THE FORESTS OF ATHOLE.

The Duke of Athole's famous plantations at Blair Athole and Dunkeld, Scotland, have engaged the pens of numerous writers from the period of Loudon's compilation of the *Arboretum* to the present time. Mr. McGregor, who holds the important office of forester on the Duke of Athole's domain, has enabled a correspondent of *The Agricultural Gazette* to repeat an old but interesting story. Previous to the accession of the great planter, Duke John, in 1774, two Dukes of Athole had planted larches. In 1738 Duke James planted, at Blair Athole and upon the lawn at Dunkeld on the banks of the Tay, on a rich alluvial sand with open channelly subsoil, 16 larch plants, the parents of the subsequent and famous crop which was sown on the same property. One of these original Blair Athole larches furnished the timber for the great planter's coffin. The hight of this tree was 106 feet.

Three of the five Dunkeld lawn trees were also felled, and two of these which were cut down in 1809 contained, at the age of 71 years, 147 cubic feet and 168 cubic feet, respectively; and the last-mentioned was sold in Leith to a company of shipbuilders for 3s. per foot, or £25 4s. the tree. Baltic timber at that time was selling at war prices. The two other original larches on the lawn still stand close to the ancient cathedral of Dunkeld, and not far from a fine group of their own offspring. They are still sound timber at 138 years old, though their period of growth had been reached some years since. The largest tree measures 98 feet 10 inches in hight, and 14 feet 6 inches in girth at 5 feet from the ground. The trunk is perfect in shape, tapering gradually and regularly, until it ceases to be measurable timber at about 20 feet from the top. It is said to contain 423 cubic fee of timber. These two companion trees are 11 yards apart, and their branches meet and interlace without injury.

From this history of two larches, which probably attained their growth at about 100 years, we learn much in reference to the quantity of timber which may be produced on good light land, with natural drainage. To continue our general history. It was by no means easy to obtain larch plants. The 16 just noticed were brought from London by Mr. Menzies, of Migony, who presented them to the Duke. Others were obtained by the same Duke James, who planted, in all, 1,941. John, Duke of Athole, who succeeded in 1764, obtained about 1,000 plants yearly from the cones of the first planted trees upon the lawn, and added in 10 years 11,400 young larches to the growing crop. His successor, John the Planter, soon became a larch lover and an enthusiast, but, previous to determining on the general planting of his estate, he felled some of the original larches, aged 40 or 50 years, and tested their value. In a short time the Athole frigate, and a small fleet of merchant ships, built of larch timber, were afloat, and, to his intense delight, he soon discovered that the timber of the new fir from the Tyrol was equal, and, in some respects, superior to that of the ancient pine of Scotland.

The greatest efforts in planting were made during the years 1816 to 1818, when 5,922,000 larches were planted, and from 1824 to 1826, when 4,038,880 were added. The great improver died in 1830, having planted 12,074,380 larches without mixture and 1,122,339 larches in mixed plantations. The following abstract account of the Duke of Athole's woods and forests was drawn up in 1829:

	Statute Acres.		Statute Acres.
Oak	1,337	Scotch	435
Larch	10,755	Mixed	3,005
Spruce fir	479	Birch	30

On the Duke's accession in 1774, the total number of acres planted was about 1,250, consequently the area planted by him was 15,473 statute acres; and allowing 2,500 plants to each acre, the total number of trees planted was 24,756,000. In reality, the number was considerably greater, and if 10 per cent be allowed for making good the failures of plants, the total number of trees planted would be 27,231,600.

INLAND SEA IN ALGERIA.

MM. Dumas and Daubree have urged several objections, says the *Engineer*, to the proposed artificial inland sea in Algeria, and agree with M. Naudin, who read a paper on the subject at a recent meeting of the Academy of Sciences, that its sanitary effects would be deplorable. It is thought that to fill the shallow basins of the region which it is proposed to convert into a sea with salt water would be equivalent to reproducing in Algeria all the worst features of marshy plains. Captain Roudaire, who proposed the scheme, admits that even in the center there would be nowhere more than about 80 feet of water, and the whole coast line would have so little water that it would be little better than a sandbank with an admixture of salt and fresh water, upon which the strong tropical heat would act in the most deleterious manner for two-thirds of the year, causing a rapid decomposition of organic matter, and spreading contagion for miles in every direction. M. Naudin considers that there is no similarity between this district and Egypt, the climate of which country has been much improved by the creation of the Suez canal and the plantation of trees; for, according to him, while Egypt lies between two seas, and is traversed by an immense river which has periodical overflows, the Algerian district is far from the sea, and is bounded by arid deserts.

AN AMERICAN SUBSTITUTE FOR GUM-ARABIC.—It is said that the mesquite gum of Western Texas is almost identical with gum-arabic, and, during the past year, has become an article of export, some twelve thousand pounds having been gathered in Bexar county, and as much more between that and the coast. This gum exudes from the stem and branches of the mesquite, a mimosa, several species of which grow in Texas, New Mexico and Arizona.—*Journal of Microscopy.*

CHEERFUL looks make every dish a feast. And 'tis that crowns a welcome.—*Massinger.*

CAN A POULTRY FARM PAY?

This question has been fully answered in the affirmative by our neighbors, the French. Hitherto with us the attempt has ended more or less in failure; but is that a reason, if a proper method is adopted, and due care and supervision exercised, that we should not succeed in the future? From the accounts I have before me of the French poultry farms, I gather that if we follow their example and breed for sale, just as ordinary farmers do their sheep and oxen, there is no apparent reason why a fairly remunerative profit should not be realized by poultry farmers in this country.

1. Let there be plenty of space in the open runs. The poultry will find for themselves much good and wholesome natural food, and so save extra feeding. 2. Let the home feeding be regular and liberal, but not excessive; your birds then will always be in good health and condition. 3. Whether you propose producing eggs or meat for the table, choose suitable breeds for each object. Do not, however, use too many different breeds, as that involves complication in your houses, yards, and accommodations generally. 4. Let your personal supervision be constant, and employ only the best and most trustworthy assistants.

I have lately read with pleasure, in Mr. L. Wright's book on poultry, of the Bellair (French) farm, that if intending poultry farmers here took this as their mode and only improved upon it so far as their own experience and that of celebrated poultry breeders suggested, they would soon have a sound system to work on, and success be assured.

To take another line of argument. A farm, say of 15 or 20 acres will only supply a certain number of sheep or oxen, according to its fertility of soil; all other feeding stuff, oil-cake, etc., will have to be paid for extra, and that in high proportion. Calculate out the product of this in beef and mutton for the market. So many oxen or sheep at such and such a weight can be raised, but what can we say of poultry? In this case so much does not depend on the quality and richness of soil; and a greater weight of poultry at less cost will be raised than beef or mutton. Poultry, it is true, are liable to disease; so are sheep and oxen. With 20 acres, too, if properly managed, nearly every requisite might be raised for the stock kept. Could this be done in ordinary farming? There is only one question that seems to me of vital importance now left for consideration—Is there a good and conveniently situated market for your poultry, easy of access, and where fair wholesale prices can be obtained? If so, I can see no reason to doubt success.

PROPELLING BY PUMPS.

Attempts have been made at various times to move boats by forcing jets of water through openings in the sides or ends of the hulls, and hitherto these experiments have not been successful. A more recent experiment in this direction has resulted favorably, and a tow-boat, 13.11 meters (43 feet) long, has been constructed that employs a common steam pump in place of an engine and propeller. A writer in *Scribner's Monthly* gives the following details: The boat has a steam boiler of moderate size, and is, in other respects, one tow-boat of the usual pattern. Four pipes, 64 millimeters (2½ inches) in diameter, are laid the whole length of the boat inside, and about a meter below the water line. At the bow two of these pipes open the whole size of the pipe directly into the outer water, and at the stern they are reduced to a nozzle of only 22 millimeters diameter. The other pair of pipes are arranged in the same manner, except that the nozzles are placed at the bows. A steam pump is connected with each pair of these pipes, and when at work takes the water in at the bows and ejects it in a powerful stream at the stern, and thus forces the boat ahead at a good speed. To reverse the direction, the pump takes the water from the stern through the other pair of pipes and forces it out at the bow, and the boat instantly reverses its direction. The novelty in this invention consists in the use of a reduced pipe or nozzle at the place of discharge. By means of the two nozzles the boat may be easily steered independently of the rudder by using one or the other of the two pipes alternately. The advantages claimed for this system of propulsion are the cheapness of the apparatus and the absence of ripple or disturbance of the water. The escaping water is so far below the surface that it creates no disturbance, and the boat only makes the wave that breaks from the bow, and, in this respect, this method of propulsion may fulfill the demand for a steam tow-boat for canals. On a trial trip at sea, the boat made a voyage of some length in safety and at good speed.

A NEW METAL.—Serge Kern announces, in *Comptes Rendus*, his discovery, in June last, of a new platinoid metal which he calls *davyum*, in honor of Sir Humphrey Davy. It is hard, silvery in luster, malleable at red heat, readily soluble in aqua-regia and very feebly in boiling sulphuric acid, yielding a yellow precipitate with caustic potash. Sulphureted hydrogen, passed through a dilute solution of the chloride, yields a brown precipitate which becomes black upon drying. Potassic sulphocyanide, with the same solution, is colored red; and if the solution of davyum in KCyS is concentrated, a red precipitate is obtained. Sp. gr. 9.385 at 25° C. Kern thinks that in Mendelejeff's proposed classification of the elements, davyum is the hypothetical element placed between molybdenum and ruthenium, in which case its equivalent should be 100. It would then rank as the second confirmation of Mendelejeff's predictions, gallium having been the first. It is probably rare. The platiniferous sand does not contain more than .00045 of davyum.

A MAN will carry four hundred dollars in his vest pocket, but a woman needs a morocco portemonnaie as large as a fist, and too heavy to carry in the pocket, to escort a fifty-cent scrip, a recipe for making a jelly-cake and two sample of dress goods.

THE VALUE OF DRY STEAM.

J. Haug, a mechanical engineer, writes for the *Polytechnic Review* some points on the loss and danger of priming in boilers, and some ways of guarding against it. He says: The use of dry steam is not only a source of economy in the boiler, to prevent an unnecessary expenditure of heat, but still more so in the engine, where water contained in the steam not only does no work, but cools the metal in the steam cylinder, etc., thereby causing a fresh expenditure of steam to heat these parts up again. If with every pound of steam at 60 lbs. pressure a half pound of water is carried over, a quantity not unusual in a priming boiler, the latter has to be heated to the boiling point, and 7% of the heat is expended in heating the water carried over. The feed pump has, of course, 50% more work to do, and the heater will have its efficiency reduced by one-third.

"To avoid priming, a boiler should have a good circulation, and be large enough to do its work without forced firing. A good circulation will also improve the evaporative efficiency of a boiler, as the steam (which is a bad conductor of heat) is quickly removed from the heated plates, and new water constantly follows it.

A steam trap, either fixed in a steam dome, or in some high place in the steam pipe, will drain the water trapped in it back to the boiler, thus saving heat expended in heating it. Sometimes the steam pipe is extended downward from the throttle valve on the engine, so as to form a *cul de sac* for the accumulation of water, which can then be pumped back into the boiler. A superheater, heated by the waste gases, may serve to evaporate the water carried over, and to dry the steam thoroughly; but if the priming is excessive, it will not be sufficient for this purpose.

If water is carried into the cylinder, it will cool the metal, with which it comes in contact; the amount of this depends upon the surface exposed, the difference of initial and final temperature, the specific heat of the metal, the piston speed, the rate of expansion, etc.; and the variable character of these conditions makes it exceedingly difficult to give a figure for the loss thus incurred, but it is certainly considerable, and may range up to 30%.

In non-expansive engines this water is partly evaporated on the back stroke, abstracting heat from the cylinder increasing the back pressure, and in a condensing engine requiring more injection water and entailing more work upon the air pump. In expansive engines the re-evaporation of this water takes place during expansion, whereby the final pressure is somewhat increased, but this is vastly overbalanced by a great fall in the initial pressure; for engines using 60 pounds of steam, cutting off at one-sixth or one-eighth, the initial pressure on the indicator card may often be 20 to 30 pounds below the boiler pressure. Even a steam jacket would be powerless against a great influx of water, as its surface and rate of conduction are necessarily limited. Last, but not least, the danger of water in the cylinder must be considered, the result generally being broken pistons and rods, knocked-out cylinder heads, and, as a natural consequence, a general smash-up.

OUR DOMESTIC METALS.

Professor Thurston makes the following points in the *Popular Science Monthly*:

"This country has for years been importing cast iron, while domestic products of equal and even greater intrinsic value sell at a lower price. Other similar instances of unwisdom are cited by Professor Thurston, as, for example, the fact that we are importing boiler-plate at 11 cents a pound, when we can purchase American steel, vastly superior in all respects for the special purposes to which the former article is applied, at eight cents. Again, we import vast quantities of foreign steel tools, when at Pittsburg and elsewhere we make steel fully its equal. In New England and Pennsylvania we have ores from which is made the finest cast-iron ordnance in the world. In Ohio we make a metal for car-wheels such as is never seen in Europe, and of such tenacity and elasticity that foreign engineers listen incredulously when it is described. Our Lake Champlain ores make an iron fully equal to Swedish for conversion into steel; and around Lake Superior and in Missouri we have deposits from which comes Bessimer metal, far superior to the phosphorus-charged metal we import. New Jersey supplies us with zinc which meets with no competition as a pure metal, and which can be used without purification, even for chemical purposes; and our native copper is absolutely free from admixture with injurious elements. It is time that these facts should be known, and that the people should disabuse their minds of the idea that, because a commodity is 'imported,' it is therefore of greater intrinsic value than a domestic product."

GALVANIC CRYSTALLIZATION.—The journal of the Russian Chemical and Physical Society, says *Nature*, contains observations, by Shidlovsky, on the microscopical crystallization of various metals under the influence of a galvanic current. The dendritic agglomerations of crystals form very speedily; their branches spread out from the cathode to the anode plate, vibrate on reaching it and collapse; this process is repeated till the space between the plates is filled with a spongy metallic mass. Each metal has a characteristic ramification. The crystallization does not appear when the anode is gold or platinum.

COLORS OF MARS.—In the observations about to be made of Mars at the time of its opposition, which occurs in this month, Professor Proctor thinks that it will be a favorable opportunity for a more careful study of the varieties of light and shade and of color in this planet. In comparing pictures of the same object made by different observers, great difference is apparent, and can be traced to this cause. The notion that the surface is divided into ruddy and green portions, and the white polar crown cape and occasional white cloud markings, is far from the truth.

GEOLOGICAL PROGRESS.

We learn from a foreign exchange that MM. Delesse and de Lapparent have prepared a valuable resume of the geological works published during the years 1875 and 1876. Their work covers 184 closely-printed pages; we have room only for a few brief notes. The mean hight of Europe, according to Leipoldt, is 296.838 meters; Humboldt's estimate was 200m. The increase of temperature at given depths below the surface, is greatest in the equatorial regions. Prestwich has confirmed the views of Dana, Carpenter and Wyville-Thomson, relative to the distribution of ocean temperatures. The resistance of rocks to crushing is diminished (in some cases as much as 80 per cent.) by the absorption of water. The plasticity of surface rocks is intimately dependent on their argillaceous character; but at great depths, pressure, water and increased temperature, make all rocks plastic. Th. Hubener has demonstrated, in a lignite, the existence of a multitude of microscopic quartz crystals, which he attributes to a slow decomposition of infiltrated silicates by the humic acid. By treating a Vesuvian pumice, which seemed to be amorphous, with fluorhydric acid, Fouque has extracted from it crystals of feldspar, pyroxene, amphibole, peridote, magnesian mica, and oxidized iron. He has also shown that the minute cavities of the pumice were decked with microscopic crystals of amphigene. The contest respecting the organic character of the *Eozoon* still continues; and even if its animal origin is granted, doubts are thrown on the assumed age of the Lawrentian formation, in which it is found. Owen has studied the bones of a curious carnivorous reptile, *Cynodraco major*, from southern Africa. He assigns it, together with other similar reptiles from the same region, to a new order, *Theriodontes*, having the dentition of carnivora. He thinks that their high organization cannot be explained by the hypotheses either of Darwin or Lamarck. Forests improve the soil much more rapidly than coppice-wood; the humus exhibits a very different composition from that of the rocks upon the surface of which it is formed. Experiments with Tresca's apparatus seem to show that cleavage and lamination may be due to the same cause, and that the schistosity of gneiss may be no evidence of stratification.

GALVANIZING IRON.—Molesworth gives the following directions for galvanizing iron—coating iron with zinc. The directions are very explicit and will be found valuable by many of our readers who have, from time to time, asked questions in regard to this kind of work. Pickle the article six or eight hours in water containing about one per cent. of sulphuric acid, held in wooden vessels; the acid requires to be renewed from time to time, according to the quantity of iron pickled. After pickling scour and wash well in clean water. Keep the article under clean water (in which a little fresh burnt lime has been stirred) until ready for the next process. Immerse in chloride of zinc for one or two minutes until a skin of fine bubbles is formed on the surface. Chloride of zinc may be formed by saturating hydrochloric acid with metallic zinc until effervescence ceases, then decanting and adding a little sal-ammoniac. Dry the article on a heated iron plate, then immerse it in a bath of molten (not glowing) zinc until it acquires the temperature of the zinc bath. The surface of the molten zinc should be protected by sal-ammoniac, or some other substance. In some cases there is a partition at the surface of the bath, one portion of the surface being protected with sal-ammoniac, the other with a layer of charcoal. Beat the article while hot, to remove the excess of zinc.

A FRENCH IRRIGATION SCHEME.—An important work of irrigation is in course of execution in the Department of Drome. The necessary legal concession for the prosecution of the undertaking was obtained on May 21st, 1874, and the works are now being vigorously pushed forward. The canal takes its origin from the Bourne, at a point about 200 meters below Pont-en-Royans, and is intended to supply water at the rate of seven cubic meters per second for the irrigation of 17,500 acres of land. It will consist of a principal canal in connection with a number of secondary channels carrying water to land in 24 different communes; and in case of need can be made to draw its supplies from two further sources, one in the Lyonne and the other in its tributary, the Cholet. The Minister of Public Works has granted a subvention of 2,900,000 francs towards the expenses of the scheme, two-thirds of which sum is to be laid out upon the construction of the principal canal, while the remainder may be employed upon the secondary and tertiary branches. The works are progressing at such a rate that it is expected the principal channel will be completed considerably within the five years allowed for its construction, and it has become necessary to present a petition to the Chambers asking for the payment of the subvention before the date at which it was originally supposed the money would be first required.

A CITY man having moved to the country for quiet repose o' nights away from "the noise of steam and horse cars," spent his first night in hunting up a cricket who whistled lustily first in his right ear and then in his left. The sun rose on a haggard man newly impressed with the wonders of nature.

Two squaws in Tacoma gave a boy a dollar to get them a bottle of whisky one day this week, and the boy forgot what he went for. The squaws did not get the whisky or see the boy again. Good little boy. He will grow up to be an Indian agent.

FOR genuine, enthusiastic economy, commend us to the Galt farmer, who killed owls without wasting ammunition. When he sees one sitting on the ground, he walks around it two or three times, and the owl twists its head off trying to follow his motions. Fact!

SOME difficulty is experienced in filling the commission to interview S. Bull. Very few feel fully satisfied with the result of Custar's interview, and have the nightmare whenever they think of "bulling" the Indian market.