The Laboratory—Chemical Analysis.

To those unacquainted with chemical science few things appear more extraordinary than the analytical art. In the laboratory, two kinds of analysis are recognized, termed proximate analysis and ultimate analysis. Proximate analysis is comparatively easy; hence the results obtained by it are generally paraded in the public prints. Ultimate analysis is, however, more recondite, and requires a good knowledge of mathematics; but it leads to the most wonderful discoveries. Proximate analysis divides the substances under examination into their natural parts. Thus, suppose beer is to be analysed—we consider proximate analysis perfect if we can separate the water, the spirit, the salt, the saccharize or sugar that it contains, specifying the quantity of each. Again, when we are to determine the composition of a mineral given to us, if, by a proximate analysis we find it soda, clay, iron, lime, and carbonic acid, we conclude that these substances indicate the mineral's composition. Ultimate analysis, however, goes still further; for by it we ascertain the composition of spirit, sugar, lime, water, salt, carbonic acid, &c. If by an ultimate analysis we divide a material into two or three parts, and these parts are no longer capable of division, or rather of being separated into other parts, then we have arrived at its ultimate composition—that is, it is divided into its absolute elements. The names of the elements not being so familiar to the general reader as those of the natural compounds, the ultimate analysis of a substance possesses little interest out of the laboratory. Not so, however, with a proximate analysis, for the interest which the public take in this is shown by the applause which has been given to the chemist who has exhibited starch in mustard, bole-ammoniac in anchovy sauce, chicory in ground coffee, and other little sophistications.

To be able to execute an ultimate analysis, and thence to deduce by calculation and analogy some fundamental principle relating to the substance so analysed, requires a genius which only now and then sparkles among men, such as Davy, Liebig, Faraday, and Graham. The proximate analyzers are geniuses of the second order in chemical fame; such men are Hassall, Bastick, Muspratt, and Piesse. Before a person can attempt to perform a proximate analysis, he must be thoroughly versed in the nature, qualities and properties of almost every substance that can be laid before him. This, of course, requires great study, years of experience in the laboratory, and a quick adaptation of the mind to see by analogy, from its mechanical form, to what chemical agents to subject the substance under analysis. We, therefore, are unable, in a short article like this, to teach the reader to become an analytical chemist; nevertheless, we can perhaps give him an idea of the process. Suppose a substance to be given for analysis; it is first examined as to the class of creation to which it belongs. Is it mineral, animal, or vegetable? The question being decided that it is mineral, the first process would be to subject it to water. After being well mixed with that fluid, we should notice its loss of weight, if any; next, we would place it in hydrochloric acid, and again notice loss of weight; then (if there be sufficient reason by its metallic appearance) into nitric acid; then into strong ammonia; then it would be fused with an alkali, and again subjected to weak acid. Now we should begin to examine the various fluids by means of these materials which in the laboratory are called "tests." All these tests are used with a previous knowledge of their action; thus, oxalate of ammonia indicates "lime;" nitrate of baryta indicates "sulphuric acid;" sulphuretted hydrogen shows a "metal" (this has to be again examined to learn *what* metal); pure ammonia tells of "phosphoric acid;" and so each base and acid has to be searched for until the analysis is complete, and the weight of each matter calculated to the proportion of the entire mineral. An ordinary kind of analysis, such as to ascertain the presence of lead in water, or arsenic in flour, is much more simple, there being only one substance sought for; we have therefore only to find an infallible test for the material to pronounce judgment as to its presence. Analytical chemists are therefore chemical police, who warn the public against adulterations, careless dispensers, and poisoners.

Utilization of Offal.

There is, according to the New York *Sun* a systematic method adopted in Paris and some other European cities for disposing of dead animals profitably by feeding them to rats. There are, it would appear, large *ratteries* conducted by men who do little else than keep on the alert for dead and dying animals. They become such ready judges of the brute creation that they frequently bar gain with, and pay beforehand, the owner of an animal likely to die, for his carcass. When obtained, the dead animals are conveyed to a large enclosure swarming with millions of rats. Being left there at night, the next morning nothing but bones remain, picked as clean and white as could be accomplished by any other method. The bones are then ready for any of the thousand means of turning them to useful purposes.

When the rats increase beyond all necessary requirements, as they naturally do, an ingenious method is adopted of lessening their numbers. All around the walls of the enclosure, near the ground, are made immense numbers of false holes, which penetrate about eight inches in depth. At night, when the rats are all out, a *charivari* is got up with tin pans, kettles, gongs, and other appliances, which speedily frighten them to their holes. They rush for safety to the walls, the real holes become choked up with numbers, and the rats plunge into the false ones, from whence they are afterwards picked out by their tails and thrown into a basket. Their skins are sold to be made into gloves, their carcasses are consumed by their brethren, and the bones are turned to other useful accounts. This is another of those astounding wonders which so often appear in American journals as emanating abroad.

Bones.

There is a bone-boiling establishment opposite Yonkers, on the Hudson river, which pays for bones in this city alone an average of $100 a day. The fore leg and hoof are usually bought by manufacturers of glue, and when they are done with, they are sold to the bone-dealers at two cents a pound. The hoofs of horned cattle are disposed of at the rate of $40 a tun, and are afterward made into horn buttons and Prussian blue. Horse hoofs and sheep hoofs and horns are sold for $15 a tun. On the arrival of the bones at the factory, the thigh and jaw bones are sawed so as to admit of the removal of the marrow. They are then thown into a vast cauldron and boiled until all the marrow and fatty substances attached to them are thoroughly extracted. The fat is then skimmed off and placed in coolers, and the bones are deposited in heaps for assortment. The thigh bones are placed in one heap for the turners; the jaws and other bones suitable for buttons are placed in a second pile; the bones suitable for "bone black" come No. 3, and the remainder are ground up for phosphates and manures.

"Bone black" for sugar refiners is worth from 2 1-2 to 3 1-2 cents a pound. There are eleven large sugar refineries in this city. Stuarts' alone pays about $40,000 a year for "bone black."

Formation of Coal.

Professor J. W. Dawson, at the late Montreal meeting, read a paper in which he argues that the largest beds of coal in Eastern America consist mainly of the flattened bark of trees, the wood of which has perished, or appears only in the form of fragments and films. He did not insist on this view, although he had specimens which showed the mass of the trees reduced to a very thin sheet, while the bark remained of a large, perhaps nearly of its original size. He suggested that of the curious fossils known as "Sternbergiæ," those which occur only with smooth coatings of coal might have been analogous to rushes in their structure, while those which had fragments of fossil wood attached were of a different character. Prof. D. has compared his specimens with living plants, and found one—the *Cecropia Peltata*—in which the medullary cylinder is lined throughout with a coating of dense whitish pith tissue, forming a sort of internal bark. Within this the stem is hollow, but crossed with arched partitions of a tissue like the coating. Of this character must have been many species of the "Sternbergiæ."

Lead.

When this metal was first used by man no one can tell. It is known to have been in common use among the Romans, who sheathed the bottoms of their ships with it. At that time lead was twenty-four times the price it is now. The uses of lead are very numerous, such as for covering buildings, for water pipes, for dyeing and calico printing, in making glass, for glazing porcelain, for refining gold and silver, for pigments. White lead, red lead, and yellow chrome, are known to everybody. The application of lead as a cosmetic is somewhat curious. The Roman ladies were wont to "paint" with ceruse (oxyd of lead). Plautus, an old poet, introduces a waiting-woman refusing to give her mistress either ceruse or rouge, because, in the true spirit of a flatterer, she thought her quite handsome enough without it. The best hair-dyes are made with lead The quantity of sheet lead used for wrapping tea, tobacco, and perfumery goods, is enormous. It is remarkable that this metal, when dissolved in an acid, has the property of imparting a saccharine taste to the fluid. Thus the common acetate of lead is always called "sugar of lead" It was, perhaps, on this account that the Greeks and Romans used sheet lead to neutralize the acidity of bad wine—a practice which now is happily not in use, since it has been found that all combinations of lead are decidedly poisonous. Lead will take off the rancidity of oil, and on this account it is much valued by watchmakers for making their lubricating oil. The alloys of lead, which we call pewter, solder, and others, are so essential in everyday life that we should be in a regular "fix" without them. "As heavy as lead" is a proverb which brings to our minds its weighty quality, which is of great importance, for it enables us to ascertain the depths of the ocean; and without we could do this, how could we lay down the telegraph cables? how ascertain the presence of those dangerous banks which upset the vehicles of the mighty deep? Thus we perceive that one material is subservient to another, till that great unity is produced which we call the world. SEPTIMUS PIESSE.

The American Camels.

The camels first imported, are, it is reported, employed with tolerable success in transporting supplies between St. Antonio and Camp Verdo, Texas. Three little ones were born in March, and five or six more births are expected. The principal remaining point is the character of the stock that may be produced. The officers in charge are, however, sanguine that it will fully equal that of the parent stock, and may, by proper attention, be more highly developed.

Diamond.

An item is going the rounds to the effect that one of the workmen engaged in boring an artesian well in Stryker, a village on the Air Line Railroad, about ninety miles from Toledo, O., found a pure diamond last week, at a depth of about one hundred feet. The diamond is represented to be of the size of an ordinary marble.

French Silk Manufacture.

The production of cocoons in France has diminished from about 58,500,000 pounds in 1853, to about 16,750,000 in 1856. The aggregate production of silk in the world is estimated at a value of nearly $200,000,000.

A piece of candle may be made to burn all night in a sick room, or elsewhere, when a dull light is wished, by putting finely powdered salt on the candle until it reaches the black part of the wick. In this way a mild and steady light may be kept through the night from a small piece of candle.

Economization of Earth Work in Cities.

The digging of a pit at the point where a branch pipe, either for water or gas, is to be connected to a main in the streets of a city, cannot be avoided, but the serious annoyance due to tearing up the sidewalk and area in front of a building, to lay down the small branch leading thereto, may, in some cases, be got over by "tunneling" with a common auger. The Hartford *Times* suggests that augers be made for the especial purpose, and instances a recent case in that city, where an operation was effected with complete success, and at a cost very trifling compared with the old mode, by simply attaching an iron rod fifteen feet long, as an extension to the shank of a common 3-inch screw auger.

Too Large Estimates.

The editor of an exchange journal is severe on a class of inventors who exhibit a money grasping spirit altogether too reckless to suit his ideas of propriety. He instances a new patent earth pulverizer which, according to the inventor, can be built for $150, and for which the asking price is $600, and premising that as this inventor says no farmer without it can compete with those who use it, very pertinently inquires if it is generous to hold it quite so high? Supposing one million, or about one in five, of the farmers in this country should pay his clean profit of $400, what would one man do with so much money?

Patent Extensions for 1856.

We publish herewith a list of such patents as were extended during the year 1856, for a term of seven years. Extended cases are not published, except in the Annual Reports:—

Spark Arresters.—William C. Grimes, Philadelphia, Pa.

Machines for Threshing and Winnowing Grain.—Andrew Ralston, West Middletown, Pa.

Reaping Machines—Jonathan Read, Alton, Ill.

Constructing Presses for Pressing Hay, Cotton, &c.—S. W. Bullock, New York City.

Heating Stoves.—Zephaniah Bosworth, Harmar, O.

Water Wheels.—Lemuel W. and George W Blake, Pepperell, Mass.

Constructing Shielded Pins for Securing Shawls, Diapers, &c.—Thomas Woodward, New York City.

Machines for Ruling Paper.—George L. Wright, West Springfield, Mass.

Constructing Brushes for Dressing Warps.—Samuel Taylor, Cambridge, Mass.

Felting for Coats, Hats, &c.—Marmaduke Osborne, New York City.

Grinding and Polishing Metallic Surfaces, particularly Saw Plates.—Richard M. Hoe, New York City.

Lamps for Essential Oils, &c.—Michael B. Dyott, Philadelphia, Pa.

Water Wheels—Reuben Rich, Salmon River Post-Office, N. Y.

Machine for Cutting Shoe Pegs.—Stephen K. Baldwin, Gilford, N. H.

Machine for Sweeping and Cleaning Streets.—Joseph Whitworth, Manchester, England.

Machine for Cutting the Threads of Wood Screws.—Cullen Whipple, Providence, R. I.

Power Printing Press.—Isaac Adams, Boston, Mass.

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Constructing Locomotive Engines.—Matthias W. Baldwin, Philadelphia, Pa.

Construction of Brick Presses.—Alfred Hall, Perth Amboy, N. J.

Window-Blind Hinges and Fastenings.—William Baker, Utica, N. Y.

Printing Presses.—Jeptha A. Wilkinson, Fire Place, N. Y.

Steering Apparatus for Vessels.—George W. and E. B. Robinson, Boston. Mass.

Pump and Fire Engines.—Benjamin T. Babbitt, Shuler C. Higbee, and Peter W. Plantz, Little Falls, N. Y.

Door Locks.—John P. Sherwood, Fort Edward, N. Y.

As we have not sufficient room for the publication of the claims, we will furnish a copy of any one of them for the usual fee of one dollar.