RESULTS OF PRACTICAL SCHOOLING.

Of all schools the most prolific has been the school of difficulty. Smiles, in his admirable work on "Self Help," says:—"Some of the best workmen have had the most indifferent tools to work with. But it is not tools that make the workmen, but the trained skill and perseverance of the man himself. Indeed it is proverbial that a bad workman never yet had a good tool. Some one asked Opie by what wonderful process he mixed his colors. 'I mix them with my brains, sir,' was his reply. It is the same with every workman who would excel. Ferguson made marvelous things—such as his wooden clock that accurately measured the hours—by means of a common penknife, a tool in everybody's hand; but then everybody is not a Ferguson. An eminent foreign *savant* once called upon Dr. Wollaston, and requested to be shown over his laboratories, in which science had been enriched by so many important discoveries, when the doctor took him into a little study, and pointing to an old tea-tray on the table, containing a few watch-glasses, test-papers, a small balance, and a blow-pipe, said, 'That is all the laboratory that I have!' Stothard learned the art of combining colors by closely studying butterflies' wings; he would often say that no one knew what he owed to these tiny insects. A burnt stick and a barn-door often served Wilkie in lieu of pencil and canvas. Bewick first practiced drawing on the cottage walls of his native village, which he covered with his sketches in chalk; and Benjamin West made his first brushes out of a cat's tail. Ferguson laid himself down in the field at night in a blanket, and made a map of the heavenly bodies by means of a thread with small beads on it stretched between his eye and the stars. Franklin first robbed the thunder-cloud of its lightning by means of a kite made with two cross sticks and a silk hankerchief. Watt made his first model of the condensing steam engine out of an old anatomist's syringe, used to inject the arteries previous to dissection. Gifford, when a cobbler's apprentice, worked his first problem in mathematics upon small scraps of leather, which he beat smooth for the purpose, whilst Rittenhouse, the astronomer, first calculated eclipses on his plow-handle. In like manner Professor Faraday (Sir Humphrey Davy's scientific successor) made his first experiments in electricity by means of an old bottle, while he was still a working bookbinder. And it is a curious fact that Faraday was first attracted to the study of chemistry by hearing one of Sir Humphrey Davy's lectures on that subject at the Royal Institution. A gentleman, who was a member, calling one day at the shop where Faraday was employed in binding books, found him poring over the article 'Electricity' in an encyclopædia placed in his hands to bind. The gentleman having made inquiries, found he was curious about such subjects, and gave him an order of admission to the Royal Institution, where he attended a course of four lectures delivered by Sir Humphrey. He took notes of the lectures, which he showed to the lecturer, who acknowledged their scientific accuracy, and was surprised when informed of the humble position of the reporter. Faraday then expressed his desire to devote himself to the prosecution of chemical studies, from which Sir Humphrey at first endeavored to dissuade him; but the young man persisting, he was at length taken into the Royal Institution as an assistant; and eventually the mantle of the brilliant apothecary's boy fell upon the worthy shoulders of the equally brilliant bookbinder's apprentice."

COPPER MINES AND MINING IN ARIZONA.

The St. Louis *Republican* says:—In conversation with a gentleman who has just arrived here by the overland mail from Arizona, we have learned some gratifying particulars in regard to the copper mines and copper mining in that interesting territory.

There are on the waters of the Rio Mimbres, one of the principal streams there, four mines, some of which are known and others are believed to be very productive. One of them, the Santa Rita, has been worked now a little over twelve months, and at this time yields two tuns of metal a day. The means of smelting are not very complete, but the ease with which the copper is extracted is remarkable. The metal is of an excellent quality, superior to the Lake Superior, and comparing well with the best Russian. The veins of ore are numerous, and yield about 25 per cent of copper. This mine is owned by some Mexican proprietors. The Hanover mine has been worked rather less than a year. It shows a vein which, at twelve feet from the surface, is fifteen feet thick. This ore is very rich, yielding over 30 per cent. The daily make is one tun and a half. This mine is owned by Messrs. Hinckle & Thibault. The two others mentioned are very recent discoveries, but promise very well. In fact there is no doubt among the best informed in Arizona that copper mines of great richness and fine quality abound there, and that Arizona is destined to be as noted for its products of copper as for those of silver.

There is a good growth of timber on the Rio Mimbres; and no deficiency in the mining localities mentioned of either wood or water.

All that has ever been claimed for Arizona as a depository of mineral we lth seems on the point of being confirmed in full. The silver mines are yielding well, and recently a tin mine has been discovered.

[If the above-mentioned tin mine is rich in the metal, we look upon its discovery as far more important than the mines of cither silver or copper. At present we are entirely dependent upon imported tin, while we export copper, gold and silver.—EDS.

CAST-IRON WATER TOWER AT LYONS.—A new iron tower has been erected at Lyons, France, on the hill of La Croix-Rousse, and it is designed to raise the waters of the Rhone to a height of 490 feet, for subsequent distribution on the high grounds of Fourvieres, St. Just, St. Irenee, Oullins, and Ecully. The volume thus raised amounts to from 540,000 to 660,000 gallons every 24 hours. The total weight of the structure is about 110 tuns. The tower consists of a center column, 2 feet 3 inches diameter, of hollow cast iron, around which are arranged in the form of a hexagon six smaller columns of about 9 inches diameter, braced and tied together with wrought-iron connecting-rods. On the the top of these columns is fixed a tank of wrought-iron, 11 feet 6 inches wide by 10 feet deep, h v'ng ascending and descending pipes of cast iron, 12 inches diameter. Beneath this tank is an open gallery, to which access is gained by a cast-iron spiral staircase w'nding round the center shaft. The height to the gallery floor is 180 feet, and the total height to the top of the tank is 199 feet. We may observe, in addition, that this tower only forms a small detail of the great works of water supply lately executed. These consist of:—1. A filtering apparatus, capable of filtering 5,500,000 of gallons per twenty-hours. 2. Three Cornish pumping-eng nes, of 170 horses' power each. 3. 98,370 yards of pipes' rang'ng from 3 inches to 3 feet diameter. 4. 21,860 yards (lineal) of sewers. 5. A system of supply at high pressure to the third story, in two services—low service and high service. 6. Monumental fountains, hydrants, street cocks, &c. The whole of this vast system of distribution cost $18,000,000; and, excepting some details, such as the tower we have been describing, was completed in the short space of three years.

THE WORK OF THE SPINNING JENNY.—A century ago the value of all cotton goods manufactured in England was estimated at £200,000; and when the spinning jenny was invented in 1767, by Hargreaves a carpenter, the yearly exports of cotton fabrics did not exceed that sum. In 1858 the total value of the cotton manufactures exported, including twist and yarn, amounted to 43 millions of pounds sterling. A century back the total value of the textile fabrics exported from the United Kingdom did not amount to 5 millions; whilst the value of such fabrics exported in 1858 exceeded 69 millions. At the beginning of the present century the quantity of raw cotton imported into England was 50 millions pounds weight. The quantity imported had increased in 1850 to 668 millions, and in 1858 to a thousand millions of pounds weight, of which the value exceeded 30 millions of pounds sterling.

LOOK OUT FOR FIRE!—There are few more terrible deaths than fire, yet it is extraordinary how little care is taken to prevent accidents. Many lives and dwellings might be saved from destruction by properly guarding the grates. Indeed, with the present fashion of ladies' dresses, in apartments of moderate size, this care is really necessary; for we fear that it will be long before fire-proof fabrics are brought into general use. We have adopted in our dwelling a brass fire screen, made so as to fit around the grate and cover the whole fireplace; thus this fierce element is in a manner caged.

BLANCHING CELERY WITH SAWDUST.—Having had some trouble in the winter of 1857 in keeping late celery from rotting in a new kitchen garden, where the soil was very retentive and damp, and the plants earthed up in the usual manner, I have since used sawdust for the purpose, and find that it answers perfectly. Last winter all the late celery here was earthed up with sawdust, and it kept quite sound till April, and no slugs or insects attacked it underground; the heads being very solid, clear, and crisp, and well flavored. I had some doubts that the sawdust from resinous trees might give the celery a disagreable flavor, but on trial I found that not to be the case, and the sawdust is now taken indiscriminately from the sawpits, where different kinds of trees are sawn up. Before the late severe frost occurred in October, I had just finished the earthing-up of all the late celery with sawdust, and I find it now wonderfully fresh, the frost not having penetrated far through the surface of the hearts. The practice of using sawdust may be new to some, yet I often hear of the difficulty of keeping late celery from rotting in winter, and the more extended use of sawdust may be of advantage to other g rdeners who, like myself, have stiff and damp soils to manage.—*Correspondent of the London Gardeners' Chronicle.*

PEACH TREES FOR FIREWOOD.—It seems a monstrous proposition to grow peach trees for firewood, yet the California *Farmer* maintains that it will "pay" to the grower; and, if so, that is enough. The above paper says:—

"Firewood is a heavy tax, and the value and price will increase for years unless we have railro ds to the mountains and woodlands, that we may have access to them. We have several times reverted to the value of the peach tree as firewood, and we sk a serious attention to what will be found true, that there is no tree that can be planted so cheaply, or that will grow so quickly, as the peach, and while it is maturing for firewood, the fruit will pay for the labor three or four times. A thousand acres can be planted on some land of little value, say a sandy, gravelly highland. The peach-pits can be pl nted in furrows made with a plow in straight lines, sixteen feet apart, and covered with the plow again. The fruit that falls the swine can eat, and nothing is better for a swine-pasture than a large peach-orchard. The good fruit can be gathered, cut and dried, and shipped abroad with profit. In six or eight or ten years the trees will have reached a size fit for firewood, and there is no wood grown on the earth that is superior to it. Whoever wishes to make his 'pile,' can do so with a little expenditure, for this will be done by somebody."

MANAGING AND FEEDING WORKING OXEN.—Oxen working on a stone-drag, on the foot of a plow, on the sled tongue, cart spire, or twitching stones or timber, should carry their heads up, as this enables them to do this work much easier: those that work as leaders, forward of other oxen, should carry their heads low, and have the yoke the right length, let the bows suit the neck; the yoke and bows to the leaders should set a little snugger than the nib oxen. Never use the whip but from necessity. When about to strike the young steer or ox, ask yourself, "Will he know what I strike him for?" Let each ox have a name, and be sure he knows his name. Never speak a word to an ox without meaning; have a particular word to start your team by, that all may pull together. Never hurry your team while riding behind them, lest they learn to haul apart. Oxen should be shod with a broad shoe, to travel on hard roads; the shoe on the fore-foot should set back at the heel, nearly half an inch further than the hoof bears upon it. Oxen are frequently lamed by reason of short shoes. The best feed for oxen at hard work, is to give to each two quarts of meal, wet mixed with good chopped hay, three times a day, and as much hay as he will eat; this is the highest feed working oxen ought to have, and on this they will work every day.—*Yankee Farmer.*

LATENT LIGHT.—At the last meeting of the British Scientific Association, Sir D. Brewster exhibited a piece of chalcedony, within which a minute landscape could be seen. If kept in total darkness for four hours, this marvelous picture vanished, but re-appeared as vivid as ever on ten minutes exposure to the sunlight; proving that not only could a design be mysteriously insinuated into the interior of the mineral, but that light could be stored up therein and produced at will. It was surmised that this effect had been produced by the action of nitrate of silver.