

could make any use of it—finally they sold it for a trifle, and thus the case stood when the discovery of aniline produced a revolution in the whole business; and other inventions following upon its track have raised the price of coal tar so materially that the time appears to be near at hand when it would pay to make it as a direct product, and to regard the manufacture of gas as incidental.

The anthracene discovered by Dumas forty years ago has been entirely lost to view, and none but scientific men were aware of its existence, but in the light of modern research it appears likely to occupy the front rank of coal tar products, and to lay the foundation of an industry that is destined to work a revolution in the whole business of the manufacture of colors, and to restore vast provinces of the richest lands to the production of corn and grain.

At the meeting of the Lyceum of Natural History on Monday evening, Dr. Walz, a distinguished young chemist of New York, read a paper on the artificial preparation of alizarine from anthracene. He gave a history of the researches that preceded the important discovery, and in a lucid manner explained to the association the transformations that had to be made before success attended the labors of the chemists who had undertaken the research.

It will be remembered that a dispute in the French Academy as to the medical properties of the red oxide of mercury, and of the red precipitate led to an invitation being extended to Priestley to come to Paris to settle the difficulty, and he, in the course of investigation, made the important discovery of oxygen gas. In a perfectly analogous way, said Dr. Walz, have we attained our knowledge of alizarine and its artificial preparation.

Alizarine is the coloring matter of madder, and, since the time of its discovery in 1831, its true chemical composition and the proper formula to express its nature have been matters of controversy among chemists. It was while carrying on researches to settle this vexed question that the discovery was made of its possible preparation from anthracene, and thus a dispute about a chemical formula has led to one of the grandest and most important discoveries of our time.

Messrs. Graebe and Liebermann are the chemists who have patented the process for the artificial preparation of alizarine. They prepare dibromide and bichloride of anthracinone, and from this make the alizarine by the action of caustic alkalies. They have since found that sulphuric acid can be substituted for the bromine and chlorine.

Dr. Walz exhibited specimens of the new coloring matter as well of pieces of goods that had been dyed with it. The colors were in no way inferior to the best aniline pigments with the great advantage of being more permanent. The problem of the economical manufacture of alizarine has not been fully solved, but enough difficulties have been overcome to insure ultimate success. Thus one by one the old pigments prepared from vegetable sources have given way to the artificial colors of the synthetical chemist. Madder and indigo were the only two left, and now indigo is in undisputed, solitary possession of the field.

When the discovery of bleaching powders released thousands of acres of rich meadow land to the plow, and the culture of grain, and thus cheapened the price of clothing and of food, a great blessing was conferred upon mankind.

If all the anticipations in reference to the artificial production of alizarine are accomplished we may predict an equal advantage to be derived from this new industry.

According to a large number of experiments 100 tons of coal tar can furnish 0.63 ton of anthracene, or we can obtain a ton of anthracene by distilling 2,000 tons of oil—the amount of alizarine that can be made from a ton of anthracene has not been published nor is it easy to ascertain, but these figures will be supplied before the lapse of many months. The annual production of madder is estimated at 47,500 tons, and the price per ton is £45, which makes the cost, per annum, £2,137,500.

To divert an industry of this magnitude into new channels is one of the most momentous results of modern science, and one that can only be compared in importance to the revolution accomplished by the introduction of aniline colors.

#### CIVILIZATION VERSUS NATURE.

There are two sets of public teachers who are very fond of referring to nature in their discourse, the one in deprecation, the other in praise. They are the theologians and the quack doctors of medicine, who publish pamphlets for popular rather than professional circulation, the aim of which is to instruct people that some proprietary nostrum which they manufacture and vend is the great panacea for the physical ills of mankind.

The first class of teachers, whose pupils are many, chiefly discourse about the moral nature of man, which they mostly unite to condemn for its asserted total depravity. The second class, whose pupils we are sorry to say, are also numerous, discourse upon man's physical nature which they unite in praising, denouncing moreover any departures from nature as fatal to physical health, and a mistake, the consequences of which they are however very careful to tell us we may escape if we will only use a few bottles of their "Great Oriental Liver Arouser," or a dozen boxes, more or less, of their "Wonderful Health Preserving Purgative Pills."

The truth about our moral and physical nature probably lies between these extreme doctrines. Our moral nature is not so totally depraved that it not susceptible of some improvement, else the preacher of the gospel would find his occupation gone. Our bodies are probably in better condition for some departures from primitive modes of living, which is what is meant by departure from nature by those who would have us eat bread made of unbolted flour, and stop our tea, coffee,

condiments, and cigars. Not that we are the better for these things, but the fact that they are not natural or primitive articles of diet does not prove them harmful.

Civilization is a direct departure from nature. In a state of nature the weaker are sacrificed to the stronger. Life and property are at the mercy of whoever has the might to appropriate the one or destroy the other. The primitive food is not as good as the food of civilized races, and the clothing and shelter of barbarous tribes are infinitely inferior to those of enlightened races, notwithstanding the many fashionable follies in dress current among the latter. Tight shoes produce corns, but the sandal of the oriental barbarian, or the buckskin moccasin of the American Indian would result in worse diseases were they to be adopted by us. Corsets are, in our opinion, health-destroying distorters of the human form; but they do less harm than would the entire absence of dress to protect the chest, which is the custom in many savage tribes.

In becoming civilized, man's physical condition has become better, notwithstanding his departures from his earlier habits. The dog which has been taught that not to molest sheep, or disturb the chickens, are virtues which admit him to good society, or that the poodle, twenty times as small as himself, has recognized social rights which he is bound to respect, has become partially civilized. By nature dogs disregard the rights of sheep, chickens, and their fellow dogs. They are better and happier dogs for the rudiments of conscience they have acquired, and for eating their meat cooked instead of raw, as they did in a state of nature.

The fact is that to be natural is to be barbarous in all respects, and to be civilized is to be happier than is the primitive state of mankind. To say then that to eat French rolls or drink coffee, to smoke tobacco or use alcoholic drinks, is deleterious because it is unnatural, is a palpable absurdity. The true scientific mode of investigation applies the test of experiment to these things. It says, this food, or that drink, that corset, and those tight shoes, are hurtful, because experiment has shown them to be so. Experiment has shown that dyspepsia, nervous disorder, consumption, and corns, none of which make people happy, result from these practices, and therefore we denounce them. We know that some things which are not man's natural food, and which he had to teach himself to relish (tomatoes for instance) have proved excellent articles of diet.

The scientific method teaches that man's primitive condition, or what is understood by the phrase "state of nature" is no index of his capabilities, but accurate experiment is. It says whatever is done, is done in accordance with the laws of nature, because it is impossible to defy them. All good, as well as all hurt, is simply a result of such obedience. If a man takes arsenic it is in accordance with nature that he shall suffer poisoning. If he eats wholesome food it nourishes him in accordance with the same laws by which poison kills.

People have been so long accustomed to regard systems of ethics as things settled for them, and to which the true scientific method cannot apply, that to suggest that in these fields there is yet room for experiment, or to go further and assert that nothing like well conducted organized experiment has been applied to determine what is morally good, and what is morally bad, may shock at least the conservative portion of modern society. We will not thus shock them, but will close by asking if there is ever to be such a thing as social science, how else is it to be obtained? Surely there cannot be a science without the pursuance of a scientific method, and the difficulty in ever applying such a method is what has led many thinkers to doubt the possibility of a social science.

#### INSTRUMENTS FOR SOUNDING ALARMS.

From remote times it has been found necessary to employ means whereby signals of warning could be given speedily through a long distance in times of emergency. Sometimes the event of which it was desired to communicate intelligence was war, sometimes fire, sometimes shipwreck; or it was necessary to warn vessels off from a dangerous coast.

Light traveling with inconceivable swiftness, and easily generated by the kindling of bonfires on hill-tops, is the primitive means adopted by savages to signal distant tribes or clans. The bonfire and firebrand gradually gave way to rockets and colored fires, and the modern light-house with French lenses, electric lights, and the various contrivances which characterize the modern system of beacons.

But the use of artificial light is limited by distance and the state of the atmosphere, and it is only seen by those who are awake.

As civilization advanced another sense was resorted to, that of hearing, which is easily aroused to action when people are wrapped in slumber. The principal device known to early civilization for sounding alarms was the bell, which to the present time, is still universally employed by civilized races.

Next followed the discharge of cannon, the sound of which travels much farther than that of the bell. The employment of steam has given birth to another class of alarm instruments, comprising steam whistles, gongs, and fog-horns, which emit sounds of immense volume and great penetrating power.

Last and most wonderful in its far-reaching, subtle power, is the telegraph wire, which penetrates the darkness even of the ocean depths, and whose action is so delicate that a pulse-beat in London may be registered in New York.

It might be supposed that in this triumph of science invention in this field had culminated and every possible means attainable by man is reached, whereby he can convey intelligence to remote points.

The telegraph has shown that the senses of sight and hearing are not all we possess by which the knowledge of distant

objects and events become possible. A blind and deaf man might easily be taught to read and communicate telegraphic messages through the sense of touch. It is obvious, however, that this sense cannot be made available for purposes of general signaling, or, even if it could, that the senses of sight and hearing are far more available.

The telegraph is necessarily limited in its application so long as a wire is necessitated to convey the electric current, and although from time to time it has been announced that somebody had discovered, or was about to perfect a discovery of a method whereby the metallic conductor might be abandoned for the universal substances, earth, air, and water, these announcements have not borne fruit, and we think the prospects of such a discovery are not encouraging.

In a recent conversation with a gentleman of some inventive genius, he made a suggestion, of a method for transmitting sounds to vessels at sea, something similar to which we seem to have heard or read of before, but which we cannot refer to any particular source. It however seems that some experiment in the direction indicated might lead to good results.

The main feature of the plan is to make the water instead of the air the medium through which the sound is to be conveyed to the vessel. To this end he suggested that each vessel should be provided with a funnel, the bell of which should be inverted in the water at some convenient position upon the ship, forming a very large hearing trumpet to collect the sound transmitted through the water, and concentrate it in the ear of a person stationed to detect the signals.

To generate a sound of great intensity, he suggests that a bell or fog-horn, or perhaps even a cannon, be placed in a submerged apartment, the air in which is submitted to the pressure of the superincumbent water. At a depth of ninety feet the air would be compressed by a weight of nearly four atmospheres, and the intensity of the sound produced would be greatly increased thereby, and would therefore be transmitted with greater velocity and to a greater distance through the water than in air.

Tyndall states in his treatise on sound that its intensity depends upon the density of the air in which it is generated, and not upon the density of the air in which it is heard, therefore the inferior density of the air in the "Dionysian ear" attached to the vessel would not affect the transmission. It is thought that vessels might be signaled at a distance of thirty miles in this way, and we think it not impossible that such a result might be attained.

#### ST. ANTHONY'S NOSE AND THE MANUFACTURE OF SULPHURIC ACID.

It appears that a portion of the rocks on the Hudson river named in honor of one of the best saints in the calendar, abounds in sulphurous pyrites, and that the manufacturers of oil of vitriol are fast blowing off St. Anthony's nose, so that soon nothing will be left but the name.

The cliff at this point contains large deposits of pyrites, and recently extensive sulphuric acid works have been erected on an island in the river, the sulphur for which is obtained by roasting the ore on the spot.

Hitherto all of the sulphur for acid works was imported from Sicily. In England they have long been in the habit of making sulphur from their own ores, and have thus effected a great saving in various ways; first, in the cost of the sulphur, and, secondly, in the reclamation of copper from ores that would otherwise have been worthless. They also manufacture large quantities of red paint out of the iron pyrites, and sometimes smelt the oxide to iron. The fact that it is found to pay to take the factory to the mines of sulphur, leads us to hope that eventually the auriferous copper and iron ores of Colorado can be advantageously worked in this way, thus furnishing us sulphuric acid for a large number of industries, while the whole of the copper and gold can be obtained. This solution of the difficult question of how best to work these ores would no doubt be the most practical of any, and would do away with the disagreeable and expensive system of amalgamation hitherto practiced.

We need sulphuric acid works all over the country to enable us to manufacture our own soda ash, and for refining petroleum and converting the phosphates of Crown Point and South Carolina into super-phosphates for our land.

#### EXTENSION OF A SEWING MACHINE PATENT.

On the 8th of May, 1849, a patent was issued to John Bachelder for an improvement in sewing machines. The claim covers an endless cloth holder in combination with a device for discharging the cloth after being sewed. This patent in due course of time became the property of the Sewing Machine combination, and was extended by the Commissioner of Patents for seven years from May 8, 1863, and now by the expiry of the patent, the invention has become the property of the public. We understand that an application is now pending before Congress for another extension of the Bachelder patent, and that strong efforts are making to secure favorable action upon the petition. It does not appear that any protest has been filed against the extension, and it is possible that the Committees on Patents may be persuaded to consider the case as one of great merit; but we can assure the Committees that the public feels a deep interest in the matter, and will not sanction the extension of this or any other patent for the exclusive benefit of a giant monopoly such as now controls the entire sewing machine interest of this country.

M. DIDIERJEAN read a note at a recent meeting of the Academy of Sciences, calling attention to the fact that milk is a preservative from the poisonous effects produced by lead upon the workmen who are engaged in the preparation of its compounds.