UNRECOGNIZED QUALITIES IN CHARCOAL.

Among the numerous and varied properties possessed by charcoal, there is one—one, too, of the most wonderful—which does not seem to be adequately recognized, probably from its being imperfectly known except to physicists. It is that of being able to condense and store away in its pores many times its own bulk of certain gaseous bodies, which it retains, thus compressed in an otherwise unaltered condition, and from which they can be withdrawn, as required, as from a reservoir.

That eminent scientist, M. Saussure, undertook the tast of a systematic examination of this subject, with a result which will prove surprising to the general reader. Operating with blocks of fine boxwood charcoal, freshly burnt, he found that by simply placing such blocks in contact with certain gases they absorbed them in the following proportions:

	Volumes.
Ammonia	90
Hydrochloric acid gas	85
Sulphurous acid	65
Sulphureted hydrogen	55
Nitrous oxide (laughing gas)	40
Carbonic acid	35
Carbonic oxide	9.42
Oxygen	9.25
Nitrogen	6.50
Carbureted hydrogen	5
Hydrogen	1.75

It is this enormous absorptive power that renders of so much value a comparatively slight sprinkling of charcoal over dead animal matter as a preventive of the escape of the odors arising from decomposition. A dead dog having been placed in a box in the warm laboratory of an eminent chemist, and covered with charcoal to the depth of between two and three inches, could not be discovered to have emitted any smell during several months, after which time an examination showed that nothing of the animal remained but the bones and a small portion of the skin. To the large excess of oxygen over the nitrogen in the atmosphere, which, according to the above table, was absorbed by the charcoal, and which thus rendered harmless the noxious vapors given off by the carcass as they were being absorbed, is doubtless owing the fact above stated and the further fact of the charcoal never becoming saturated.

A reader of the *Scientific American*, who has been trying certain experiments on the value of charcoal as a convenient means of storing oxygen, reports favorably as to the results. In a box or case containing one cubic foot of charcoal, may be stored, without mechanical compression, a little over nine cubic ft. of oxygen, representing a mechanical pressure of 126 lbs. on the square inch. From the store thus preserved, the oxygen can be drawn by a small hand pump.

From the fact of the charcoal absorbing oxygen in so much greater proportion than nitrogen, we have here a means of utilizing its discriminative powers of selection in obtaining unlimited supplies of oxygen from the atmosphere, which contains nitrogen five times in excess of its oxygen, or 20%; whereas, by the separating or selective powers of the charcoal, the mixed gases capable of being extracted from it contain over 60% of oxygen. It only suffices to withdraw this now highly oxygenized air into another vessel of charcoal, by the further exposure to which the proportion of oxygen will be increased to a still greater extent. This indicates a most feasible means by which atmospheric air can be decomposed in such a way as to provide a cheap supply of oxygen.

One cannot readily recognize the fact, which is nevertheless true, that the condensing power of charcoal, as applied to ammonia, is equal to what would be obtained by subjecting this gas to a pressure of nearly 1,260 lbs. on the square inch.—*Illustrated Scientific News.*

Number of Plant Species.—The total number of plant species existing on the globe, according to recent calculations made by Dr. Muller, of Geneva, is 250,000.

PERAZOTIC ACID.

The discovery of a new compound of oxygen and nitrogen has been announced by MM. Hautefeuille and Chapuis. It contains more oxygen than azotic acid, and has been named by the French chemists perazotic acid. It is well known that on passing an electric current through oxygen a portion of the oxygen is transformed into ozone. If the ozone be mixed with nitrogen, the spectrum indicates the presence of a body characterized by black bands. The bands disappear when the gaseous compound is mixed with water, and the latter is acidified. The application of red heat to the gaseous mixture also causes the black bands to disappear. The experimenters are now endeavoring to isolate the new acid in order to study its properties. M. Berthelot some time since suspected the existence of the body in question during some experiments which he has not published. Its presence was indicated to him, however, merely by phenomena of coloration which appeared and disappeared during the passage of an electric current through a mixture of oxygen and hypoazotic acid. His observations were communicated to Messrs. Hautefeuille and Chapuis, who, by obtaining the spectrum, have placed the existence of the new acid beyond doubt. The discovery is the more surprising, as oxygen and nitrogen, being constituents of the atmosphere, have so long been the objects of what might have been considered exhaustive study.—*Design and Work.*

Uses of Chemistry.—Let us give chemistry its true place. It has led the world's progress for half a century, and it will lead it with still more rapid strides during the next half century. It has preceded the practical man, lantern in hand, along all the untrodden paths of invention and discovery. It has become to every progressive industry what a cane is to the blind man. It does not follow, however, that we can depend upon it alone, nor that we can rely on every analysis handed us. Because the blind man finds a cane helpful, no one with unimpaired vision would be wise in shutting his eyes and walking with the aid of a cane. Still less would the blind man be wise to throw his cane away because it sometimes fails to detect an obstruction in his path. We have a right to distrust an analysis when it points to conclusions which cannot be safely accepted unproven, but the man who looks to the chemist for all the information which an intelligent study of the composition of matter can give him, will know more and act more wisely than the man who depends upon his practical knowledge or his general intelligence. When we are willing to pay for care, skill and experience in laboratory work, and the profession offers a career for ambitious young men who are driven from it by the lack of promising opportunities in this field, the general standing of chemical work will be raised, and there will be a longer list of names which, appended to analyses, will command confidence. Meanwhile, no one who spends money judiciously in learning all that the chemist can tell him will waste it, while the owner or manager of works who feels that he can dispense with the chemist's services, will make a mistake.—*Iron Age.*

An Aluminum Battery.—Liebeg's *Annelen* describes a novel and curious voltaic cell, which has recently been devised by Herr Wohler. The chief peculiarity is that both plates are of the same metal—aluminum—and a tolerably strong current is supplied. The cell consists of a glass vessel six inches high, filled with very dilute hydrochloric acid, or caustic soda, and containing an inner porous pot filled with concentrated nitric acid. In each compartment is placed a cylinder of aluminum provided with a projecting lug which passes through the cover of the vessel, and acts as a contact piece for the electrodes or conducting wires. As soon as the aluminum cylinders are plunged into the acids, a current is given off sufficiently powerful to heat a platinum wire red hot.

MINING ALTITUDES.

Scientific men have proved by actual measurement that most of the great silver mines lie 10,000 ft. above the present sea level, and among the richest are some which lie 2,000 ft. higher still. Very rich mines have been found as high as 16,000 ft. It is a notable fact that as a rule the richest silver mines lie over 10,000 ft. above the sea level. The mines on Ruby Hill are between 8,000 and 9,000 ft. above the level of the sea.—*Ruby Hill Mining News.*

According to the above item Nevada is a notable exception to that 10,000 ft. rule, her richest mines, including those of Ruby Hill or Eureka mining district, lying considerably below that level. The *News* says that the general surface of the Comstock lode, which must be classed as among the most famous and richest of the silver mines of the world, is about 6,000 ft. above the level of the sea. The Sutro tunnel, which intersects the Comstock 1,600 ft. below the surface, is 4,400 ft. above the level of the sea. The rich bonanzas of the Crown Point and the Consolidated Virginia sections, which have yielded $200,000,000, were nearly or quite down to the Sutro tunnel level. In point of fact, the deepest workings of the Comstock are less than 3,000 ft. above the sea level. There are no large bonanzas of ore found at that depth as yet, but there is no reason to believe that there will not be, extending perhaps far below the sea level.

Scientific Progress.—The recognized and frequently applauded tendency of modern investigation in natural sciences, has been toward an accumulation of facts, rather than toward any effort to generalize from them. As a reaction against the mania of speculation prevailing in the earlier stages of the development of modern chemistry, geology, etc., the direction taken has produced highly salutary results. The foundations thus laid have been broad and substantial, and the haze of doubt and uncertainty has been swept away in many departments of science, while new fields of research are constantly opening to a large number of intelligent and active workers. No one will be inclined to underrate the value of their labors, and yet it is difficult to escape the feeling that, notably in chemistry, this search for new facts is conducted without the proper discrimination. A mass of data is piled up without order or connection. It would be valuable material in the hands of those skilled in grouping and arranging it in such a manner as to secure a basis for further work. In its present shape, however, it is only raw material, and while a great deal of credit properly attaches to original investigation, it should be remembered that it is as great a thing to make a fact useful as to find it out.—*The Iron Age.*

A Powerful Light.—The Brush Electrical Manufacturing Company at Cleveland, Ohio, has recently manufactured for use in the British navy an electric light, which has been tested and found to have a 100,000-candle illuminating power—a power 50 times greater than the ordinary electric lamp for street lighting. This is believed to be the largest and most powerful light ever made with human hands. It is designed to be used in night attacks, and to scrutinize the sea for torpedoes. A 40-horse power engine is required to produce the light. The carbons used are two inches and a half thick. The intense heat generated between the carbon points is half a million degrees, one-ninetieth the estimated heat of the sun. It is calculated that with an ordinary reflector a beam of light will be cast so powerful that a person 15 miles away can see to read by it.

Malleable iron is said by Forquignon to be intermediate between steel and gray pig iron, differing from the latter by the special nature of its amorphous graphite and its greater tenacity, and from steel by its small elongations and large proportion of graphite.