

# WHY ARE NOT THE SCIENCES BETTER UNDERSTOOD?

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Under this head it is proposed to make a simple inquiry, which doubtless thousands can answer with quite as little trouble, as it is to propound the question. But though thousands can give a ready answer to the inquiry, yet there are millions who cannot, and therefore, it is to them that the question may more properly be put – “why the Sciences are not better understood?” That is a lamentable fact, that the phenomena of many of the simple and most practical things of life are not understood, no one will deny -- why this is the case is the question. It cannot be that there is not sufficient interest in these phenomena; because it is well known that the understanding of the laws which explain these things are more conducive to the happiness of mankind than all other knowledge put together. In fact, civilization could not progress without it, and though thousands and thousands are applying the laws every day, yet they do not know how they do it. Every woman and child is applying some one of the laws for their comfort every day of their lives, yet, how few are they of this great mass of persons, even if the adults be taken, that can explain the reason why they are warmer in a woollen blanket than in a cotton one of equal weight? – or why a man may go into an oven, dressed in a woollen cloak, and remain there long enough to broil a beef steak, without being injured, while in any other garment he would be roasted alive – or why a white hat is cooler than a black one – or why a rough stove, gives off more heat than a polished one – or a black stove more than a tin one. Now, that these are but few of the simple questions of well-known facts of every day occurrence, cannot be doubted; but, as simple as they are, and as easily as they could be answered by any child, if one directed to the subject, there are thousands who never for a moment give their attention to the subject. But these are not the only illustrations, because there are the several branches of science, equally as applicable to phenomena around us.

The subject of heat however is applied to such practical purposes, that it is singular that it should not be more understood -- and particularly the laws which would explain many of the phenomena of heat, experience almost every minute in the day. The apparent cold of iron, on taking hold of it, or heat of wood, is so well known, that it would be superfluous to mention it; were it not equally as apparent that a great majority of person do not know why

it is so. They know that it is so, because it gives them a painful sensation on a frosty morning to pick up an iron bar, while a piece of wood that has lain beside it, and is of the same temperature, is much warmer to handle. The simple fact of wrapping up a piece of ice in a woollen blanket to preserve it, is known to every porter in the country, yet how few can tell why it is that the blanket which is warmest in winter, will not melt ice in the summer, -- or why a black or blue blanket would melt the ice when one would preserve it.

These things are of so common an occurrence, that it would be natural to suppose every person would know them; yet it is far from being the case. This want of knowledge on these every day matters does not speak much for the information of those who are not in possession of it. The simple operation of a pump, which every boy has worked at many a time, is apparently one of the least understood. A majority of the young men, who are exceedingly well dressed, would be apt to say, "that a pump sucks the water up from the well" -- if asked for an explanation of the operation of pumping -- or if a similar enquiry were to be made to a young man of considerable accomplishments in a ball room, but engaged in the liquor trade, why it is that the syphon he uses to take liquors from a cask performs the operation, he would be very likely to say by suction, which certainly is one of the vulgar ways of exhausting a pipe of liquor, but nevertheless is far from being the true cause for that simple operation.

All have more or less used the "sucker," as it is usually termed by boys, in raising up bricks or other smooth substances, by means of a piece of wet leather patted down on it. This simple operation is as equally one of the known laws of pneumatics as that of the atmosphere rail-road; and the laws which govern one would explain that of the other.

The pressure of fifteen pounds to the square inch of the atmosphere, may easily be conceived to be an extraordinary amount of force to be applied. The pressure on the human body to a person not acquainted with the laws of pneumatics seems to be incredible. That there should be a pressure of about fifteen tons on the human body, makes a person of considerable good sense look a little credulous at the idea of his having to shoulder such a load as that every day; and he would very soon being to imagine that the burdens of this life were great indeed. But if in addition to this, he were told on that rainy day, when the "atmosphere was so heavy and thick," that two or three tons of atmospheric pressure were taken off his shoulders, he would be very likely to say, "Come -- come, Mr. Philosopher, that is putting it on, and taking it off rather too thick. What! on a rainy day the atmosphere lighter than on a bright sun-shining day? See here, sir, can you tell how many beans five blue beans make if shook up in a bag?" Now as ridiculous as all this appears, it nevertheless is true.

Many young persons have this impression on their mind, and unfortunately have such a particular desire to be accomplished gentlemen, to be familiar with the name of Signora Pico<sup>1</sup>, and others of the opera -- or the last new step in the Polka dance, and other amusements of the sort, that they would not know these simple every day things, because they are not fashionable.

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<sup>1</sup> Signora Pico was a popular singer of the time. Her concerts were "indeed a triumph; and the clorious voice and intense passion of this delightful artist never achieved more brilliant conquests," (*Morris's National Press, a Journal for Home*, 1846). Her "warm and impassioned style is daily finding (as we once predicted it would) fresh admirers," (*Home Journal*, 1847).

It would be idle to attempt to illustrate this subject as fully as it would permit, as it would occupy too much space. And the cases that have been cited are only such as are of such simple use, that it is much to be wondered at, that they cannot be as thoroughly explained by any young man, as can the tune of the last new opera, the steps in a quadrille, or the latest cut of the Imperial<sup>2</sup> or Moustache of some recently imported German or French Count. If this were the case, it would be a source of great credit to the young men generally; but unfortunately it cannot be done.

The love of some of the frivolities of the day, have more attractions than the useful sciences; whether it is that the name of science conveys to the mind of the young man the idea of something very abstruse, requiring minds like those of Bacon, Galileo, Newton and Franklin, to explore their mysteries, it is difficult to say; but it is very natural to suppose that something of this kind must deter them from the enquiry, or else they would make a venture to read such works as Brewster's Optics, Arnott's Physics, and hundreds of other volumes, which would not only be more valuable to them than reading that they could undertake, but would be equally as pleasing' for it is an absurdity to suppose that science has no pleasures, because all the phenomena in nature can be explained by her laws, and how much more gratifying it must be to any person to be able to explain the causes of these phenomena. Most truly, the satisfaction of being able to set a person right, who has stumbled into the error that ice is formed at the bottom of the river, and then rises up to the surface to be dovetailed together, would be more pleasing, as well as more to the credit of the person, than being able to correct a false step at a cotillion.

This error is not an imaginary case, but one of real occurrence, from a person who possesses as much good sense as the majority of young men, and occupies as respectable a position. But it is a case, and not unlike thousands to be met with every day; manifesting as much ignorance upon practicable subjects as to their laws as this. Not knowing these things, does not presuppose want of capacity to understand them; but a want of proper appreciation for their acquisition. In these cases mentioned there has been no attempt to select such as it is required that a person should be able to answer, because if that were the case he could easily learn by heart the usual modes of explaining their phenomena; but it has been to direct the attention to palpable cases of ignorance, not only of these things, but the application of the laws governing them. They should be known. The laws of mechanism, heat, hydraulics, hydrostatics and pneumatics, as well as of optics, and in fact all phenomena of nature, should be well understood as that of any species of learning known. Every person can appreciate this knowledge. There is a tangible form to it, by which, through life, it can be made available in more ways than one to promote happiness. While the same may not be

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<sup>2</sup> Imperials were a popular facial hairstyle and denoted a more manly man than someone without it. In a story titled "The Moustache and Imperial" by T.S. Arthur, one of the characters thinks: "Of his moustache and imperial she was particularly proud. They were long, black, soft and silky in appearance, and altogether more beautiful than the brown, red, or dirty looking, stiff, bristly things that gave to the face of many young bucks of her acquaintance a disgusting appearance, even in her partial eye," (*The Columbian Lady's and Gentleman's Magazine, Embracing Literature in Every Department*, 1844).

said of the advantages from reading the best of Scott's<sup>3</sup>, or other novels and romances that can be found. They may afford some pleasure to excite the mind, and leave pleasing recollections of such characters as Ivanhoe and Rebecca<sup>4</sup>; but they never can give as much pleasure as would be derived from the knowledge of these laws. Besides the pleasure of being able to explain these phenomena, it has the great advantage of leading to many useful inventions. On the subject of heat alone, there is a field enough yet to exhaust the mind of some half a dozen Davy's<sup>5</sup>, in applying it to the most advantage for manufacturing purposes, and that of warming houses. For it is a fact that there is double the quantity of fuel used in houses to warm them, that is required, owing to the simple circumstance of not knowing how to use it. Fuel generally is but half consumed, and even of that which is consumed, a great portion of it is lost, owing to the bad arrangement of radiation. Enquiries into this matter may be made by any one -- and though a Davy or a Farraday<sup>6</sup> might be able to discover the mode of economizing fuel sooner than a mere superficial reader of the subject, yet it does not follow that they may not turn the knowledge to good account, with a possibility of making an improvement on the mode of using fuel to generate steam, or for warming houses. In chemistry the application of its principles are so universal, that nothing is touched but governed by its laws. The bread that is partaken of at each meal, has to be made by as fixed laws of chemistry, as that of preparing gases -- or the boiling of potatoes by equally as well known chemical laws; yet of the millions who eat the bread and potatoes, if they were told that there was a science in boiling the potatoes, they would be likely to think it rather too "small potatoe"<sup>7</sup> a science, for them to condescend to learn its laws. It would not be genteel to know how a potatoe was boiled, or why it changed from a nasty hard vegetable, to a delicate bread-like substance, by simply putting it into boiling water. But though it might not be genteel, it would certainly be very creditable, and perhaps detract none the less from any person's claims to gentility to be in possession of such an amount of knowledge. In fact, the elementary principles of physics should be more thoroughly studied in the schools, and forced upon the mind of the child, that he may, on coming to maturity, feel more interest in the subject. As it is now, most young men have no inclination that way. The name of science has too much of the abstruse about it to attract the attention; and the extravagant notions of gentility, which the great mass of the young men in the city have, of

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<sup>3</sup> "Scott's" is a reference to Sir Walter Scott, who established the form of the historical novel and wrote *Ivanhoe* (*Encyclopedia Britannica Online*).

<sup>4</sup> Ivanhoe and Rebecca are two characters from Scott's novel *Ivanhoe*, a novel published in 1819 that is now one of Scott's most popular works, but was first criticized for its historical mistakes (*Encyclopedia Britannica Online*).

<sup>5</sup> This is a reference to Sir Humphry Davy, a Cornish chemist and inventor (Knight).

<sup>6</sup> Farraday was a popular university science lecturer. "The London Athenum of February 23, contains an interesting account of a lecture of Mr. Farraday, in which he describes Mr. Gurney's mode of obtaining a powerful light, by introducing oxygen into the center of the flame produced by the combustion of gas or oil," (*Army and Navy Chronicle*, 1839).

<sup>7</sup> The term "small potatoes" originated from the farmers of antebellum America who didn't want to bother with the smaller vegetables since they were typically not worth as much as the larger ones. The phrase is used here to say some people believed particular sciences were too insignificant to bother learning (*McGraw-Hill Dictionary of American Idioms and Phrasal Verbs*, 2002).

patronizing the operas and Pinteux<sup>8</sup> -- and the young and old and junior bachelor's balls<sup>9</sup>, or getting a red flannel shirt<sup>10</sup> on to run after an engine or hose cart, have become a serious evil to them. Their love of these amusements, without a proper cultivation of the mind, has had the tendency to lower very much the estimated intelligence among them; though in dress, and general appearance, they betray all the accomplishments of very learned gentlemen, and it is not until you put to them any of the simple questions of natural philosophy that it is discovered they are not what they appear to be, that all is not gold that glitters – and that a tailor has made the more pleasing part of them.



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<sup>8</sup> Pinteux was a popular venue for operas and entertainment. People would come to Pinteux for its musical talent showcased, saying “I have heard delightful singing at Pinteux’s,” (*Magazine for the Million*, 1844). “Pinteux Odeon” was mentioned in the midst of other venues people could go to for amusements, mainly musical entertainment (*Spirit of the Times; A Chronicle of the Turf, Agriculture, Field Sports, Literature and the Stage*, 1848).

<sup>9</sup> Bachelor balls, also referred to as B&S balls for bachelor and spinster balls, gained popularity in Australia. They would hold bachelor balls where young men and women could meet and socialize. The men and women were typically around 18 years of age and dressed up in formal wear (*Saturday Evening Post*, 1827).

<sup>10</sup> Red flannel shirts, along with black pants and suspenders, were a trademark of Old Honey Bee’s and became a traditional outfit in fire service in the 1840s (Legeros).

## *EDITOR'S NOTE*

This article primarily deals with the frustration of why the basic science behind everyday activities is not better understood by a wide variety of people. C.L. Barritt makes the case that young boys are too concerned with meeting young women and other people, such as older men and women, are too concerned with less intellectually stimulating and important subjects, such as literature. Focusing their attentions too much on these amusements is a detriment to the mind, according to Barritt, and is the main factor in making them dumber. He says, "While the same may not be said of the advantages from reading the best of Scott's, or other novels and romances that can be found. They may afford some pleasure to excite the mind, and leave pleasing recollections of such characters as *Ivanhoe* and *Rebecca*; but they never can give as much pleasure as would be derived from the knowledge of these laws." Here, he is saying that knowledge of scientific and tangible things is more pleasurable and beneficial than knowing these romantic stories and characters.

The state of science in antebellum America was undergoing a shift of importance. In the 1830s, schools for men started making science courses a component of the required studies and placed added emphasis on "sophisticated scientific apparatus," (Warner). Along with schools for men, female schools also started stressing the importance of the sciences. "The Albany Female Academy promoted the natural sciences as 'essential to a proper education,'" (Warner). One could speculate that the rises of these classes were in response to people who held similar views as Barritt and believed people needed to have more knowledge of the sciences.

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