Rural Economy.

OLD FRUIT TREES RENOVATED.

There were old apple trees in profusion, with nearly a hundred pear trees of vigorous growth, but utterly neglected, and reported as yielding small crops of indifferent fruit. The out-going seller of the farm had intended to cut them down. He knew the market value of pickles, but the pear culture was a sealed book. The buyer, educated in a different school, believed that there was yet a high money value in those trees, and that they could be resuscitated. We stood among them and debated the question. He thought that there was a foundation to begin upon, and that an investment of money in reviving them would yield a far quicker return than in waiting for the product of a newly-planted orchard. Among other facts and experience, reference was made to the memorable account recorded in this journal, nearly twenty years ago, of the complete renovation of two out-cast pear trees. Like all these, they had once borne excellent crops of fruit, but for several years had produced only worthless specimens. The owner was told that the trees—for there were several in like condition—had exhausted the proper element in the soil, and that it must be reintroduced by artificial means. That autumn he carried out the suggestion, and scraped off all the rough outer bark from the two trees, then coated them with soft soap, cut out about one-third of all the poorest branches, and shortened the head of the trees one-third by cutting back the principal limbs, paring the wounds and covering them with shellac solution.

The preparation being made, a trench was dug around each tree, three feet from the same, four feet wide and twenty inches deep, the soil being carted away. In making this trench, about a third of the roots were cut away. The trench was then filled with soil from a good pasture field, there being added at the time of filling, two bushels of the refuse scoriæ from a blacksmith's forge, two of well-broken charcoal, and two pounds of potash. All these were thoroughly intermingled after the trench had been filled, by frequent overturnings with the spade.

The result of this cheap and simple operation was manifest the following summer. The luxuriance and vigor of the foliage were surprising, for the newly-formed roots were wandering into fresh and wholesome pasture. The next year was a moderate bloom, but every blossom produced fruit. The third season there was a fine crop, the two trees producing six bushels of superb fruit. Is was convincing evidence that the failure of old established pear trees to produce good crops is owing to a want of proper nutriment in the soil, and that instead of being cut down when they cease to bear, they should be taken in hand and renovated.—*Horticulturist.*

FANCY HENS.

The hen-fanciers are, I dare say, very worthy people; far be it from me to pluck a feather from the tail of any of their brood. But to my obscure sense, an egg is always very much of an egg, whatever fowl may have the laying of it. Nor can I detect much difference between a "broiler" of the Chittagong, or any other heathen family, and the "broiler" Bridget may dress, and lay before me at a June breakfast, from the cackling company that have always laid and scratched about the dunghills of our Christian country. Nay, I take a rather pleasant entertainment in fancying my cheerful and cackling barn-door brood are lineally descended from those veterans of the British roost, who, under the name of Chanticleer, have for so many centuries lifted up their welcome to the morning. There are family associates which are a source of pride; what if my gallant fellow in white, yonder, with golden legs, and blood-red comb, curveting with wings down spread, and giving a coquettish look to the demure feathered people of his harem, comes in direct lineage from the alert old Chanticleer of the House that Jack Built?

This is the cock that crowed in the morn,
That waked the priest all shaven and shorn,
That married the man all tattered and torn, etc.

Can we say as much, or fancy as much for an awkward, frizzled creature of Shanghai name, as stupid as the celestials with their hair tied into a cue?—*Hours at Home.*

NEW GRAPE BUG.

Asa Fitch, of Salem, New York, writes to Moore's *Rural* as follows:—

"The 'New Grape Bug,' noticed in your issue of August 11, as having been sent you from Pennsylvania and Ohio, I presume is the BROWN COLASPIS, *Colaspis brunnea*, as named by Fabricius—an oval, drab-colored beetle, about twice as long as broad, and nearly two-tenths of an inch in length, having the outer under edges of its wing-covers black, and also the underside of its body and the tips of its antennæ. It pertains to the *Chrysomela* family, and is thus akin to the small flea-beetles which are such pests in our gardens, upon cabbages, etc. It is a rather common insect throughout the United States, appearing here in New York each year the latter part of June, and continuing through the month of July. I have heretofore noticed it as being most common upon the wild grape vines and the Cinquefoil or Potentilla, but it has also occurred on several other plants, and on sweeping the grass in our meadows in July, some of the beetles are almost always found among the other insects gathered in the net.

"This year, from the information I have received and the inquiries sent to me, it appears that all over the Northern and Middle States, in particular localities if not universally, this insect has fallen upon the cultivated grape vines in such numbers as to completely riddle the leaves with holes. It has now disappeared for the season, but we shall watch with much anxiety for its reappearance upon the vines the beginning of July next year. Probably, as you suggest, our best remedy will be to sprinkle the leaves with hellebore, or perhaps with soot, pulverized aloes, wood ashes, or some similar application that will render them distasteful or poisonous to these insects, and drive them back again to their wild vegetation on which they have heretofore subsisted, and thus save our cultivated grapes from the serious injury they are now threatening them."

WEEDING POTATOES WITH SHEEP.

It may not be known to farmers in general that it is a common practice in some of the extensive potato-growing districts to turn flocks of sheep into the potato fields for the purpose of eating down the weeds. The sheep will not touch a potato vine; they cannot be starved into eating them. This pasturing with sheep is very advantageous when the crop is a late planted one, so that the hoeing cannot be completed until after the haying or harvest is finished. At this growing season it is the planter's aim to keep down the grass and weeds so that they may be covered with dirt by the cultivator and hoe, when these are used. Pasturing with sheep will attain this object. Early planted crops, the cultivation of which is completed in the first half of summer, frequently become grassy and weedy before the time of digging—when the size of the tops precludes cultivation. In this stage the sheep are economical weeders. It is hardly necessary to mention that the food thus given to the sheep makes a double profit, inasmuch as it costs absolutely nothing, while labor is saved and weeds prevented from seeding in the crop.—*Rural.*

DWARF APPLE TREES.

The culture of dwarf apple trees (*i. e.*, worked on the paradise stock) is yet very limited in our country, and it is only within a few years that they have attracted any attention; but as they become better known, and their real value appreciated, they will, we are sure, be considered as indispensable as the pear. They are less particular as to the soil than the pear, grow quite as readily, occupy but little more space than a currant bush, and bear three to six dozen large and beautiful fruit each. Beside this, they are so completely within the control of the cultivator, that if the canker worm attacks the trees, they can easily be destroyed by the application of whale-oil soap. Now that this pest is so destructive to the orchard trees, the apples supply their place, and the same ground, covered with a dozen or two trees, will produce nearly the same quantity as a standard, and much larger and more beautiful fruit.—*Hovey's Magazine.*

MIXING POTATOES.

We met with a farmer last week, whom we know to be very successful in his agricultural operations, but who has some notions of his own about farming. Among other things, he said that he always gets a better crop of potatoes when he mixes together several kinds. He says that if you take the several kinds and plant them separately on the same piece, and then plant another similar with them mixed, the latter will be a larger crop than the former. The idea was new to us. Can any of our potato-raisers tell us about it? We thought it at first only a whim, but as he always has good crops, we did not like to let him off without an investigation. What think *you*, brother farmers?—*Maine Farmer.*

Scientific.

NATIONAL ACADEMY OF SCIENCES.

(*Continued.*)

ORIGIN OF SOLAR HEAT.

The next paper was "On the Origin of the Solar Heat," by Prof. Peirce. He spoke of the various theories framed to account for the maintenance of the sun's heat. A ball of carbon of that size would burn itself out in about 5000 years; a ball of molten iron would cool down in not far from the same time. We had no knowledge of any substance which by its combustion could produce for any geological period the heating effect which the sun produces. A very current recent theory accounts for the undiminished supply by the constant fall of meteors into the sun, producing heat by their impact and loss of motion. To a refutation of this theory Prof. Peirce devoted the bulk of his paper. The various considerations which he offered against it, drawn from the gradual increase of the sun's mass, and its effect on the motions of the planets, and so on, were in great part of too technical and detailed a character to be reported; but his final *reductio ad absurdum*, which dismissed the theory with a laugh, was to the effect that the conditions of the meteoric hypothesis were such that if the sun's heat was actually thus kept up, the earth must also derive an equal amount of heat directly from the impact of its share of the meteors upon it; it must get from the meteors just as much as from the sun. He did not attempt a satisfactory explanation of his own, but rather suggested than argued, at the end, that condensation would answer the purpose; if the sun had been originally of the diameter of Mercury's orbit, it would, by contracting, have given off its present heat for 30,000,000 of years; and, being still only a quarter as solid as the earth, it might go on to contract and give off the same heat for as much longer.

Prof. Frazer, by questions, brought out some interesting statements as to the velocity of meteors, and comets which were considered to be larger meteors.

Prof. Stephen Alexander expressed his gratification with the paper and with the overthrow of the meteor theory, and brought out from Prof. Peirce further explanations of his views.

VARIOUS PAPERS.

Prof. Whitney, of Yale College, read the first paper on "Grounds of Analogy between Linguistic Science and the Physical Sciences." He reviewed briefly the considerations which prove the study of languages to be a moral rather than a physical science. Yet linguistic science has many striking analogies with the physical sciences, especially in its method in collecting and observing facts, and drawing from them each of the uses, principles and laws of speech. Speech is a conscious act, but, as a system, the usages of speech are wholly unconscious. Language is not a mere human invention, but a development wrought by the changing needs and advancing knowledge of the races of men. A prolonged and lively discussion followed the reading of this paper, in which the effort was to make out that linguistic science has a physical department. Prof. Whitney agreed that sound is a physical product, but the science which is devoted to thought-bearing sound is not a physical science. Language is a growth which is historical.

The next paper was by Prof. Agassiz, on the "Limitation of Homologies," in which he showed the entire difference of structure between vertebrates, articulates, mollusks, and radiates. He argued from it against Prof. Dana's principle of cephalization. In the absence of Prof. Dana, he did not discuss the bearings of his views at any length. Prof. Gibbs, of Harvard College, read a paper on a new method of optical analysis, which he thought would be of great value when fully developed. Mr. Henry Mitchell then read a paper on recent soundings in the Gulf Stream, giving the mode and results of work near Southern Florida and Cuba, in which he had been engaged. Some discussion on his statistics followed, and also questions. J. E. Oliver then read a mathematical paper on repeated linear substitutions, which was warmly praised by Prof. Peirce, who considered it a great forward step in mathematics.

The Hon. Samuel B. Ruggles, of New York, was then invited to sit with the Academy, and present any papers he might have to offer. He came forward, and spoke at some length of the success of the efforts of the Academy, and others, to introduce the metric system of weights and measures, and especially of the five cent coin, which is five grammes in weight and one-fiftieth of a meter in breadth. The cube of the breadth of five of these coins is a liter. He urged the Academy to continue its efforts, and spoke of the desirability of a uniform coinage for the world, and the prospects of realizing such a good thing.

ECONOMIC APPLICATION OF SOUND.

Prof. Henry, of the Smithsonian Institute, then offered a paper "On Sound in its Economic Applications." He gave an account of the organization of the Lighthouse Board of this country. This Board consists of two officers of the army, two of the navy, and two civilians of high scientific attainment. Three members of this Academy are on the Board. He spoke of the committees on lighting, experiments, etc. Being a member of the committee on experiments, he gave an account of some which had been made at the lighthouse near New Haven, with a view to selecting the best means of using sound for giving warning to ships. They had tried steam whistles, fog-bells, etc. A steam-whistle which had been presented made a very great sound, which was said to have been heard at the distance of thirty miles. The instrument they found best adapted to their purposes was a fog-trumpet, which gave the most sound in proportion to power, in the best way. Prof. Henry stated, as the most surprising fact observed, that the sound was found to reach to the greatest distance in a direction at right angles to the course of the wind, instead of in the direction of the wind, as would naturally be supposed. He thought at first that he must be mistaken, but on finding something similar in a French scientific magazine, he conconstructed an instrument by which he verified his previous observations. His experiments were still very incomplete, but he hoped with his instrument to work out some valuable results. Prof. Henry added a remark as to automatic machines offered to the Board. None had been adopted except one invented by Col. Bache, of the army, by which the waves dashing into the lower end of a hole in the rock made a trumpet sound at the upper end by the column of air driven up. He asked for any suggestions the Academy might have to offer that would be of use to the Board.

The subjects of interrupted sound, and change, and variety of pitch, were brought up, as also the question whether sounds of different pitch traveled at different rates of speed.

THE FISHES OF THE AMAZON.

Prof. Agassiz next spoke "On the Geographical Distribution of the Fishes in the Waters of the Amazon." He found, when he went there, that about 150 species had been described. We have trustworthy information that the greatest number seen was not over 230. Now he himself had collected specimens of over 1800 species, and he was convinced that the whole number of species was at least 3000. He spoke of the facilities extended by the Government of Brazil, the Amazonian Steamship Company, and by every one whom he met, without which he could have accomplished little. Even the fishermen were ordered by the Mayors or Presidents of the provinces to go fishing for him. Often five or six boats would be about his ship, bringing fish which had been speared, shot with arrows, caught in nets or with hooks, or poisoned. He thought, therefore, that such a collection of fishes as he had brought home would not soon be seen again. The Emperor of Brazil, returning from the army on the Paraguay, sent for him to talk with him of the Amazon. Imagine his delight at finding the table covered with dishes filled with the fishes of the Uraguay, which the Emperor himself had gathered, and which he then gave him for comparison. He believed he was not wrong in saying that the basin of the Amazon is the largest fresh-water basin in the world. It flows through a country of 3000 miles long, with a fall of only 250 feet. As a result of this, the time of filling up of the Upper Amazon is six months earlier than that of the mouth. The tributaries on the south side supply it most in December, while those on the north take their turn in June. This is the economy of power in this grand river, by which its rise and fall are very much counteracted. Many of these rivers are tinged with some solution, which he thought to be vegetable, and which had a blackish color. Those, however, which took their rise in tropical forests were clear. The Amazon is so white in color that when the Rio Negro pours in its black tide it does not change the Amazon. The white rather overlies the black, or the two colors flow side by side for many miles. The average temperature of all these rivers is twenty-seven degrees centigrade, and the range only five degrees centigrade. It would be hard to find a basin of such equable temperature. The known fishes of the Amazon are more than the known fishes of the Atlantic, while, he might add, the number of aquatic birds is amazing. He then spoke of the characteristics of our fishes and those of the Amazonian fishes in comparison. The most characteristic class is that of the goniodouks, which corresponds to our hornpouts, but much more nearly to our sturgeons. There is a kind of sturgeon in the Mississippi River which is very closely allied to them. It is a family of tropical distribution. It may be said, Is it not possible that these fishes migrate? so that nothing could be inferred from their presence in certain localities only. He had foreseen this difficulty and had divided his party, making collections on different parts of the river for many months at the same time; so that he felt that his conclusions were not based on insufficient knowledge. Another family, which is quite numerous, is that of the Siluroids. He knew of no lake or small river in this country which furnished more than 62 species. But in a very small lake in Brazil he obtained 300 species, and from larger lakes and rivers he procured still larger numbers. The next family is that of the Chromids. It is almost exclusively South American, with a few species in Africa. He believed the number of these known to exist in the Amazon was 11. He himself had added 19. Where the boundaries of transition in geographical distribution of these fishes were, and what were the causes of this distribution, he could not say. He had spread his assistants about so that he was sure of the fact, but he could not yet go beyond it. Every prominent type of the ocean had its type among these same Chromids. He might speak of the habits of these fishes. Many species carry their eggs in the sides of the mouth, like food, or tobacco, if you please; others bury them in holes. There are others in which the eggs become attached to the lower part of the abdomen; others sit upon their eggs like a bird, one class covering them with the mouth; the aerated water thus helps to hatch them. Another family is the Cararids, corresponding to our minnows and herring. But there are some kind of fish which range all along the Amazon and its tributaries. We cannot tell why they should have a general distribution any more than we can at present explain the local distribution of the others. He spoke of the occurrence of skates, of eels, of swordfish, etc. He finally spent three weeks at the mouth of the Amazon, receiving every facility from the President of the province of Para to see what fishes went into the ocean from the river, or the other way. He did not know a single codfish-like fish on the coasts of Brazil, nor anything like the sculpins. He added that the artist of his expedition had prepared paintings of 800 fresh-water fishes, and of 300 species from the ocean. If Prof. Henry could let him fill ten volumes of the Smithsonian publications, he had the material wherewith to do it.

Prof. Henry spoke of the great value to science of Prof. Agassiz's explorations, of the facilities afforded by the authorities of Brazil, and of the duty of the Academy to take action showing its appreciation of and gratitude for their kindness. Prof. Peirce paid a tribute to Prof. Agassiz's modesty, personal influence, worth, and scientific character.

(*To be Continued.*)

Miscellaneous.

Insurance Companies.