Correspondence.

Notes from Washington, D. C.

To the Editor of the Scientific American:

The Hon. M. D. Leggett, Commissioner of Patents, having been the subject of a series of scurrilous and defamatory articles in a disreputable paper, published in this city, and called the *Capitol*, has thought proper to strike back, and in a letter to the Zanesville *Daily Courier* makes public a variety of facts concerning the personal history of the editor authorof the paper in question,which are anything but complimentary.

Donn Piatt, the editor of the paper, values the character thus given him by the Commissioner at about $20,000, and has therefore brought a libel suit for the above amount. The case will probably come on for trial at the November term of this year, when we may expect to hear the truth about some very peculiar transactions that are now only vaguely hinted at.

The ordinary business of the Office is still increasing, the number of patents issued during the month of April being 1,204, or an average of 301 per week. The weekly average for the corresponding period of last year was only 263.

Among the patents lately issued is one for electro-plating with cobalt, which, it is stated, will form a thick and useful covering that perfectly protects the plated surface from the action of the elements, and the coating is said to be very white, exceedingly hard and durable, tenacious, adherent, and not liable to tarnish.

For many years past there has been an ugly pile of marble in this city, which has been an eyesore to our own people and a wonder to the visitors here: a wonder what it was originally designed for and (when informed) a wonder at its unfinished state. I refer to the Washington Monument, which in its present appearance suggests a cross between a factory chimney and a shot tower; and if ever finished, it will serve more as a memento of the want of taste in its design than as an honor to Washington. For ten or twelve years past nothing has been done to it, owing mainly to a lack of funds, which the wretchedly poor design has probably caused, and partly to a very strong suspicion that the foundation is not strong enough to carry the immense weight which finishing the monument, according to the original design, would bring to bear on it. In view of this, Senator Morrill proposes that the material in it should be used to form a large monumental arch, by which plan, it is thought, a structure that would not disgrace him in whose honor it was raised may be erected at less expense than it would take to finish the present abortion.

Mr. Sutro, of Sutro tunnel fame, is in this city looking after his interests before Congress, and has been giving a series of entertaining lectures on mines and mining. I shall send you a few interesting items therefrom in my next.

Washington, May 19, 1874. OCCASIONAL.

The Overflow of the Mississippi.

To the Editor of the Scientific American:

The Mississippi river, its relation to commerce and agriculture, and especially the protection of these alluvial lands by the restriction of the waters which flow near, through, and now over many of them, are points of vital interest to a large section of the great South.

As the Mississippi valley is the home of our chief staple, the nation should have yielded all the aid she lawfully could to every scheme looking to the protection of those lands and to enriching, draining, and cultivating them in a proper and scientific manner; but the government has absolutely refused to do anything,and has altogether withdrawn any semblance of encouragement to agriculture in this region. The water that irrigates this great valley turns the spindles of the Eastern and Middle States. Thousands of the laboring classes of these sections find the bread that we cast upon these waters come to them.

At this time, the condition of this country is attracting unusual attention. The overflow in the Mississippi valley,the consequent damages to the crops, extending perhaps to an entire failure and the terrible results following the same, direct our notice and the action that should arise therefrom to the experience of those whose knowledge of the locality extends over a series of many years. In looking for protection from these waters by embankments called levees, and endeavoring to place metes and bounds to this inland sea, we must admit that the treatment has failed. Levees have proved useless on smaller streams; and agriculturists on the lands of this river, who have had the advantage of twenty-five or fifty years experience, and who were, for the most part, in favor of the levee system as now used,are convinced that it is and always will be a failure. If it could be successful, the advantage is not sufficient to justify the expense. That the lands are more productive, that better crops of corn and cotton are made, in the overflowed regions cannot be doubted.

During the last half century, there has been but one year in which a crop could not have been made as well and better without a levee than with one. That year was 1858. Land sellers, speculators, and theorists on the subject, are the only advocates of that levee system. What we wish to find is some better system of protection. There are two ideas prevalent among practical men who acknowledge the inexpediency of the present system of protection. The one is to straighten the river and levee the outlets; the other is to divert the volume of water by canaling the upper portion of the river and the largest tributaries, and thereby lessen the quantity of water and the danger to this region, and also to level the outlets, as in the other suggestions. Either of these ideas, practically applied, would succeed in the direction of protection to these overflowed lands. And it would be much better judgment on the part of the nation to discuss these ideas in a practical way before expending the public money on a scheme for the protection of the cotton region. The application of these ideas needs science and capital. The government can command both; and as it is a subject of eminent national import, the nation ought to take the matter in hand. It would be a public benefaction; and the whole country, the readers of your valuable paper, would be greatly interested in the discussion of the scientific aspect of this subject.

Austin, Miss. J. F. S.

Boiler Explosion at Philadelphia.

To the Editor of the Scientific American:

On the 8th instant,about 3 o'clock P. M.,a plain cylinder boiler exploded at the Keystone Mills on Callowhill street, owned by Mr. Henry Hoppen, who rents portions out to manufacturers, with power. The boiler room was located outside of the mill and contained 6 plain cylinder boilers set on the oven plan, in sets of two each, with separate feed, blow off and safety valves for each set. The two sets next to the mill wall have been in constant use in their present position for the past 8 years. The other two have been out of use since last June. All of the above have been under the inspection of the Hartford Boiler Insurance Company. Owing to getting in a bad lot of coal, the four boilers in use would not maintain pressure to drive the engine up to speed. The other two were fired up a few days back so as to bring up the pressure (60 pounds per square inch) necessary to run the mill at speed. All seemed right until a short time previous to the explosion, when the engineer, Hugh Sweeny, found the outside boiler was leaking. He immediately hauled his fire from this set, and was in the act of blowing them off when the explosion took place. He was badly scalded, as also was Thomas Devoe, a lad 13 years old who was employed in the mill. Both of them died on the morning of May 10. On making an examination of the boiler, I find that it parted at the junction of the second and third rims, through the line of rivets a part of the way. The fourth rim had a new piece along its whole length and about 17 inches wide, which, Mr. Hoppen says, was ordered to be done by the inspector of the Hartford Boiler Insurance Company. My examination shows that the boiler has been cracked through the line of rivets at the point of rupture, no doubt for some years back, as there are no signs of junctions of metals, at the point of separation, in two places of over 2 feet in length.

How the inspector of the Hartford Company and the boilermakers who put on the new patch could have overlooked these cracks passes my comprehension. I am satisfied if the hammer test had been properly applied, followed by the hydraulic pressure, the patch would have shown itself defective. The cause of the explosion is therefore obvious; it exploded from wear and tear, having been in use some 25 years. The average duration of boiler life is 10 years.

This latter is objected to by some people from the fact that a large number of boilers older than the above are working older than the above and have done so for years with steam of an equal or even a greater pressure; still they are continuing to do so only at a risk, and their past exemption is no security against explosion in the future. A year ago a boiler exploded which was 20 years old,and killed 11 persons. This boiler, over 25 years old, has killed 2 persons. Now I believe that 13 human lives are worth more than all the boilers over ten years old in this city. The law should be that a boiler after ten year's use,no matter its condition, should be replaced. Our railroad companies understand this; after a car wheel has run a certain number of miles it is condemned, and why should not boilers be also? Man wears out by use, and so does iron.

Philadelphia, Pa. W. BARNET LE VAN.

A National Museum of Science.

To the Editor of the Scientific American:

Would it not be an appropriate and beneficial mode of celebrating our Centennial, for Congress to make an appropriation for the erection of a museum of natural history, mineralogy, and geology, the corner stone of which should be laid on July 4, 1876? It seems to me that it is a national disgrace that a country which is so wealthy, and one which possesses within itself so much material to make a first class museum of the above description, should be contented with the miscellaneous collections now in the Smithsonian Institution, which has been supported almost entirely by the bounty of a foreigner. Let us leave to that institution the formation and development of an archæological and ethnological museum, and let the nation excel the world in the magnificence of its natural history collections, for we can scarcely hope to rival European nations in our strictly art collections.

Now that the time of the year is approaching when our various scientific and educational bodies will hold their annual meetings, I think it would be well for them to take some action upon the subject, and, by memorials, show Congress that there is a large body of learned and thinking men in the country who have arrived at the conclusion that the time has come when our Government, "of and for the people," should expend annually as large a sum, in behalf of science, literature, and the useful arts, as it now expends in supporting one regiment of soldiers or one ship of war. I firmly believe (after extensive travels) that our people are the most interested of any in the world in scientific pursuits; and when we think how much has been accomplished in this country in this way, without the aids which even the smallest foreign nation extends to its investigators, I think that, with such aid, a very few years will not fail to see our land the home of the sciences, and filled with students from abroad. But at any rate, we ought to be as far progressed and civilized as Russia now is; but at present we are far behind even her in our national liberality to culture and learning.

Chicago, Ill. S. G. L.

The Ants of Brazil.

To the Editor of the Scientific American:

An article on the army ants of Central America, their doings, habits, etc., in a recent number of your journal brings to my mind some observations, which I made several years ago concerning a species of ants, inhabitants of the country along the banks of the Uruguay and Paraña rivers in South America, on parallel 35° S. latitude. Their habitations consist of mounds, some of which are at least ten feet in diameter, and rise above the ground some three or four feet. These mounds seem to be built of coarse grass (a sort of bent, common to that section of tbe country), intermixed with soil. At the base, at intervals of about a foot, were arches, about ½ inch wide and the same hight in the center, for ingress and egress. The country is rolling, lying entirely open, with an occasional patch of dwarf trees on some high knoll, and ravines fringed with trees of larger growth. There are here and there roads, which are really nothing more than cattle trails, leading from the *estanchios* in the camp to the *saladuos* (salting establishments) which are situated near the river.

One of the large mounds was situated within a few feet of one of these trails; and as I was walking along the trail, I noticed that the front of the mound had a different appearance from any I had seen. So I examined it, and found all the ports on the front barricaded. All the rest of the way round, the ports were open and the ants were passing out, seeming very diligent about their business. From each of these little ports or doors leads a path, away into the camp or open country. The first, next the trail, ran nearly parallel, and I traced it more than a quarter of a mile. From the other ports, the paths led off, as spokes from the nave of a wheel.

To watch these ants and see them work and give tokens of recognition as they met each other was very interesting. Each ant, on leaving the fortress, took his path and hurried away; and, on meeting some particular friend, would stop and apparently shake hands and pass on. Returning, each ant would have a piece of the stalk of the grass, from a half inch to an inch long on his shoulder, as a soldier would carry his musket at easy march. When they arrived at tbe fortress, they would dip down the forward end of their load and march in as naturally as human beings could; and by steadily watching them for a while, you would almost imagine that they were human beings on a small scale.

Stratford, Conn. TRUMAN HOTCHKISS.

Bunsen's Battery Improved.

To the Editor of the Scientific American:

While Bunsen's battery is one of the most intense in use, considering its cost, there are two serious objections to its general adoption. The first is a want of continuous action, which renders it entirely unfit for many purposes; secondly, the offensive and deleterious vapor, which arises from it while in action, is an objection of scarcely less importance.

I have been laboring for some time to improve the constancy of this form of battery, while at the same time preserving its intensity; and this I have accomplished by filling the porous cup around the carbon with coarsely powdered (it should be powdered about as fine as gunpowder) graphite, which is a hard substance obtained from the inside of gas retorts. The battery is set in action by moistening the powder with nitric acid, which is done by pouring a few spoonfuls into the porous cup. I have found that the current developed by this arrangement will be sustained for a long period of time, while its intensity is equal, if not superior, to that when acid alone is used. The poisonous vapor arising from the battery is very little, owing to the small quantity of acid employed.

There is, however, a circumstance attending the use of this battery, on which it will be well to make a remark. Sometimes, in making connections with the carbon, a screw is forced into it; and when this is the case, the screw becomes corroded and partially cuts off the current, and in some instances I have known it to cut the connection almost entirely off. If the points of the screws were plated with platinum or gold, the difficulty would be completely overcome. JAMES POOL.

Friendsville, Ill.

BUT few persons are aware of the magnitude and perfection to which the manufacture of doors and window blinds by machinery has arrived in the United States. It is stated by those who profess to know tbat the number of doors alone made within the one State of New York, exceeds 30,000 per day, or not far from nine millions per year. From statistics deemed reliable, it is believed that the amount of capital invested in this branch of manufactures in this country cannot fall short of $40,000,000.

THE home of the cactus family appears to be in southern Arizona. Here the grand cactus, *cereus giganteus*, is from thirty feet to forty feet high, and from three feet to four feet in diameter.

The Eucalyptus Tree.

The San Francisco *Bulletin* gives the following account of the *eucalyptus globulus*, or Australian gum tree, obtained principally from Messrs. Sontag & Co., of San Francisco, who have given much attention to its cultivation. (We recently published an engraving of this tree in the SCIENTIFIC AMERICAN).

The eucalyptus is favorably known to all residents of California, where probably not less than 1,000,000 trees are planted. In this city, in front of handsome residences, you will find it, with its magnificent drooping branches, making an effective and graceful shade tree. In Oakland, the broad avenues are lined with them, eucalyptus forests are planted in the country surrounding Oakland, and, in fact, in every country of this State where the cold winter will permit it to live, the eucalyptus will be found growing. The wonderful properties of this tree have only within the past few years been discovered and appreciated. It is justly claimed that when the tree flourishes in low, marshy, and feverish districts, all miasma will cease. It destroys the malarial element in any atmosphere where it grows, and is a great absorbent of moisture, draining the subsoil almost as thoroughly as a regular system of piping. The eucalyptus is an evergreen, and is found in its native country (Tasmania) in boundless forests, both on the hillside and in the lowlands, under extremes of climates, both as to heat and cold, ranging from 130° to 20° Fah. Whether it will endure a greater degree of cold, we think, has not as yet been determined. It is, however, worthy of a trial. Its remarkably rapid growth is a matter of much surprise, attaining, as it does, a maximum hight of about 300 feet, with a circumference of from thirty to fifty. For timber and fuel it is exceedingly useful, being hard and easily worked, and very serviceable for such purposes as the keels of vessels, bridges, etc., where strength and durability are essential. It is estimated that from $4,000,000 to $5,000,000 in value of this timber is exported annually from Australia. The leaves of this tree are of a dark bluish color, about ten inches long, an inch wide, thin, and oddly twisted. They exhale a strong camphor-like odor, quite agreeable and pleasant, which, with the large absorption of water by the roots, causes the beneficial influence of the tree. It bears a small white flower, having no odor. In consequence of its anti-febrile qualities, the English Government has planted it extensively in the East Indies and Africa, in fever districts, with the most satisfactory results. In France, Cuba, Spain, Mexico, and many other places where malaria, fever, ague, and other pestilential diseases prevailed, the eucalypti have been planted. The wonderful properties of this tree have been discussed by many scientific institutions in Europe. In the Academy of Sciences, in this city, its medicinal and anti-miasmatic qualities have received considerable attention. Dr. Pigne Dupuytren testified before that Academy of the virtues of the eucalyptus, and stated that both he and Dr. D'Olivera had tested it in the French Hospital. In the garden surrounding this hospital, a large number of the trees are planted for sanitary purposes. It had been found efficacious in the treatment of affections of the larynx and of the mucous membrane in general. Experiments, carefully made, have proved that, in a medicinal preparation, it cures cases of intermittent fever, against which quinine alone proves powerless. It is also valuable as a disinfectant. In Algeria its cultivation was undertaken on a large scale. Some 13,000 eucalypti were planted in an extremely pestilential and unhealthy section, where fever prevailed to a great extent every year. During the first year of their growth, at the time when the fever used to set in, not a single case of fever occurred, yet the trees were only nine feet high. Since then this place is reported free from its unwelcome visitations. In the vicinity of Constantinople, another fever spot, marshy and sickly, the whole ground was dried up by 14,000 of these trees. In Cuba, marsh diseases are rapidly disappearing upon the introduction of this tree. A railway station in the Department of the Var was so pestilential that the officials could not remain there longer than a year. Forty of these trees were planted, and the unhealthy condition of the place was changed. Two miles from Haywards, in this State, the surveyor-general planted groves of the eucalyptus, one of about ninety acres and the other seventy acres, the whole comprising about 150,000 trees. They are now only about five years old, yet many of trees are forty to fifty feet high, the whole making a most extensive and beautiful forest, being, for fuel and timber purposes, worth thousands of dollars.

Dynamite as a Stump Puller for Land Reclamation.

The following report of experiments with the newly discovered blasting agent, dynamite, which were carried out on Sir W. S. Maxwell's Cadder estate, is from the *Glasgow Herald*. Dynamite is nitro-glycerin mixed with a silicious earth found near Hamburgh, and known as *kieselguhr*, which, being used as a fine powder, absorbs and retains the liquid explosive.

Dynamite is a moist and plastic solid, of a pale brown color, not unlike the finer qualities of sugar. The dynamite is made up in cartridges of various sizes to suit the bore holes, one inch diameter being the general size. The great advantage of this substance over gunpowder is its greater comparative safety, as it will not explode without percussion; when ignited without percussion, rapid combustion ensues, but there is no explosion. In order to make dynamite effective, it is necessary to explode with it some detonating substance. Specially prepared and extra powerful percussion caps are the agents used, in connection with a suitable length of Bickford's fuse, which consists of a line or thread of gunpowder inclosed in a tube made of gutta percha, a piece of this fuse being tipped with one of the percussion caps. The cartridge was placed on the stump of an old tree and ignited. After a short interval there was a loud and powerful explosion, accompanied with considerable splintering of the wood. We quote the actual experiments *verbatim* from the pages of the *Herald:*

The stumps of a number of trees that had recently been cut down were experimented upon. By means of an auger, a hole about one and a quarter inches in diameter was bored vertically to a depth of twelve or fifteen inches in one of the stumps; and when it was found to be quite through the wood of the stump, it was continued by means of a crowbar to a depth of fully two feet. Two or three cartridges were put into the bore hole and firmly driven home by means of a wooden rammer. Then a small cartridge, called a primer, prepared with a cap-tipped fuse, was dropped in and rammed home, and the hole was tamped or stemmed by filling it to the top with water, care having in this case been taken to put a luting of clay round the junction of the cap with the fuse. The latter was fired, the observers betook themselves to a respectful distance, and in a brief space of time a great upheaval took place. The noise of the explosion, however, was in a great measure smothered. When the members of the party returned to the spot, they found the stump to be rent in a most extraordinary manner; but the general opinion was that the bore hole had been made so deep that the energy of the explosion had spent itself too much upon the subsoil and too little upon the wood. The stump next operated upon was bored to a less depth, and the result of the blasting process was more effective. In either case a few strokes with an ax, by way of severing the principal root members, would be quite sufficient to leave the woody masses in such a condition that they could easily be dragged out and lifted away.

It was suggested by Mr. John Scott that the operation of piercing with an auger should be dispensed with in blasting the next root stump, so as to do the work with as great economy of time as possible. In this instance, therefore, the crowbar was brought into requisition instead of the auger, and by means of it a hole was driven horizontally inward between two of the principal root members to about the center of the stump. The whole was charged and fired in the usual way, the result being a much greater amount of eruptive and disruptive action, with a smaller expenditure of time and labor. One or two other root stumps of large size were blasted in the same way, and it was clearly demonstrated that, under certain circumstances, dynamite could be employed to more advantage immediately underneath than in the mass of material to be operated on. Mr. Scott expresses himself to be fully satisfied, from what he has now witnessed, that he could use the new blasting agent with great effect and economy in land-clearing operations in Canada, so far as tree roots were concerned.

Sebacic Acid.*

When castor oil is gently heated with sodium hydrate, the whole solidifies, after much frothing, to a soft yellow waxy mass of sodium ricinoleate. On raising the heat, this salt melts and decomposes, an oily distillate passing over, and the residue yields sebacic acid. This acid, discovered in 1802 by Thénard, usually crystalizes in a multitude of long, fine, feathery crystals, which, when dry, have a peculiar pearly luster, or from dilute saline solution in long thin needles; but under certain conditions, it separates from the ammonium sebates in very thin, brilliant laminæ, with apeculiar bright luster.

Soluble in 700 parts at 20°; in 400 parts at 40°; in 240 parts at 50°; in 50 parts of water at 100°. By prolonged boiling, it is possible to dissolve it in 22 parts of water, of which 1 part in 45 remains in solution at 96°. It is readily soluble in cold alcohol and ether, easily dissolved by hot ether, and extremely soluble in hot alcohol. It crystalizes from hot ether in short, transparent needles, and from hot alcohol in the same manner as from hot water.

It is readily soluble in hot nitric acid, and not decomposed by boiling therewith for a moderate time, but separates out when cold; easily soluble in hot hydrochloric acid without change, crystalizing out on cooling; readily soluble in cold sulphuric acid, extremely soluble in sulphuric acid at 100°, and separates out unaltered on dilution with water; not sensibly attached by digestion with nitrohydrochloric acid, or potassium permanganate and sulphuric acid.

Aqueous sebacic acid reddens litmus strongly, tastes acid and bitter, completely neutralizes the alkaline hydrates, decomposes the carbonates of potassium, sodium, barium, strontium, and magnesium, and precipitates solutions of lead acetate and silver nitrate if dilute, but neither mercuric nor calcium chloride, nor silver nitrate if strong, but precipitates the silver ammonio-nitrate.

Even after being twice recrystalized, it is apt to retain traces of a white solid hydrocarbon, melting below 100°, and a pale yellow hydrocarbon, which can be removed only by repeated recrystalization. A trace of hydrochloric acid is also frequently retained, even after a second recrystalization, and is also best removed by repeated crystalization; but it is probably to this trace of retained hydrochloric acid that one or two of the discrepancies in the earlier descriptions are due.

Of the two classes of salts formed by sebacic acid in its capacity of a bibasic acid, the neutral salts would appear to be the more stable, the second class, or the acid salts, being apparently decomposed more readily, and even in some instances by prolonged boiling of their concentrated solution. The acid salts seem to be all more or less soluble in water, and neutral salts of the heavy metals and of calcium insoluble i water, while the rest are soluble.

By treatment of sebacic acid with the salts of various metals, a great variety of crystals and powders of different colors, blue, orange, green, red, white and purple, some of magnificent character, are produced.

*From a paper read before the Chemical Society, by E. Nelson, Principal Assistant in the Laboratory of the Royal Veterinary College.

Formation of Gum in Fruit-Bearing Trees.

In the wood of a tree diseased with gum, a great number of vessels are always seen more or less completely filled with gum; sometimes they are entirely filled to a certain length, and sometimes the gum only forms a coating either upon all the periphery or only on one side. The gum first shows itself in very small drops, which gradually increase in size and touch each other, forming small irregular masses. Recent German observers have stated that the formation of the gum is due to the disorganization and transformation of the internal part of the wall of the vessel, but the author has come to an opposite conclusion. In examining the wood of an apricot tree from which large masses of gum were extracted, it was found that the vessels were marked with areolated punctures, and with a spiral line due to a thickening of the membrane; also that the surfaces of the masses of gum were marked with deep furrows corresponding with the spiral lines of the vessel wall and even with small projections according with the punctures. It is thus certain, in the author's opinion, that the gum has poured into the interior of the vessel, and that the marks upon it are imprinted from the vessel wall.

In the production of gum in the cellule by the transformation of starch, it has been observed that, on the first appearance of gum in the cellule, the unchanged starch gathers into small masses, around which forms a thin coating of gum. Gradually the starch diminishes, while the coating of gum increases, until at last the starch disappears altogether, leaving generally a vacant space in the center of the mass of gum.

Often the gum, produced in such considerable quantity, is formed neither in the vessel nor in the cellules, but in the spaces between the young tissues, generally between the wood and the bark, yet often also at the different depths in the wood. These gum spaces grow at the expense of the neighboring tissues, which suffer important modifications: the cambium, instead of producing woody fiber, forms cellules in which abundance of starch is deposited, which starch subsequently becomes converted into the gum.—*E. Prillieux (Comptes Rendus).*

Geology of the West.

Among the geological deductions of the Wheeler expedition are the following: All that portion of the United States west of the plains is characterized by corrugation, that is, the geological formations once horizontal have been bent and broken and thrown into ridges so as to produce a mountainous country. The ridges vary greatly as to hight and length, but agree in general northerly trend; so that in traveling north and south, it is generally easy to follow valleys, while in going east or west one is confronted by range after range that he must climb or go around. In the lower parts of this great mountain system, the slow but indefatigable agencies of rain and stream have accumulated so great an amount of detritus that the valleys are clogged and the mountains nearly or quite buried. In this way have been produced the great desert plains of Utah, Arizona, and Southern California, vast seas of sand and saline clay, from the surfaces of which a few half sunken peaks jut forth as islands. These intermissions of the mountainous character are mere concealments, not interruptions, of the corrugated structure; but that structure is interrupted in one place—perhaps in others, but in one notably—by a tract in which the strata are almost undisturbed. The general surface of this exceptional region lies from 6,000 to 8,000 feet above the ocean, and it is intersected by the celebrated cañons of the Colorado and its tributaries. By these gorges and by other modifications, chiefly dependent on erosion, it is divided into a great number of plateaus which the surveys now in progress are defining and naming. The geologists of the expeditions have found it convenient to designate the region, considered as a geological province, as the region of the plateaus, or the Colorado plateau system. It is surrounded on all sides by areas of corrugation, the ranges at the east constituting the Rocky Mountain system proper, and those at the west having been designated as the Cordilleras. At the north and south, these mountain areas coalesce.

Explosion and Firing of Volatile Oils.

A mixture of two parts of perfectly dry permanganate of potassium with two or three parts of concentrated sulphuric acid is a most powerful oxydizing agent, owing to the separation of permanganic acid and its immediate decomposition with the liberation of oxygen. Volatile oils are violently affected by this mixture, if about ten drops are placed in a little dish and then touched with a stout glass rod previously dipped into the mixture. The following produce explosions, often most violently: Oils of thyme, mace, turpentine (rectified), spike, cinnamon, origanum, rue, cubebs, and lemon. The following oils are simply inflamed, particularly if poured upon blotting paper and touched with the mixture, though under certain still unknown circumstances explosion may occur: Oils of rosemary, lavender, cloves, rose, geranium, gaultheria, caraway, cajeput, bitter almond, and rectified petroleum. The following substances are ignited without explosion: Alcohol, ether, wood spirit, benzole, chlorelayl, sulphide of carbon, and cotton. Gun cotton and gunpowder are not ignited.—*N. Repert. f. Pharm.*