eloquent Bishop of Orleans, preaching in behalf of the distressed workmen of Rouen, contented himself with saying: "This is no time for long sermons, but for good works. You are all acquainted with the calamity of those whose cause I have come this day to plead. Once upon a time a king, whose name is still cherished by us, said to his companions in-arms, on whom he thought with reason he could rely: "My good friends, I am your king; you are Frenchmen. Yonder is the enemy; let us march!" I will not address you in other words to-day than these. I am your bishop; you are Christians. Yonder are, not our enemies, but our brethren who suffer. Let us flee to their succour!" The result was the collection of more than six hundred pounds.

Edwin, a once popular English actor, is credited with the authorship of one of the briefest of sermons, his text being: "Man is born to trouble as the sparks fly upwards." —"I shall consider this discourse under three heads. First, man's ingress into the world; secondly, man's progress through the world; thirdly, man's egress out of the world; and

First—Man's ingress into the world is naked and bare.
Second—His progress through the world is trouble and care.
Lastly—His egress out of the world is nobody knows where.
If we do well here, we shall do well there;
I can tell you no more if I preach for a year.

The last time Judge Foster went the Oxford circuit he dismissed the grand jurymen to their work with: "Gentlemen—The weather is extremely hot; I am very old, and you are well acquainted with your duty—practise it!" Equally curt, if not quite so courteous, was the Irish judge, who, after two of his brethren had delivered opposite judgments at great length, said: "It's now my turn to declare my view of the case, and fortunately I cannot but be brief. I agree with my brother J——, from the irresistible force of my brother B——'s arguments." In an action for slander, Justice Cresswell put the case to the jury on the emphatic words: "Gentlemen—The defendant's a foul-mouthed fellow. What damages?"—an example of judicial brevity only to be matched by Baron Alderson's address to a convicted prisoner who prayed that God might strike him dead where he stood if he were not innocent. After a moment's silence, the judge sternly and coldly said: "Prisoner at the bar, as Providence has not interposed in behalf of society, the sentence of the court is, that you be transported for the term of 20 years." An American judge once intervened in an odd way to prevent a waste of words. He was sitting in chambers, and seeing, from the pile of papers in the lawyer's hands, that the case was likely to be hardly contested, he asked: "What is the amount in question?" "Two dollars," said the plaintiff's council. "I'll pay it," said the judge, handing over the money; "call the next case." He had not the patience of taciturn Sir William Grant, who, after listening for a couple of days to the construction of an act, quietly observed when they had done: "The act is repealed."

ON THE CONSTRUCTION OF MATERIALS.

The products of art are nothing more nor less than connections of materials—as well the steam engine as the watch—the suspension bridge as the oil painting, are all the result of well deliberated connections of different things, whose co-operation causes the effect proposed. Every technicist, every mechanic, according to his skill and experience understands more or less the required combination of those articles especially belonging to his trade. The carpenter calculates whether he has to glue, to nail, or to screw together; the machinist and blacksmith know respectively according to circumstances when they have to screw or solder, and to rivet or weld. We mechanics would not need all the above mentioned different methods of connecting materials if the troublesome air would not compel us to use them. The atmosphere consists essentially of oxygen and nitrogen, which stand in the proportion of one to four(1:4). We know the process of burning, and know further that burning is merely a combination of the substance with the oxygen of the atmosphere. Mostly all substances are constantly burning, but the flames are not always visible—the burning is very slow. The rottening of wood and other organic matter, the rusting of metals, the fading of colors, the tarnishing of glass—which has been exposed to the atmosphere for a long time—are all caused by the slow, continuous burning of those materials.

As chemistry is an ancient science, and at a former period all strange substances were called by Latin or Greek names, the chemists invented the word, *oxygenium*, which signifies "air of life," and in chemistry as well as in medicine, the very same substance, according to circumstances, may be either advantageous to another matter, or just the reverse, so oxygen not only causes the formation but also the destruction of most of the products of nature.

No metals, with the exception of the precious ones, (gold and silver,) ever show a chemically clean surface. I make the assertion, that none of the readers of the *Journal* ever saw a chemically clean surface of iron. As soon as the original surface of iron is removed, by filing, or in any other manner, so soon is the atmosphere ready to oxidize the clean surface. This oxidation is nothing else than a slow spontaneous combustion of the metal—a combination of it with the oxygen of the atmosphere—and this gradually progresses inwardedly. We are are able to render the oxidation slow by greasing, or by coating the articles with a substance which keeps the atmosphere from constantly operating upon them. But, nevertheless, the oil burns slowly and must repeatedly be applield anew. We iron workers have observed very often that finely polished pieces of engines, etc., which were oiled for the purpose of being stored away, began to look yellow and brownish after three or four weeks. This is the result of the oxidation of the oil, allowing the oxygen to penetrate to the iron, and causing a slight rusting of the metal at these places. Water being composed of equal parts of oxygen and hydrogen hastens oxidation. Hence a man would not cover his roof with sheet iron, the oxidation, commonly termed rust, would rapidly spread and eat in until the last atom of iron would be converted into rust. Zinc, copper, and the composition of both—brass, do not become destroyed as rapidly as iron and other metals. They become covered with a stratum of oxide—with a layer of rust—and this rust is a good preventive for keeping the metal disoxidized, or at least rusting but very slowly.

Experience has taught us that metal cohere if they come in contact with surfaces entirely free from oxide. By dipping a piece of pure gold into quicksilver it will be observed that after being taken out it seems to be converted into silver. Rubbing it will only effect a brighter silver-shine, the metals hold together firmly, and only by heating them can we destroy cohesion, in subtilizing the quicksilver; both metals met under the above condition—both had chemically clean surfaces. If you dip your gold ring into quicksilver, after having cleaned it of the always adhering grease, by means of boiling water or any acid, you will observe the cohesion of both metals. Many a person who handled a broken thermometer has had his gold ring converted into a "quasi" silver one; heating it gently will remove this and return it to its original color. As neither gold nor silver, on account of their extreme softness, are ever worked or circulated in their virgin state, without being alloyed with other metals, all attempts to make two rings cohere will prove useless. The tinning of copper is based on the same principle, both metals are brought in contact with surfaces entirely free from oxide. The copper is dipped in acid, taken out and immediately put in melted tin. After taking it out of the tin the desired result will be obtained. If we put an iron key into a solution of blue vitriol and allow it to remain for about five minutes, on taking it out the key will seem to be converted into copper. The iron has the property of separating the acid and the copper, the two ingredients blue vitriol consists of. The acid takes away the oxide of the key, and the copper will cohere to they key free from oxide, and form a coat.

The welding of iron and the soldering of metals is based on the very same principle. The iron is first heated to a good white heat, the state in which it is best adapted to oxidize; at this temperature the oxide is rendered almost liquid but not entirely so, by holding the pieces together and hammering on them the oxide becomes pressed out to some extent and a certain adherence is the result. but to render a good job of welding we must make the oxide so it can be very easily removed. To do this we use what is called a flux, which is in this case sand. This substance is melted in the white heat, and forms a chemical combination with the oxide, producing a very fluent liquid—which is chemially the same as bottle glass and is easy to squeeze out by hammering, allowing the real metal surfaces to come in contact, and as a matter of course to cohere, or weld.

To weld steel with iron or steel with steel, there must be a different flux used. The low temperature at which the welding is to be performed, on account of the danger of burning the steel, renders sand of no use, it would not melt at all. In this case borax is used. This salt melts at a low temperature, and absorbs the oxide of the steel, forming a chemical combination which is easily pressed out by hammering, on account of its fluency.

The soldering of metals depends on the same principle, viz.: that metals cohere if their surfaces, free of oxide, come in contact. The difference between welding and soldering is this. By welding, only two pieces are employed to be combined; but by soldering three are employed, one medium, the solder metal. There are two kinds of soldering, the hard and the soft. To solder hard the three metals must be made red hot, but the latter kind of solder requires only the solder to be hot. To solder pieces of iron together we operate as follows; We file the places of both pieces we want to have cohere, in order to clean those places as nearly as possible of the stratum of oxide, then we fasten both pieces in the manner we desire to have them, attach a piece of brass at the soldering place and surround this place with plenty of clay. Now we put the whole into a charcoal fire and increase the heat slowly until the flame is of a blue color. At this moment we stop blowing and keep the object for about a minute at that temperature. Then we take it out, lay it gently down, to have it cooled off. It must be expressely understood that the piece must be kept in the fire so that the brass will be above the place to be soldered. At a certain degree of heat (1,870° Fahr.) the brass melts, and as it is an alloy of copper and zinc, the latter will subtilize at the same moment and give a beautiful azure blue color to the flame. This indicates that the heat required is obtained, and to save the copper the heat must not be allowed to increase. Some of the melted copper runs down between the two pieces to be soldered and carries off the slight stratum of oxide. The melted matter following it, adheres to the cleaned surfaces, and after being cooled off causes the junction of the two pieces.

To solder steel the medium or solder metal must have the property of melting at a low degree and at common temperature, it must also have considerable hardness and flexibility. The best mediums for soldering steel are spelter and silver solder. The former is an alloy of equal parts of copper and zinc, the latter of 12 parts copper, 67 parts silver, and 21 parts calcimine. Both melt at a very low degree and are hard and tough at common temperature.

The soft soldering is done as follows: We take the two metals to be affixed and put some strong acid on the places to be soldered. For the so-called tin, which is iron coated with a compound of tin and antimony, we take with the best advantage muriatic acid; for copper, sulphuric acid; for brass, nitric acid. This removes the greasy substances and the oxide of the metal. Now we take a heated soldering iron, wipe it with a rag to remove the adhering ashes, then we rub the tip to salammoniac to remove the stratum of oxide, in order that the solder may adhere to it. The point of the soldering iron is made of copper, as this metal is easier cleaned of oxide than iron, and, as previously stated, is less affected by the oxygen of the atmosphere. The solder, pewter, is an alloy of tin and lead, and melts at a low degree, (370° Fahr.,) while it shows a great tenacity in common temperature. This melted solder is brought between the pieces we want to fasten together by means of the soldering iron, and finding both surfaces perfectly free of oxide, it will therefore adhere to them, and after being cooled off the desired result is obtained.—*Machinists and Blacksmiths' Journal.*

THE AIRLESS MOON.

Among the illusions swept away by modern science was the pleasant fancy that the moon was a habitable globe like the earth, its surface diversified with seas, lakes, continents and islands, and varied forms of vegitation. Theologians and *savants* gravely discussed the probabilities of its being inhabited by a race of sentient beings, with forms and faculties like our own, and even propounded schemes for opening communication with them, in case they existed. One of these was to construct on the broad highlands of Asia a series of geometrical figures on a scale so gigantic as to be visible from our planetary neighbor, on the supposition that the moon people would recognize the object, and immediately construct similar figures in reply! Extravagant and absurd as it may appear in the light of modern knowledge, the establishment of this Terrestial and Lunar Signal Service Bureau was treated as a feasible scheme, although practical difficulties, which so often keep men from making fools of themselves, stood in the way of actual experiment; but the discussion was kept up at intervals, until it was discovered that if there were people in the moon they must be able to live without breathing, eating or drinking. Then it ceased. There can be no life without air. Beautiful to the eye of the distant observer, the moon is a sepulchral orb—a world of death and silence. No vegetation clothes its vast plains of stony desolation, traversed by monstrous crevasses, broken by enormous peaks that rise like gigantic tombstones into space; no lovely forms of cloud float in the blackness of its sky. There daytime is only night lighted by a rayless sun. There is no rosy dawn in the morning, no twilight in the evening. The nights are pitch dark. In daytime the solar beams are lost against the jagged ridges, the sharp points of the rocks, or the steep sides of profound abysses; and the eye sees only grotesque shapes relieved against fantastic shadows black as ink, with none of that pleasant graduation and diffusion of light, none of the subtile blending of light and shadow, which make the charm of a terrestial landscape. A faint conception of the horrors of a lunar day may be formed from an illustration representing a landscape taken in the moon in the centre of the mountainous regions of Aristarchus. There is no color, nothing but dead white and black. The rocks reflect passively the light of the sun; the craters and abysses remain wrapped in shade, fantastic peaks rise like phantoms in their glacial cemetery; the stars appear like spots in the blackness of space. The moon is a dead world; she has no atmosphere.

INFLUENCE OF COLORED LIGHT ON INSECTS.

The discussion of the changes produced in animal and vegetable forms by the influence of varying conditions of temperature, moisture, light, locality, etc., especially as connected with the Darwinian hypothesis, has induced a great variety of experiments, from which some interesting results have been derived. In one of these experiments, lately published, a brood of caterpillars of the tortoise-shell butterfly of Europe was divided into three lots. One-third were placed in a photographic room lighted through orange-colored glass, one-third in a room lighted through blue glass, and the remainder kept in an ordinary cage in natural light. All were fed with their proper food, and the third lot developed into butterflies in the usual time. Those in the blue light were not healthy, a large number dying before changing; those raised in the orange, however, were nearly as healthy as the first-mentioned. The perfect insects reared in the blue light differed from the average form in being much smaller, the orange-brown colors lighter, and the yellow and orange running into each other, instead of remaining distinct. Those raised in the yellow light were also smaller, but the orange-brown was replaced by salmon-color; and the blue edges of the wings seen in the ordinary form were of a dull slate. If changes so great as these can be produced in the course of a single experiment, it is probable that a continuance of the same upon a succession of individuals will develope some striking results.

EXPLANATION OF THE RAINBOW.

The bow is seen when the back is turned toward the sun. Draw a straight line through the spectator's eye and the sun; the bow is always seen at the same angular distance from this line. This was the great difficulty. Why should the bow be always, and at all parts, forty-one degrees distant from this line? Taking a pen and calculating the track of every of every ray through a rain drop, Descartes found that at one particular angle the rays emerged from the drop almost parallel to each other, being thus enabled to preserve their intensity through long atmospheric distances; at all other angles the rays quitted the drop divergent, and through this divergence became practically lost to the eye. The particular angle he referred to was the foregoing angle of forty-one degrees, which observation had proved to be invariably that of the rainbow.

TRADES COMICALLY CONSIDERED.

A labor strike is said to be impending.

The carpenters say they don't get enough to pay their board.

Shoemakers, that it takes their awl to keep them at work, and their sole dependence is in their last job.

Painters complain that they have become literally hue-ers of wood.

Upholsterers complain that hangings have gone out of fashion.

Boiler-makers aver that Congress has kept the country in hot water to such a degree that they have no chance.

Blacksmiths complain that all the forging is done in Wall street, and they have no show.

Tailors say they mean to give their customers fits.

The hatters have kept ahead.

The gas-fitters will go in for light work.

Printers say they are tired, and can't "set up" any longer—that's what's the matter.

Bakers say they knead more, and don't like to see so many rich loafers.

Butchers complain of being asked to work at killing prices.

Candle-makers urge that wick-ed work ought to be well paid for.

Wheelwrights say that all the spokes-men in Congress voted more pay before retiring, and they expect to do as well as their fellows.

The paper-makers say their business is such that it brings them to rags.

DISEASES OF ARTISANS.

Gilders are subject to mercurial affections. They suffer from giddiness, asthma, and very frequently from partial paralysis, which often induces a peculiar kind of stammering. As might be supposed, they frequently suffer from unpleasant ulcers in the mouth, which is a true salivation.

Miners in the quicksilver mines suffer from vertigo, palsy and convulsions, and survive generally but a few months.

Pottery glaziers who use lead largely, suffer a condition very similar to that described above, with the addition of dropsy, loss of teeth and enlarged spleen. Palsy of the limbs, especially of the arms, is a common effect of poison from lead. Consumption is common among these workers.

Glass-blowers are the victims of those affections produced by sudden vicissitudes of temperature rheumatisms and various inflammations. Their eyes are weak, while they are generally thin and delicate.

Stonecutters inhale the sharp particles, which are apt to produce disease of the lungs.

Plasterers suffer from the gases disengaged and from excessive moisture. They suffer very much from labored breathing, have wan, pallid visages, and they digest badly.

Filers are short-lived. Whether the metal be brass or iron, the fine sharp particles make their way into the lungs, where they develop disease, sometimes asthma, sometimes consumption.

Workers in wool and cotton breathe a short, unchanged atmosphere, while their lungs are filled with the irritating dust of the material upon which they work.

All in door occupations, with the present imperfect notions about ventilation, are more or less mischievous. Out-door occupations—farming, gardening, and other similar employments—afford, with an intelligent comprehension of the food question, the best opportunity for health and long life. Driving a stage or express waggon, with frequent leaving for the delivery of packages, travelling through the country on foot as a book agent—these and similar employments are, perhaps, not inferior to farming and gardening.

FACTS IN PHYSICS.

Gold beaters, by hammering, reduce gold to leaves so thin that 283,000 must be laid on each other to produce the thickness of an inch. They are so thin that, if formed in a book, 1,500 would occupy the space of a single leaf of common paper.

A grain of blue vitrol, or carmine, will tinge a gallon of water, so that in every drop the color may be perceived; and a grain of musk will scent a room for twenty years.

A stone which on land requires the strength of two men to lift may be lifted in the water by one man.

An immense weight may be raised a short distance by tightening a dry rope between it and a support, and then wetting the rope. The moisture imbibed into the rope by capillary attraction causes it to become shorter.

A rod of iron which, when cold, will pass through a certain opening, when heated expands and becomes too thick to pass. Thus the tire, or rim of a coach wheel, when heated goes on loosely, and when cooled it pins the wheel most tightly.

One pint of water converted into steam, fills a space of nearly 2,000 pints, and raises the piston of a steam engine with a force of many thousand pounds—it may afterwards be condensed and re-appear as a pint of water.

Sound travels in water about four times quicker, and in solids from ten to twenty times quicker than in air.

THE PHILOSOPHY OF ACCURATE THOUGHT.

Too much stress cannot be laid upon the fundamental importance of perfect command over thought. How many a student finds a lack of this power the chief hindrance to progress! How many a page must be re-read, how many a lesson conned over and over to compensate for lapses of thought. In the possession or absence of this power over mind lies the chief difference between mental strength and mental weakness. Some men think as a child plays with a hammer, striking little blows here, there, anywhere, at any object within reach. The action of a strong mind may be compared to the stone-breaker's sledge hammer, dealing stubborn blows successively upon one spot till the hard rock cracks and yields. The power to classify and arrange ideas in a proper order is one that comes more or less slowly to even the best of minds. In proportion as the faculty is strengthened, desultory and wasted effort diminishes. When the mind acts it acts to some purpose, and can begin where it left off without going over the whole ground again to take up the threads of its ratiocinations. Concentration and system are thus seen to be the chief elements in the art of thinking. To cultivate the first, constant watchfulness to detect the least wandering, and the immediate exercise of the will to call back and hold the mind upon the subject under consideration, should be vigilantly exercised. To secure the latter, the practice of analyzing and constituting the different parts of a subject, first separately and then in their relations to each other, is a discipline to which every young mind should be subjected, and which, we are sorry to say, is much neglected in most methods of instruction.

SOLOMON'S TEMPLE AND THE PYRAMIDS.

If we regard, says a writer in the Edinburgh *Review*, not so much the evidence of the labor devoted to the work of the Temple as the effect produced on the mind by its apparent magnitude, we may suggest the following comparisons: The great length of the wall of the Sanctuary is rather more than double that of the great Pyramid. Its height, from the foundation of the rock on the south, and near the northern angles, was nearly a third of that of the Egyptian structure. If to this great height of one hundred and fifty-two feet of solid wall be added the descent of one hundred and fourteen feet to the bed of the Kedron, and the further elevation of one hundred and sixty feet attained by the pinnacle of the Temple porch, we have a total height of four hundred and twenty-six feet, which is only fifty-nine feet less than that of the great Pyramid. The area of the face of the eastern wall is more than double that of one side of the pyramid. Thus the magnitude of the noble Sanctuary of Jerusalem far exceeded that of any other temple in the world. Two amphitheatres of the size of the Coliseum would have stood within its Colossal girdle and left room to spare. The coliseum is said to have seated eighty-seven thousand spectators, and accomodated twenty-two thousand more in its arena and passages. For such a number to have been crammed within its circle, the space for each person must have been limited to seventeen by twenty inches. Allowing two cubits each way, or about four square cubits for each worshipper in the Temple, the Sanctuary would have contained thirty thousand; the Chel, excluding the Priests' Court, twenty thousand more, and there would yet have been room in the great court and the cloisters to make the total reach more than two hundred and ten thousand.