

For the Pearl.
ON METALS,CONSIDERED IN REGARD TO THEIR UTILITY,—DELIVERED
BEFORE THE HALIFAX MECHANICS' INSTITUTE.

By W. F. Teulon.

Throughout nature metals exist: they appear as the basis of the bones and shells of animals, and the ligneous trunks of vegetables:—but they nearly pervade the geological or mineralogical world; and although our humility is bespoken by a remark of Sir John Herschell "that our deepest mines have but scratched the earth's surface," yet even these indentations are to us important, and we owe them to the laudable ambition of our ancestors, to be acquainted with the mystic treasures of metals, which they rightly surmised were hidden there. Even the loved name *Britannia*, of our Mother Land, which ever vibrates on the vital chords of him who loves liberty, religion, the arts, and merited fame, is ascribable to such a passion, to such a source: and further, our own aboriginal population,—the early attention of the Roman Eagle,—our universal commerce, antitypical of that of ancient Tyre,—our many apices of national distinction,—and our present amiable position in the society of nations; are all traceable to the same primitive regard for the metals which the green sod of Britain, and her heaven-blest periphery of waters, environed.

A handful of gross dust is perhaps to the untaught observer the most contemptible of possessions. But to the chemist whose science "instructs him in the relations that affinity establishes between bodies,—to ascertain with precision the nature and constitution of the compounds it produces,—and to determine the laws by which its action is regulated," it appears an interesting microcosm,—a little world.

From this handful of dust subjected to the refining influence of fire, there will arise in succession, Hydrogen, Hydrazote, Iodine, Water, and Carbonic Acid; in the retained mass there lies concealed without lustre, apparently without worth, a series of metallic particles, which further urged, will surrender two metals Arsenium and Zinc, in fugacious forms, and a fulgent button of two others, Iron and Adamant, commonly known as Steel, which by the hand of the artizan may be further developed in the form of a spring for a Gold Repeater, to admonish some fair virgin of the rapid speed, and worth, of passing time; and be brought to realize more than its counterpoise of gold.

By a similar process we are informed that the ashes of the funeral pyre may be transmuted: and thus a much-loved, oft-remembered friend, become a splendid medallion, reclining upon the sympathetic heart of the fond survivor.

The fields spread before us by the hand of nature, are all delightful fields of enquiry: and it is equally a mistake to suppose that scientific interest is to be reaped only from the vast and sublime; or that things are intrinsically precious, and deserving of our esteem, just in proportion as they are small in quantity, and rare in occurrence. Contrary to this, and as a proof of the wisdom of design of the ineffable architect, the most precious products, are invariably the most common; and many of the broadest and most astounding of his laws of nature, may be demonstrated from the basest of her subsistences and manifestations.

We have cause to perceive and admire that utility is an attribute of matter universally. This is indeed perceived and acknowledged by all intelligent persons; and it is a principal source of the delight and emolument of man, that all things bend to his use and advantage;—that there exists nothing, which may not be drawn into a profitable subserviency to our permanent advantage.

Here, for instance, is an uncultivated spot; accompanied there with a forest, and here, with a river, trees may be barked and felled for tanning and building, houses may be reared, and plantations may be realized,—further, mills may be erected by the streams, and mines excavated. Now it is evident how in all these operations, the success of our industry depends upon the plasticity of our materials;—in other words, upon a common attribute of *utility* which they possess.

Now in the working of a coal mine a vast deal of rubbish will accumulate at the mouth of the shaft; this is named Pyrites, and is synthetically an impure sulphuret of iron; descending rains moisten the heaps, a decomposition of the water ensues; oxygen is attracted by the metal, and hydrogen by the sulphur, until combustion is effected. Now, a new order of affinities is established; oxygen unites with sulphur in the proportion of three to one, while more oxygen in the proportion of eight to one unites with hydrogen. The sulphuric Acid and water, thus formed, unite with the Protoxide of Iron, already accounted for, and produce sulphate of Iron, or green Vitriol. Nature's art, has thus placed at our disposal a valuable product, from a worthless stock. This salt may be subjected to distillation in dry retorts, and an abundance of sulphurous Acid, and Peroxide of Iron, (an excellent paint) obtained. But, observe further, the neighbouring rocks having for their base the metal named Magnesium, oxidized and combined with a feeble acid, is soluble in vinegar, that is acetic acid. Let it then be effected, and let this solution be mingled at a certain temperature with a solution of the former salt, and a compound elective affinity will instantly result. By this I

mean that the acid of each base, will go over to the base of the discrepant acid; and thus from the same materials, two new metallic salts will be formed: viz, Acetate of Iron, in the room of the Sulphate; and Sulphate of Magnesium, in the room of the Acetate. The former is a saleable product of great value to dyers and hat-makers for the production of black, and the latter is of extensive value to the public, being the beautiful and sanative Epsom Salts; which emanating from the site of Magna Charta, have proved themselves of similar public benefit; being perhaps the most generally advisable and safe, yet effectual aperient. Observe then how an uncultivated spot comprises manifold advantages, which we may reap; and which we owe equally to the prowess of industry, and the utile properties of matter, principally metallic. Nor need we wonder provided we admit, what is undoubtedly true, *that matter was made for the perception, administration and use of mind.*

Utility is an attribute of Metals considered aggregationally, or particularly. A due mixture of soils is required by the Agriculturist as essential to his success, but every particular species of earth, appears to owe its original to a particular metal, and the just analysis of a soil, an ore or a substratum, must have constant reference to a knowledge of metals, their propensities and their results. But to enumerate in but a catalogical brevity, the utilities of the particular metals, even those anciently and commonly known, would be greatly to overpass the limits of a Lecture, and also of your convenience. Even to dwell at some length on the utilities of Iron and its invaluable binary alloy called Steel, though both important and legitimate, is, as it were, forbidden; because sufficiently such, to claim an entire lecture; but to invite your attention to the subject, and to induce you to traverse it at will, according as you enjoy leisure, and means, may for the present be considered the scope of this superficial performance.

Metal, is matter in perhaps its most discrete, tangible, extensible, and useful form. A sort of instinctive regard, in even the most savage mind, leads it to behold metal with a kind of veneration. And not without a reason of this kind it has been adopted, wherever to be had, as the pledge of commercial transaction, and the indicator of charitable affection. On money itself, and the reasons for its adoption, the state of a coinage, and its influence upon physical, political and moral society, much that would appear both scientific and interesting might be elicited, but this would be out of time and place at present. A mere glance at the department may, notwithstanding, be permitted as reminding us that the utilities of metals in the separate allotment are universally felt, and acknowledged.

A large number of our most attractive adjectives are applicable to metals:—and even to each particular metal, as a definition of its most useful characteristics. At every town we are met by appearances and forms all allied to usefulness arising from the extensive employment of metals in the various departments of life and business. In a number of instances we owe our safety to metal. That portion of society engaged in mines, has too often suffered a heart-rending catastrophe, through the firing of the combustible airs, which traversed their cavities. To prevent this dire consequence a scintillating light, gathered from a periphery of steel, and the collision of flints was employed; and much valuable life was thus saved. But the benevolent nature of the invention has been far transcended by the SAFETY LAMP of Sir Humphrey Davy's invention which owes its excellent properties to a wire gauze of Platinum which emits the light and sustains the heat while it confines the flame. The faithful magnetized Needle, the copper sheathing of our Men-of-War and Commerce, their anchors, and chain cables, frequently and admirably save, a multitude of the most interesting of our species from a briary grave; when the fury of contesting elements would render all hopeless without them. Our cannon and other arms have terminated long wars with triumph, and given liberty and peace to nations, as well as safety to the homes of our fathers. The rude assassin, and the daring robber, are sent away justly disappointed, and at the same time our wives and children are protected by the ingenious assemblage of springs, and bolts, and locks, and other ammunition of home and office; all which we could not enjoy but for the ample and efficient resource of metals.

In a conflagration we are awakened to activity by the Fire-Bell, ere the devouring element overtakes us; to restrain and repress it, through the effective power of engine; and at the worst, to find preserved amidst the ruins, our accounts, etc. deposited in the fire proof chest. The firing of a gun from the fort or the privateer, or the trumpet's call, prepares us to encounter the enemy,—and the metal conductor that surmounts the high tower, parries off harmlessly the descending lightning; preventing by one simple means, the demolition of our property and our persons. How many instances of a similar nature exist, proving that nearly all the advantages which we possess for safeguard and defence, beyond those of children, we are indebted for to metals, and the various operations of art, by which they are formed to our use.

Possibly it may be required that I should say something of the utilities of metals, in relation to our safety from disease; or rather its fatal issue; as dependent on the practice of medicine: but as metals cannot be introduced into the human system in their pristine state, but only as calces and salts (which I prefer to come under

consideration in a distinct Lecture,) it would exceed justice to expatiate here.

Nevertheless, as a proof of their utility in this department, I will venture the assertion. That if the physician was to eliminate all his materia derived from other sources, from the organic or inorganic world; all remedies drawn from animal and vegetable sources; he would yet, have in his possession an improvable fund; far from contemptible, because sufficient to answer most, and probably all his intentions;—to complete the various ends of the therapeutick art.

Besides, where this art manifestly fails as regards the efficiency of ingesta; what in the vast assemblage of immedicable cases shall we resort to if deprived of the utilities of metals!—of the galvanic trough, or electric catena?—of the bright and exact assemblage of chirurgical instruments, for the introduction, or removal of fluids, the excision of appendages that are abnormal or effete, and the exoneration of vital organs, of impacted volumes? By these and similar means, myriads of else incurables are rescued from prodacious diseases, and a precocious grave. In a number of instances we owe our elegance to metal. You have several proofs of this position before you; and you have but to enter the hall, the gilded saloon, the parour, or the drawing-room, to behold in innumerable attitudes, this dazzling form of matter, courting our admiration and applause. And elsewhere you may behold all the gorgeous, imposing, and chaste forms of architecture; ascending like the spirits of the deep, from the eternal fires of Carron and Colebrook-dale; from thousands of classic models ergiverstating to the eye, and claiming its approval; from the bronze pedestal of the sideboard Lamp, to the imperial column, the towering arch, and the magnificent bridge.

In a number of instances we owe our usefulness to metals. Every business, supposes tools, and of what are these formed? of what the rules, the squares, the callipers, the compasses, etc. of the artizan? of what the vessels of capacity, which washed by the lambent flame attract and communicate heat to the perfectionating fluid? Think of the punches and matrices of the type-founder, the variety of exact and impressive forms of the printer: the accurate gravers, and chisels, of the life emulant statuary and engraver, and say what could we do in this our day if deprived of the uses of metal. Consider in succession the various employments of men and insignia of office, from the scraper of the chimney-sweep, to the sceptre of the sovereign, and reflect how variously, how amply, how effectually, metals contribute to the common weal: the mean and the exalted utilities of society.

Now what is the use of this simple review, if not to show that we must understand this enquiry as deserving of our faculties; partly, because its domain is vast, partly, because it is interesting; and principally, because the fruit of the search may be the expansion of our faculties; the improvement of our resources; and the multiplication of our improvements.

To be continued.

DUCK SHOOTING.—*An Adventure.*—The scene of the adventure was on the low flat shores in Hampshire opposite the Isle of Wight; the hero of it a wild-fowl shooter:—"Mounted on his mud pattens, he was traversing one of these mud-land plains in quest of ducks; and being only intent on his game, he suddenly found the waters, which had been brought forward with uncommon rapidity by some peculiar circumstance of tide, had made an alarming progress around him. To whatever part he ran, he found himself completely invested by the tide; a thought struck him, as the only hope of safety; he retired to that part which was uncovered with water, and sticking the barrel of his gun, (which, for the purpose of shooting wild-fowl was very long), deep into the mud, he resolved to hold fast by it as a support against the waves, and to wait the ebbing of the tide. A common tide, he had reason to believe, would not in that place have reached above his middle, but this was a spring tide, and brought forward by a strong westerly wind. The water had reached him; it covered the ground on which he stood: it rippled over his feet; it gained his knees—his waist. Button after button was swallowed up, till at length it advanced over his very shoulders. With a palpitating heart he gave himself up for lost. Still, he held fast by his anchor: his eye was eagerly bent in search of some boat which might take its course that way, but none appeared. A solitary head, sometimes covered by a wave, was no object to be described from shore at the distance of half a league. Whilst he was making up his mind to the terrors of certain destruction, his attention was called to a new object! He thought he saw the uppermost button of his coat begin to appear. No mariner could behold a Cape at sea with greater transport than he did the uppermost button of his coat! But the fluctuation of the water was such, and the turn of the tide so slow, that it was yet some time before he durst venture to assure himself that the button was fairly above the level of the flood. At length, however, a second button appearing at intervals, his sensations may rather be conceived than described; and his joy gave him spirits and resolution to support his unobscured situation four or five hours longer, till the waters had fully retired."—*Gilpin's Forest Secrecy.*