted a definite physico-chemical function. Experiments were then made upon various salts all containing the same base, with the result that it would seem that this function not only existed, but that it bore an atomic relation to the substance dissolved, so that the variation in condensation would be characterized by the base contained in the salts employed. The experiments made on sodium and potassium salts, some of which have been published in detail, seem to substantiate this hypothesis, and the investigators contemplate ultimately establishing a complete volumetric relationship.

Fuel from Coal Dust.

Instead of using pitch to cement coal dust together to form briquettes, Buckland & Myers employ substances of a glutinous or farinaceous character, such as are obtained from wheat, barley, rye, or other cereals or vegetables, 5 per cent to 95 per cent of coal dust being a suitable proportion. The mixture may be kneaded by hand and sets in a short time, so that moulding under pressure is unnecessary, though the use of moulds may be adopted to aid rapid manufacture. It is claimed that the product burns with less smoke than the ordinary briquettes, and is more economical in use. Ashes or refuse matter from coal fires, with or without fresh coal, may also be utilized.

Honey in the Goddess' Head.

The St. Louis *Republican* says: Officer Musgrove, of the capitol police at Austin, Texas, lately ascended to the dome of the granite capitol at that city to inspect the swarm of bees which had settled in the nostrils of the statue of the Goddess of Liberty. The figure is seventeen feet high and surmounts the dome, which is over 300 feet high. Officer Musgrove says there are probably several barrels of honey in the bronze head of the goddess.

Artificial Rain.

The artificial production of rain is just now a topic of much interest. The government experiments carried on by Gen. Dyrenforth, at Midland, have not at all satisfied the public mind that rain can be produced on demand, but have aroused an interest which is intently waiting for further developments.

Reports concerning the amount of rainfall at Midland, during the time of experimenting, are conflicting. Mr. Dyrenforth stated to a reporter, when on his way to Washington, that the greatest success had attended his work; that Midland had had no grass rain for three years before his advent to that arid district, while during his brief stay three copious grass rains had fallen. He describes one experiment as follows: "At three o'clock one afternoon a balloon was sent up about one mile and a quarter and then exploded by means of electricity. There were but few fleecy clouds in sight, the air was very dry, and the barometer declared that the weather was fair. Ten minutes after the balloon had disappeared in a peal of thunder, kites were set flying, and attached to the tails was dynamite. This was exploded when the kites were high in the air; and then a great quantity of powder, which was scattered over the ground for about two miles, was set off by electricity. This made a noise like a succession of batteries of artillery. The smoke rose in the air about 200 feet and drifted toward the expert's headquarters. Before it reached there, however, it was driven to the earth by a torrent of rain."

This testimony is rapturous, but over against it we are forced to put the testimony of some native ranchmen and visiting reporters, who, from some unfortunate cause, failed to discover any relation of cause and effect between the noise and the rainfall. They say that late in summer is their rainy season, that more rain fell at a great distance than fell near the C ranch, where the experiments were made; and W. T. Foster is so unfeeling as to intimate that they chose his storm day to make the experiment. But Senator Stanford comes to the rescue of the rain makers with his assurance that the daily blasting necessary in the construction of the Southern Pacific Railroad through the desert region was attended by daily storms where such phenomena had hitherto been unknown.

With these scanty but interesting data before us, we must stop and wait for more light. But meantime we may take a look at the theoretical side of the question.

Science has never known a method to condense a vapor except by supersaturation. This may be effected, 1st, by cooling, or 2d, by pressure. Noise has not heretofore been considered a factor in producing condensation. Shall the time come when the chemist will find it advantageous to hire the boy with the tin whistle to stand over his Liebig condenser to hasten the precipitation of the vapor? Can the distillers of the future throw aside their spiral condensers and attach instead a village school building to their plant?

But if theory is opposed to the new process, they claim that facts substantiate it. Have not great battles been followed almost invariably by rainfall? Perhaps so. We were not there to see. But history is so uncharitable as to tell us that in ancient times, before gunpowder was known, the same was true. And this suggests another cause for the subsequent rainfall.

Every one has noticed that when water passes from the liquid to the solid condition, the process begins about some foreign substance. Little sticks and straws projecting into the water are first girdled with a fringe of ice. It has been observed by some scientists that the same is true of water in passing from vapor to liquid. This affords a rational explanation why rainfall follows a battle. Think of the volume of smoke and dust sent up in the atmosphere during an all day's engagement between two powerful armies. Each minute particle of carbon or sulphur or dust, too small for detection in the rain, forms a nucleus upon which the molecules of aqueous vapor cluster very like a swarm of bees settle on a limb.

The eruption of volcanoes is almost always attended with heavy rainfall, and during an eruption the quantity of ashes and cinders hurled thousands of feet into the heavens is inconceivable. They have been known to fall hundreds of miles from the place of eruption. During the great eruption of Tomboro, in 1815, enough cinders were ejected to cover the whole of Texas two feet deep, and the most violent rainstorms succeeded it. Of course, those who wish to will believe that the noise of eruption produced the rainfall, but it seems more rational to attribute it to the volume of solid matter thrown into the atmosphere. They put stress also on the fact that during a storm the rainfall is greater immediately after the thunder claps. This is true, but it has no bearing on the question at hand. During the storm the small rain drops are buoyed up by ascending currents of air, and the thunder jars the atmosphere so that a number of these small drops are jostled together, and being collectively too heavy to be buoyed up, they fall to the earth.—*A. J. James, B.S., Teacher of Science in Dallas High School.*

Evaporating Apples for Profit.

All fruit growers, and more especially of the apple, know that much of their fruit is unfit for market, being either wormy, specked, scabby, knotty, or small. Now, all this fruit can be utilized by the evaporator, and placed upon the market at remunerative prices. It is not necessary to have a large establishment to accomplish this result. There are driers with their capacities ranging from one to two bushels of green apples per day up to thousands.

The work can be done just as well and as cheaply on a ten bushel machine as in any of the large factories, and my experience has been that they are the least expensive. Often it will pay to evaporate the whole crop. I have often realized more for culls than for the shipping fruit.

One hand can run a ten bushel drier, with twenty-five cents' worth of fuel, and make fifty pounds of white fruit per day, which, at ten cents per pound, about the average price, would net four dollars and seventy-five cents, making nearly fifty cents a bushel, including the day's work, and, at this year's prices, would be over seventy cents, and if the waste is dried, almost a dollar.

Again, one important point thus gained is culling out your shipping fruit, making it grade fancy, and thereby obtain the highest market price for it.

Market only the best, evaporate the rest. Thus you would avoid the breaking down the markets for the green fruit. This is always done by inferior stock being run on the market, and never by good choice fruit. We can, at nearly all times, see apples quoted on the market at 75 cents to $1.25 per barrel. These represent loss to the grower. All of this kind should never go on the market, but in the evaporator. The world is your market for evaporated fruit; you have nearly four barrels of apples in a fifty-pound box that can be shipped just as safely to Alaska, China, or India as to St. Louis, and you need be in no hurry to market it. Next spring is as good as this fall, and often better prices are obtained.

When properly packed, and with proper storage, it can be kept for years as fresh and sweet as when first prepared, except a little loss in color, but even this may be overcome by cold storage.

If prices are as low as they were two years ago, when it was worth only from four to six cents a pound, and the waste and chop less than one cent, it can safely be kept over until there is a shortage like the present, when fifteen cents can be obtained for the white fruit, and four to five cents for chop and waste. The chop is apples sliced just as they are without any paring or coring, and dried; in this the small and knotty apples that cannot be pared are used. The work is done quite rapidly with a machine made for the purpose. Forty or fifty bushels can be sliced in an hour by two hands.

One bushel of apples will make ten pounds of chop, which is now worth four cents a pound.

The waste is the skins, cores, and trimmings from white fruit, which needs no other preparation only to put it in the evaporator, dry it and pack it in sacks or barrels ready for shipment. It is used for making jellies, and usually brings about one-half cent more than the chop. Most of the chop is, I understand, shipped to Europe and there manufactured into fine wines and sent back to this country, and sold at from one to five dollars a bottle. The price is, therefore, greatly influenced and governed by the grape crop in the old country. Many thousands of tons are manufactured each year. Everything can be used, nothing wasted.

A delegate said: "I think still more can be done than the gentleman says. I evaporated some 1,400 pounds of fruit, which sold for ten cents per pound. I made use of every part of the fruit, except the wormy part. Vinegar was made of the waste. I sold some ten or twelve barrels at twenty cents per gallon, $9.60 per barrel of forty-eight gallons.

"I picked out the choicest to ship and evaporated the culls and seconds, which would have damaged the whole lot if shipped together. The vinegar apples made nearly as much money as any. I netted $85, using a cider mill that cost $15. We use a pear corer and slicer to prepare the apples for drying. Wife and two little girls did the work, apples and wood being brought to the house for them.

"Some of the apples kept a year and a half were as white and good as when first put up. No trouble to keep them five years. We used about a tablespoon of sulphur to a half bushel. When dry, we put the fruit right into flour barrels, and headed it up tight. Some kept eighteen months are as nice and fresh as when first put up. They are better to cook than fresh fruit, as they don't require sugar, while fresh fruit does.

"We pack them hot, right from the trays. If they stand open, the miller will get into them. Turn them from the tray into the barrel, and keep them perfectly close. Just as soon as a barrel was full, I headed them up."—*J. B. Durand, before Missouri Hort. Soc.*

THE most powerful guns of American and foreign make can carry from nine to twelve miles.

Keeping Fruit in Winter.

A writer is quoted as objecting to the practice of gathering apples for keeping "as soon as the pips begin to turn brown." He says apples gathered at this stage "do not keep as well, or average of so good quality." Certainly they do not. An apple makes a noticeable portion of its growth—often as much as one-fourth—while its seeds are coloring. But, on the other hand, the keeping of late-ripening apples is greatly lengthened by gathering them as soon as the seeds are fully colored. Up to that time the fruit improves on the tree. After that it deteriorates, so far as keeping is concerned, and, with some varieties, it deteriorates rapidly, so that winter fruit soon becomes fall fruit.

The art of handling fruit for keeping is very imperfectly understood, both as regards principles and practice. The season of many of our fruits is capable of being much lengthened in the hands of growers and dealers who are willing to learn and make use of the principles involved. In the first place, so far as Nature's purpose is concerned, the external covering of the true fruit—that is, the seed—exists primarily for the sake of the seed itself, and only secondarily for its envelopes, which are the parts that give it its chief value for human use. As soon as the fruit and its seeds are ripe the fleshy exterior part begins to decay, and what we call ripening or maturing are only primary stages of that process, which is to release the seed, so that it may grow into a new plant.

After the fruit is carefully gathered, the whole question of keeping resolves itself into a question of temperature, but with due attention also to moisture. Pears, apples, and grapes require a low and uniform temperature, and proper protection from fungous attacks. Aside from the latter danger, which may be favored by dampness, a saturated atmosphere is not objectionable; but care must be taken not to allow cold fruit to be taken into a warm atmosphere, producing that deposit of visible moisture upon its surface which is erroneously called sweating. In such cases it is not so much the moisture itself that harms the fruit as it is the mouldiness which is apt to ensue. Apples can be well preserved in very damp cellars if these points are kept in view. In fact, a cellar with a spring in it is thought by many fruit growers to be specially favorable to the perfect keeping of apples. In Russia it is a custom to preserve apples fresh in cold water; and the late Charles Gibb, of Abbotsford, Quebec, once told me of some very fine Fameuse apples which he found on sale in April, and which, he was told, had been part of the cargo of a canal boat that had sunk and been frozen in and had just been raised. The Fameuse can rarely be kept in air much beyond the first of February.

The temperature of a fruit cellar is best when kept as near to the congealing temperature of the fruit as possible. It is not safe to freeze so watery a fruit as the grape; but apples and pears can be frozen without injury, if slowly thawed again in the dark. I am not quite sure of the latter condition being essential, as I have had apples that had been slowly frozen, and as slowly thawed, in a light cellar, come out of the trial apparently uninjured.

But, unquestionably, an even temperature, near to freezing, is the best. Even this, however, is of small avail toward good keeping if the fruit does not go into its cold storage in perfect order and at the right stage of its existence. That stage is reached, in apples and pears, as soon as the seeds are fully colored. Fruit designed for long keeping should be gathered early in the day or in cloudy weather. A barrel of sun-heated apples, even if put at once into a cool cellar, has lost greatly in keeping quality. If fruit must be gathered in the heat of a sunny day, let it be in baskets, which are to be kept under airy cover until they are well cooled before they are placed in the cellar.

For the best results, gathering and assorting ought to be simultaneous; but in a large orchard, when careful hands are scarce, this is not possible, and the best alternative is a large and airy sorting shed, where the work can be deliberately done by skilled hands. I prefer round-bottomed half-bushel baskets, with drop handles, for use in gathering and assorting. It takes a good many of them in a busy time, but in the end they are economical. They are easily handled, and will not be slung around, as bushel baskets with side handles are sure to be, to the great injury of their contents. The small baskets can be put down into the barrel and emptied without bruising their contents in the least. Hand barrows for two men are much better than wheelbarrows. A stone boat answers well on smooth, level ground.

As an evidence of the value of careful attention to all the points above referred to, I may be allowed to say that our chief winter apple in Northern New England is the Wealthy. Observing all these rules, I find that I have not the least difficulty in keeping it firm, fresh, and free from decay up to April, while less careful neighbors (and growers generally) decry it as merely a fall apple. By similar care the Gravenstein, grown in Southern Maine, is found in the Boston market all winter in prime order.—*T. H. Hoskins, Garden and Forest.*