GREAT OFFICE BUILDINGS OF NEW YORK.

A few weeks ago we had occasion to speak of the work of engineers as employed in the construction of the new office buildings, of which so many are being erected in the lower part of this city. In our present issue we illustrate a view of Broadway looking to the north from a window in the Post Office building, corner of Park Place and Broadway. Many of the street features are old. To the right is seen the Stewart building, in its day a triumph of city architecture, and on the same side, nearer the spectator, is the end of the new County Court House. But what our illustration is designed principally to show are the new office buildings built in this part of Broadway, and seen on the left side of the cut, or west side of the street.

Nearest to the spectator is the great building of the Postal Telegraph Company, G. E. Harding & Gooch, architects. This building is fourteen stories high, with a front over 70 feet wide in Broadway, and extending 156 feet down Murray Street. The walls to the fifth story are of Indiana limestone; above that gray brick, with terra cotta trimmings to correspond, is used to complete the structure. Next to it stands the beautiful 16 storied marble structure of the Home Life Insurance Company, Le Brun & Son, architects. This building is remarkable for its ornate architecture, combined, in the main, with great chasteness and purity of style, and forms a fitting companion to the more somber building adjoining it.

Following up Broadway, and passing, as we do so, the iron front building at the corner of Warren Street formerly the headquarters of the SCIENTIFIC AMERICAN, we see a tall, tower-like structure with pinnacles on its roof, rising at the corner of Broadway and Chambers Street. This curious building, adapted to meet the exigences of the restricted lot, is occupied by the Shoe and Leather Bank, and is due to Messrs. Cadey, Berg & See, architects. Again going to the north, on the corner of Broadway and Duane Street is the building of the Mutual Reserve Insurance Company, Mr. W. H. Hume, architect. Again we have a very high building in which the architect has been exceedingly successful in preserving purity of style in spite of the difficulties of doing so in a building of such exaggerated proportions. But what these buildings are on the outside dees not disclose their principles of construction. They are not stone or marble buildings in the true sense of the word, but are erected on the steel girder principle. Each in effect is a frame of steel girders, self-sustaining, with steel floors and filled in or lined with stone or brick. Were the attempt made to construct the building out of stone and brick alone, the foundations and walls would be of prohibitive thickness, so that the building at the base would be but little more than a solid mass of material.

Striking as is the view we present, it is but an earnest of what is to come. The high price of real estate, in view of the solidity and safety of the investments such buildings represent, make it a matter of certainty that in a very few years one after the other of the older down-town buildings, deemed first-class in their day, must be torn down and replaced by more modern and gigantic structures. Equipped with a full elevator plant, some elevators running on the express plan, not stopping until the eighth or tenth story is reached, the upper stories are as valuable, or more so, for offices than the lower ones. The capitalization invested in the attainment of height is just as advantageous as that represented by the lower stories alone.

GREAT OFFICE BUILDINGS OF NEW YORK—VIEW UP BROADWAY FROM THE POST OFFICE.

Electrical Notes Concerning the New Postal Telegraph Building.

The new building of the Postal Telegraph Company, corner of Murray Street and Broadway, was opened for public inspection on June 18, and in its electrical equipment is probably the most complete of any telegraph building in the world. The ground floor is elaborately yet tastefully fitted up as the receiving and delivery office for telegrams. The walls and staircases are finished in beautifully colored marbles. Access to the various floors is had by swift, smooth-running electric elevators.

The top floor is occupied as an operating room, where numerous mahogany tables, supplied with the latest and most approved sounders, relays and transmitting keys, are to be seen. At intervals in the tables are placed typewriters. The sounders are supported on a brass rod about twelve inches long above the surface of the table, and are inclosed in a half dome-shaped wood box open on one side, about 8 by 6 inches. The box re-enforces the sound so strongly that it is easily heard distinctly above the other multitude of confusing sounds, and being in a line with the ear of the operator, he is able to receive the message in an upright sitting posture.

The operator, who is also a typewriter, simply sits back comfortably in his chair and typewrites the messages as fast as he receives them from the sounder. The caution published by the superintendent in regard to writers of messages emphasized the letters *t* and *k*. The small *t's* must be each separately crossed, and the *k's* made not to look like an *h*, but be clearly defined, as in the word "knock." By arranging the sounders in an elevated position all cross divisions on the desks, which usually accumulate dust, are eliminated, and a more open and airy effect is given to the entire room. In one corner of the operating room is an elevated platform where the distributing department is located, which is connected with the ground floor by pneumatic tubes, and also by tubes to each set of or section of tables. Messages to be telegraphed, we will say, for example, to Washington, are sent by this department through the tube leading to the desk to which the Washington wires come in, and the operator promptly transmits the same.

When the operator receives and prints a message, he places it in the little box and sends it by air pressure through the tube to the distributing department; thence it is sent to the basement and passed over to the messenger boys for delivery. In the story next below the operating floor are the executive offices of the company and of the Commercial Cable Company, all of which are sumptuously fitted up. A most interesting part of the building is the basement, where is generated the electrical energy which keeps this great system of telegraphy at work. In the center of the basement is a large elaborate marble switchboard, through which the main current from two of the three large Westinghouse dynamos passes. There is one switch pivoted here so arranged that in case all the dynamos should be stopped, the current from the Edison Electric Com-

pany from the street can be immediately switched in without interrupting in the least the supply of electricity. The current from the dynamos operates several combined motors and dynamos arranged in multiple series or in pairs as desired, for supplying the telegraph wires at an average pressure of fifty volts. Switching devices are arranged in connection with them for shifting the current from one to another without affecting it up stairs.

In one corner of the basement is the electric elevator driving mechanism, designed by Pratt & Sprague. It works very effectively and positively. There is a horizontal screw 25 feet long by eight inches in diameter, which has a motor attached at one end. On the screw works a huge nut attached to which on one shaft are half a dozen loose pulleys, over which the elevator propelling rope passes. By means of a special small pilot motor the main switch is operated, which turns on the current to the propelling motor in amount to correspond with the load to be carried, which is regulated by the man in the elevator. When the elevator motor revolves the screw rapidly, the nut holding the pulleys is carried forward and the elevator rises in a steady, smooth motion. To descend the current is reversed, and the screw revolving in the opposite direction draws the nut supporting the wheels back to the other end. In each case the motion is perfectly steady and positive. The elevators have been tested up to carrying two tons weight and worked perfectly.

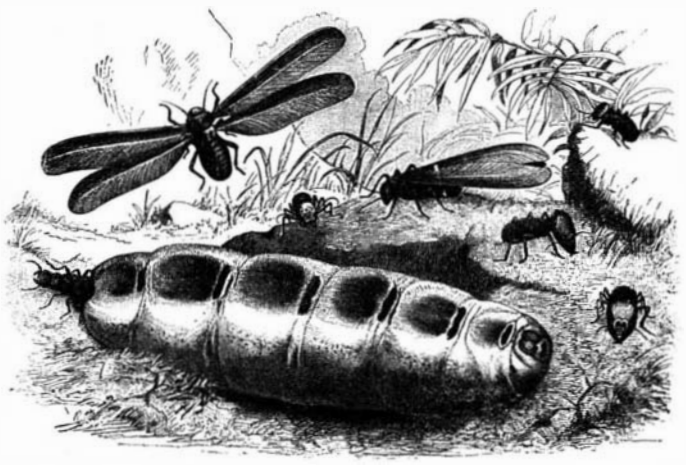
Mr. Francis W. Jones, the electrician, is credited with having arranged the electrical devices and the distribution of the electrical power in this building. His aim has been to have all of it fixed in as positive and simple a manner as possible and to provide for all kinds of contingencies. To electricians and others interested in electricity a visit to the building will be instructive.

A Few Kinks in Brazing.

Brazing is getting to be quite an art now that bicycle mending is coming in from all directions, and the way some of these thin steel tubes for the framework are handled down by the furnace-room door of an establishment is enough to make one think that soft coal and water gas must be selling cheap. A pound of spelter is first sent for, or something that will melt a trifle below the fusing point of common brass, and, if it is not already granulated, must be worked into fine powder with a file. A supply of borax is the next thing to look out for. Then if there is a gas jet handy an artificial blast can be sent through a burner of the Bunsen type and quite a heat directed on a bed of charcoal, where the delicate work is supposed to be buried waiting for the brazing. The joint to be brazed is intended to be made as firm as possible by having a close fit well pressed together, so much so that it will stand the sharpest raps of the poker, for when the brazing materials first melt and are well absorbed in the joint, it is a relief to realize what a rap will do toward working the solder through the joint and knocking off the waste material. The borax is first spread over the joint as the work is approaching a low red heat, and it soon swells up and turns into a snow-like froth, on account of the water of crystallization boiling out of it, settles down and flows over the joint like glass, ready to clean off the surface and prepare the way for the soft brass that is about ready to melt under this temperature. Then comes the green blaze that is always a sure index that the work of sweating the joint with brass is being performed. The zinc, from which is due the green blaze when the brass flashes, is employed in the brazing material to reduce the melting point of brass, and, when it volatilizes and gives off the fumes that produce the colored blazes, leaves the brass behind in a less fusible state. It stands the brazer in hand, then, to prepare the work with the brass all in position and heated so carefully that none of it will melt till the joint is well heated all alike and every portion settles down at the same moment. Borax is a substance that is supposed to dissolve all the rust and every kind of earthy substances and make a clean surface no matter how the work is brought together, but the surfaces that are found on both the outside and inside of steel pipes, as well as drop forgings, will need to be cleaned off by some other treatment in which a file or scraper will be found useful. With sheet iron a joint can be brazed by using filings from soft cast iron in the same way as if it was brass, and a joint produced that will pass off for welding. In all kinds of brazing the substance used for this purpose is inclined to etch the edges of the work and mar the surfaces wherever they have been exposed to the fused material, with the exception of silver. When used for a solder this substance has such a liking for iron and steel that it will take hold without any of that biting action whatever, and when we come to see how economically it can be used for these purposes, it would seem to be the cheaper material in the end.—*Boston Journal of Commerce.*

Action of the Liver After Death.

When a person dies, the tissues of which he is composed do not die immediately and simultaneously; so the chemical functions of the tissues continue for some time after death. The most celebrated example of the persistence of the life of the organs has been given by Claude Bernard, who has shown that the liver continues to form sugar after it has been removed from the body. Mr. Charles Richet has just proved that one of the most important functions of the liver, that of the formation of urea, continues to act the same way in the liver removed from the body and washed.



THE QUEEN ANT, SOLDIERS, AND WORKERS.

If, in fact, the quantity of urea that the liver contains be ascertained through analysis, it will be found to be nearly 0·25 per kilogramme of liver; but, if such liver extracted from the body be put into a stove at 40°, we shall find at the end of a few hours that the proportion of urea has greatly increased, and that there is then 0·9 of it. Consequently, the essential chemical phenomena continues to take place in this organ, and the glycopoictic, like the ureopoictic function, is still exerted in the liver separated from the circulation and hæmatosis.

The parallelism between these two great functions is complete. The sugar is formed through a phenomenon of diastasis, and the urea also is formed by an analogous chemical action. The demonstration of this is now made, for Mr. Richet has been able to filter the liquid expressed from the brayed liver and to establish the fact (in taking precautions, of course, against any microbian infection) that urea is produced in such liquid.

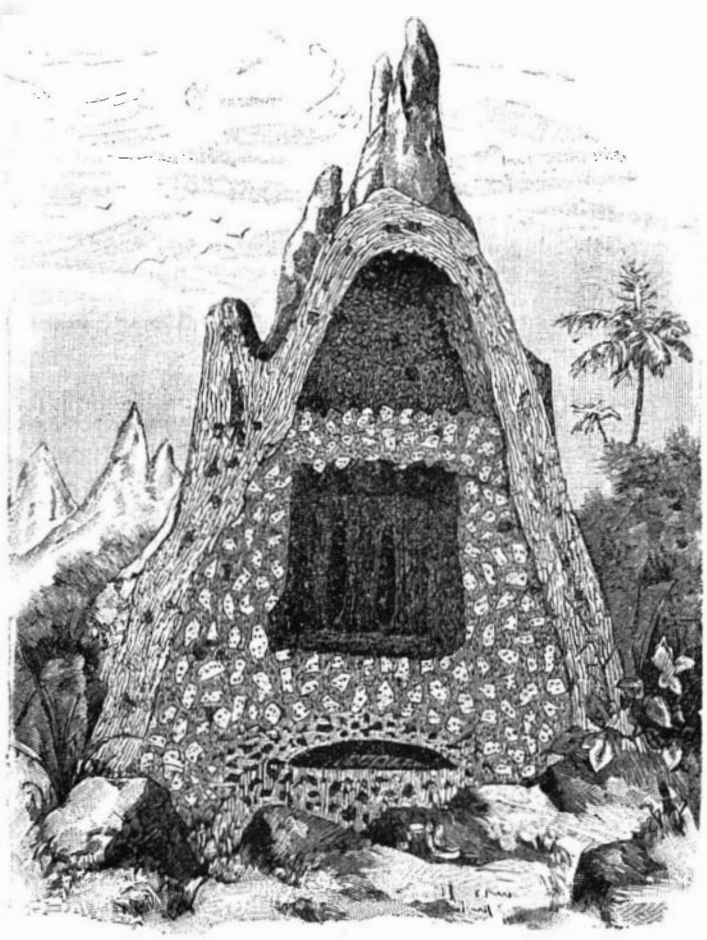
We have here the first example of a ureopoictic diastasis, and this remarkable phenomenon throws a light upon one of the functions that, up to the present, has been the obscurest of the hepatic gland.—*Le Genie Civil.*

THE TERMITES OR WHITE ANTS OF AFRICA.

The scientific traveler, Max Buchner, tells us how we may picture to ourselves the savannas of Central Africa: "First sprinkle a few million brick-red, irregular pyramids of the termite or white ant over a brick-red surface, in the proportion of, at least, five to the hectare. Next, take about four times this number of trees, and distribute them so that there shall be twenty, more or less, to the hectare. Then distribute, in like proportion, an equal number of Bushmen. Finally, fill up the intervening spaces with clumps of high grass, just far enough apart to render visible the red earth between. Do this, and you will have a faithful representation of the open African forest, but little influenced by the destructive hand of man."

The presence of these white ant pyramids is the characteristic feature of the African landscape. The builders of these structures are not ants; but belong to the much smaller family of termites. There is scarcely an insect so thoroughly hated by man as the termite, and the hatred is fully justified. "There are regions in Africa," writes a traveler, "of which it is safe to say that if a man with a wooden leg were to lie down to sleep at night, nothing of the leg would be visible in the morning save a little sawdust." The termites gnaw away everything; the balconies and posts of the houses, tables, chairs, wardrobes, books, leather, cloth—in fact, little comes amiss to them except iron—though, strange to say, on the authority of Franz Leuschner, they will not touch the European pine and fir timber brought to Africa for building purposes. The evidences of the destructive labors of the termites are to be seen on every side; but the creatures themselves are rarely seen. They steal sneakingly to their labors. They are all blind, with the exception of the king and queen, and all defenseless except the soldier caste, which constitutes about one or two per cent of the population. To escape starvation they must leave their subterranean homes or pyramids in search of dead wood, and, because of their blindness, they render themselves invisible as the best mode of defense.

If one has an opportunity to observe the insect in his work of destruction, the sight is really a most remarkable one. Here is an opening in the earth. A little head appears in it, with a pellet of clay in the jaws; the pellet is laid down, and soon another head appears with another pellet covered with a viscid salivary secretion, by means of which the pellets are fastened together. In this manner, by incessant toil, a small clay tube is constructed, and prolonged until it strikes against a piece of dead timber, the soldier termites guarding the opening from hostile insects the while. The termites then gnaw their way into the timber, eating or removing the whole inner contents, leaving only a thin outer shell. These tubular passages, made by the termites, are even more wonderful than their pyramids. They are about the diameter of a small gas pipe, and are frequently carried in a zigzag course by the termites up the trunk of a tree in their search for a dry branch. One may travel for hours and not find a single tree without one of these passages.



PYRAMIDS OF THE WHITE ANTS.

In spite of their destructive proclivities, the termites perform much useful work. There is a certain neatness in the open park-like scenery of Central Africa which strikes one immediately. It gives one the impression that it is scrupulously swept and cared for, and one asks himself, involuntarily, what good fairy maintains such perfect neatness and order in the wilds? There are, indeed, forest keepers of various species, who are continually occupied in the removal of all dead animal matter, from the fallen elephant to the dead fly, and who bury in the purifying earth what they cannot consume. What these do for animal remains, the termite does for the vegetable kingdom. Every trunk, branch, twig, or old bark layer the moment it is smitten with death, is attacked by the white ants who subsist on it, and whose numbers are limited only by their means of subsistence. The balance between them and the vegetable kingdom is thus maintained by natural law. If we examine their pyramids, we find that the interior, as shown in the illustration, contains innumerable chambers connected by passages. There are store rooms, breeding rooms, and nurseries. The chamber of the queen is near the ground, and frequently below the surface. Each of these settlements may be taken as representing a kingdom whose people are divided into distinctive castes, with division of labor. First, there are those engaged in the perpetuation of the species. There is only one queen in each settlement, and she, when fertilized, is enlarged to a cylindrical shaped figure, several centimeters long, with nothing in her appearance, except her head, to