process of restoration except as an interesting experiment. The original and proper strength of fine steel can never be FULLY RESTORED after it has once been destroyed by overheating.—*Treatment of Steel.*

Geology of the Panama Canal Route.

Discussing the geology of the Isthmus along the route of the proposed canal, the Panama correspondent of the *Herald* says:

The nearest signs of comparatively recent volcanic action are to be found in the neighboring Department of Veragua, in this State; and the conical hills between here and the Atlantic are not, as one might suppose, of surface volcanic origin. But it is admitted that the signs of submarine igneous action are to be found in considerable variety. Granite, syenite, and crystalline schist are not plentiful. Trachytes, blendes, dolomites, and basalts are, however, to be frequently met with. Columnar basalt composes a goodly portion of the Culebra Mountain, and it is very hard. The trachytes line much of the Chagres banks on both sides, forming hills that range away back into the country. In the bed of the Rio Grande dolomites and trachytes predominate, while on its bottoms the sedimentary earths are formed of vegetable mould and submarine tuffs. On the Atlantic side, near Mindi, these formations are of rocks which have little cohesiveness. The corresponding formations on the Pacific slope belong to a more ancient period. A variety of conglomerates, containing porphyry, granite, and syenite, is discoverable in the vicinity of Panama; but neither dolomites nor basalts appear here. The rocks receive their characteristic color from the presence of peroxide of iron. The stratified ledges in the center of the isthmus are acknowledged to have originated in submarine volcanic action of the tertiary period.

The conglomerates around Barbacoas are exceedingly hard and tenacious. Near San Pablo station the gray conglomerate, whose layers may be seen from the railroad, contains trachyte of a totally different nature from what is found within a radius of twenty-five miles, as it does not show any fossil remains. Some not very distinct traces of fossils are discoverable among the calcareous spars on the banks of the Obispo River. At Gatun the upper strata are mostly made up of brown argillaceous matter and rocky detritus. Here fossils are met with in such small fragments that it is difficult to classify them; nevertheless, they appear to differ but little in character from those of Aspinwall bay. Under some of the recent tertiary formations deposits of conglomerates repose whose upper portions present the aspect of volcanic tuffs. Porphyritic and trap formations make up much of the rocky mountains in the background to the central chain of the Varro Colorado. The Panama sandstone formation belonging to the transition period extends to the slopes of the Cerro Grande, at which latter point it may be considered as almost identical with the rocky layers of Barbacoas. Only at the point called Varnos-Varnos is there a deposit which may be assigned to the secondary strata. The tertiary formation of calcareous and fossil bearing sandstone, and the most considerable after the traplic and porphyritic deposits, comprises all the distance from Trinidad River to the sea. Baila Monos marks the northern limits of the dolomitic, porphyritic, and trachytic deposits. At Mamei, in addition to the formations already named, there must be included several species of phonolites, granite, quartz, and dolomites coming from the rocky ledges above Las Cruces. Matechin, in addition to the rocks already mentioned, has trachiidolomites, simple dolomites, and several other kinds. It is here where the heavy work of excavation must begin if that sort of labor shall ever commence. Near Emperador the coniform hills are mostly made up of dolomites mixed with tuff of the conglomerate character in the nature of volcanic and marine matter. Coming up from the Pacific basalt is met with at Paraiso, nine miles from Panama. In the valley of the Rio Grande, which begins near there and runs toward the ocean, the pyramidal hills seen on either hand chiefly consist of basalts and dolomites, with conglomerite tuffs in the bottoms, mixed with earthy cements containing fragments of rocks belonging to the various orders. Around Pedro Miguel the formation is about the same in nature, excepting in this locality some beautiful agates have been picked up. Rocks of remote volcanic origin are found along the line to near Panama without showing the presence of either granite or gneiss. At the mouth of the Rio Grande, a little west of this city, there is a stratified horizontal belt of sandstone, holding no fossil remains, which seems to belong to the transition period. Panama is built on a small peninsula of this reddish conglomerate sandstone, and the picturesque Cerro de Ancon, a mile or so distant, is for the most part composed of conglomerate trachytes.

The Cause of Explosion in Kerosene Lamps.

The *Technologische Blätter*, of Vienna, contains a scientific disquisition by P. Knopp upon the causes upon which depend the explosions too frequently noticed in petroleum lamps.

The combustible hydrocarbon gases formed by the evaporation of petroleum burn easily, and when mixed in certain proportions with oxygen gas they burn so rapidly as to produce a violent explosion. This takes place when one part of the vapor is mixed with two parts of air. This gaseous mixture expands at the moment of ignition and in consequence of the heat generated, so that it far exceeds its former volume, and it makes room for its increased bulk by destroying the surrounding bodies. The explosions that occur in petroleum lamps have their origin in the existence of such explosive gas mixtures. What remains to be shown is: first, how such a mixture is formed in the receptacle; and secondly, in what manner it can be ignited.

The oil receiver, which in the greater majority of kerosene lamps consists of glass, has only one opening which is provided with a metallic collar. This is used both for filling the lamp and for receiving and holding the burner. This receptacle and the oil contained in it, when the lamp is burning, acquire a certain temperature, which is different under different circumstances, but in nearly all cases it is high enough to generate these hydrocarbon vapors. The higher the temperature of the oil in the receiver the more rapid, of course, will be the evolution of vapor.

Every burner, consisting of a good conductor, becomes heated by the flame and communicates this heat to the petroleum holder. Since heat and light are very nearly related this development of heat will increase in proportion to the illumination given by the lamp. For example: if a lamp that gives a poor light is burning in a cold room no vapors will be generated at all. On the other hand, if a lamp that gives a good light burns in a well-heated room, at a short distance from the ceiling, where the temperature, owing to the ascending heated air, often exceeds 30° R. (100° Fah.), and in addition to that a shade is suspended above it and thus reflects the heat down upon it, there will be a rapid evolution of gas and vapor. (Yet these hanging lamps very rarely explode, because they are let alone.)

Now let us imagine that a lamp has been filled to the rim with oil before the wick is lighted. The petroleum is consumed by the flame, and hence the volume of oil in the lamp gradually decreases. The empty space thus formed, so long as little or no vapor is generated, will be filled with atmospheric air sucked in through the burner. It is absolutely impossible to prevent this entrance of air; for if it were technically feasible, a vacuum would be formed in the lamp, and the oil could not be drawn up the wick to the flame, so that the burning of the lamp would be hindered if not entirely prevented. This admission of air, combined with the gases evolved in the lamp, are adapted to the production of the explosive mixture.

We now come to the question of how it is possible for this mixture to be ignited.

In all the burners hitherto in use in Germany the flame is regulated by shoving the wick up or down in the metallic case by means of a ratchet wheel at the lower part of the burner and attached to a projecting wheel and axle. Owing to the softness and flexibility of the wick this movement is possible only when the wick is rather loose and has some play in the tube. This space, which is frequently increased accidentally still more by the wick being too small or thin, would be of no importance so long as it merely permitted the atmospheric air to enter the oil holder, for this access of air, as already remarked, is not to be prevented, but rather aided. Unfortunately this space permits the gases rising from the oil to reach the flame, which is sure to take place as soon as there is the slightest pressure in the receptacle. This pressure, however, is necessarily produced by the development of gases in the holder.

If, now, these gases are pressed upward through the wick space by the side of the wick, they reach the flame and are at once consumed there without any explosive action as long as the gas is not mixed in the requisite proportions with the atmospheric air. Since this intermixing may take place in many different ways, we can explain in this way the many explosions and the greater or less danger with which they are attended.

If no explosive mixture of gases has been formed in the receptacle itself, but only in the tube with the wick, the explosion will be but a slight puff, accompanied by a flickering of the flame and the evolution of some smoke. This little explosion will be more violent and noisy the greater the volume of explosive gases that have collected in this wick tube. If the dangerous mixture almost fills the free space within the wick tube, the burning gases will burst out below because of their expansion at the moment of combustion. In such cases a bluish flame can be distinctly seen to descend into the oil cup or holder. This flame is immediately extinguished without any injury being done, provided there is no explosive mixture present in the oil receptacle itself, because the force generated by the expansion of so small a volume of gas as that burned in this case, does not suffice, as a rule, to break or injure the receptacle. If, however, there is an explosive mixture in the receiver itself, an explosion can not but take place, and its violence again will depend upon whether all the space in the receiver above the surface of the oil is filled with the explosive mixture of air and vapor, or only a part of it.

We may add that the less oil there is in the lamp the larger the space which may or may not be filled with this dangerous mixture. The relative safety of an oil is judged by the temperature at which it gives off combustible vapors, but in a lamp where a certain degree of rarefaction may exist it is quite possible for these vapors to be generated a few degrees lower than in the usual petroleum tester.

A Deep Oil Well.

One of the deepest wells ever drilled for oil purposes is the Tack Bros. well, recently finished in Millstone Township, Elk County, Pa. It was drilled to a depth of 2,600 feet, and was dry. The sands were found regularly, and the second sand looked very encouraging, but all hopes were abandoned when the third sand was passed and no oil found.

AGRICULTURAL INVENTIONS.

Mr. John Bartlett, of Oshawa, Ontario, Canada, has patented an improved root-harvesting machine, which removes the tops while the root is in the ground, and afterward removes the root from the ground.

Mr. John H. Bethune, of Fayetteville, N. C., has patented an improved cotton-chopper of very simple and inexpensive construction. The chopping wheel is rotated by connection with one of the driving wheels, and the forward end of the machine is supported on a shoe or runner of peculiar form.

An improvement in seed-drills has been patented by Mr. John Bartlett, of Oshawa, Ontario, Can. The object of this invention is to facilitate the planting of grain and seeds in drills and promote the convenience of the farmer by enabling him to plant different kinds of grain and seeds with the same distributing apparatus.

An improved harvester-finger has been patented by Mr. Charles Jay Johnson, of Lone Pine, Cal. The object of this invention is to increase the durability of mowing and reaping machine fingers by reducing the wear, and by providing a detachable wearing block at the back of the guide for the sickle-bar.

Sensitiveness of the Retina.

Any photographer who has ever considered the subject of the human eye as a camera and lens must have been struck with the marvelous sensitiveness of the retina, the part of the eye which represents the photographic plate or film; but probably it has never come under his notice that this sensitiveness varies, and to a very great extent. We know that the iris of the eye changes in diameter without our being conscious of it, and that it forms, in fact, a most perfect self-adjusting diaphragm, and we know that by this means a larger proportion of the light reflected by surrounding objects is allowed to enter the eye when these are dimly lighted, than when they are brightly; but it is not generally taken into account that there is a far greater change than this—that besides the change in the amount of light admitted, there is an enormous change in the sensitiveness of the retina. The very change is of such a nature as to prevent us from perceiving how very great is the range of light through which we can see distinctly. We shall take an example.

On a brilliant moonlight night, some hours after sunset, our friend, on looking round, remarks, "Oh, how beautiful, how bright the light; almost as bright as daylight," and really it almost seems to be so; yet we know that the light is in reality vastly less bright than sunlight. Let us look a little into what really is the ratio of the brightness of moonlight and sunlight. We all know, of course, that the light of the moon is but borrowed light—light received from the sun and reflected from its surface. Now, were the surface of the moon a perfect reflecting medium—that is to say, were it to reflect all light which reaches it—the amount which we should receive from a full moon would be only about a one-hundred-and-eighty-thousandth part of what we receive from the sun in the daytime. But it is evident that the moon's surface will reflect but a small fraction of the light which reaches it. Probably its average color is about the same as the color of the rocky parts of the earth's surface, and it is likely that we are overstating the amount actually reflected when we say that it may be a fifth or a sixth of the whole received, yet this assumption leads us to the astounding conclusion that the bright moonlight which we have so much wondered at is really about a million times less bright than sunlight. It is quite evident that, besides the alteration in the area of the iris of the eye which has taken place, there must, in the few hours between sunlight and moonlight, have been an enormous increase in the sensitiveness of the retina.

We have stated the ratio of the brightness of the sun and moon as perhaps a million to one; but certain experiments in moonlight photography, which we made some time ago, lead us to the conclusion that the ratio is probably considerably higher—likely about two millions to one.

The limit of sensitiveness which may, so to speak, be excited in the retina, does not, however, stop here. Under certain conditions it may be still more increased, so much so that moonlight may in its turn appear by comparison an almost unbearably strong light. It is not, as might be expected, by remaining in total darkness that the maximum sensitiveness may be reached; it is by working and continually using the eyes in the least possible light for a considerable time. We have experienced such a sensation when experimenting with extremely sensitive emulsions. We have worked for several hours in our dark room at night time by artificial light, and have kept the light just to the lowest point at which it was possible to see at all. On emerging from our room into the open air, the moonlight appeared so powerful that, for some seconds, it was painful to look at any white object lying in it. From this we conclude that the sensitiveness of the retina may become so marvelously great that it can perceive objects, and follow the rapid motion of those objects, in a light which may be white, but so dim that, were the retina replaced by the most sensitive gelatine film, it would take weeks or even months for a developable image to be impressed upon it.

But what is the practical outcome of all this to photographers? Well, we deduce from it a lesson which all of them might take to heart. There is the most extraordinary difference of opinion as to what is and what is not a safe light in which to work in the dark room. Now, we believe that a great deal of this difference of opinion is due to the fact that the constant change in the sensitiveness of the retina makes it most difficult to judge of the amount of red light which is being used. For example, one man is in the habit of leaving his brilliantly lighted studio, and immediately entering his dark plate room. At this time his retina is at its lowest sensitiveness. He will tell you: "I work in a place about as dark as pitch, and yet my plates fog if I do not keep them shaded from the apology for a light which I do have."

Another man exposes plates in the field. He brings a number home and develops them a few hours after sunset. He will tell you: "I use plenty of light. Ruby, doubtless, but a perfect flood of it, and my plates never fog." Now it may seem astonishing, but it is more than likely that the first photographer was working in a very much more bright light than the second, even although the non-actinic medium may have been of the same color in both cases.

A room which will—for developing—appear brilliantly lighted when entered some hours after sunset, will appear absolutely dark if entered from the open air at midday. We believe we do not exaggerate when we say that the photographer sometimes works in the daytime with a light a hundred times more bright than one which he would not consider safe if he entered his room at night.—*Photo News.*

DECISIONS RELATING TO PATENTS.

Supreme Court of the United States.

PATENT FOR MANUFACTURE OF IRON.—VINTON *vs.* HAMILTON *et al.*

The bill of complaint alleged that the defendants were infringing certain letters patent, dated October 14, 1873, granted to the complainant, John J. Vinton, for an improvement in the manufacture of iron from furnace slag, and prayed for an injunction to restrain them from further infringement and for damages and an account of profits. The answer of the defendants denied that Vinton was the original or first inventor or discoverer of the improvement in the manufacture of iron from furnace slag or from the slag of blast or smelting furnaces, set out in his patent, and denied infringement. Upon final hearing in the Circuit Court the bill was dismissed because the process described in complainant's letters patent was known and in common use before the complainant's application for his letters patent, and the same were therefore null and void. The complainants, therefore, appealed the case to this court.

Mr. Justice Woods delivered the opinion of the court.

It is matter of general knowledge that pig iron is made from iron ore in a blast or smelting furnace; that to secure this product the furnace is charged, first, with a layer of coke or charcoal, then with a layer of iron ore mixed with broken limestone, and so on in alternate layers until the proper quantity of these materials is placed in the furnace. The fuel is then ignited, and for the purpose of increasing the heat, streams of air are forced into the furnace by means of blast-pipes, the nozzles of which, called "tuyeres," are inserted in openings in the walls of the furnace, usually from four to six feet above its bottom. The limestone is used merely as a flux. The ore under this process undergoes a chemical change, and iron is formed and sinks in a molten state to the bottom of the hearth, by which is meant not only the bottom of the furnace, but its sides as high up as the foot of the boshes. The refuse left after the melted iron has dropped into the hearth is also in a molten state, and, being lighter than the iron, floats on its top. This is indifferently called "cinder and slag." About three or four times in every twenty-four hours the melted iron is drawn from the furnace. This is accomplished in the following manner: The furnace is constructed with two holes, one called the "iron" and the other the "cinder" notch. The iron-notch is made at the bottom of the hearth. The cinder-notch is higher up the side of the furnace, just below the level of the tuyeres—so high that the cinder can be drawn through it without letting off the molten iron. These holes are kept habitually closed with clay or other similar material. At frequent intervals, and always just before drawing off the molten iron, or making a "cast," as the ironmongers call it, the cinder notch is opened and the cinder or slag is allowed to escape, and is carried away from the furnace in a trough made of moistened sand. The cinder notch is then closed and the iron notch is opened, and the molten iron is drawn off through a sand trough, and conducted into moulds made in sand beds, called the "sow and pigs," where it is allowed to cool. The result is the pig iron of commerce. In the meantime the furnace is supplied with constant charges of fuel and ore mixed with limestone in alternate layers, dumped in from the top, and this process is kept up without cessation for months and sometimes for years. The sand trough which connects the pig-beds with the iron notch is usually larger and deeper, but more elevated than the sow or general gutter which conducts the iron into the moulds or grooves in the pig-beds. When the metal is first let into the trough it accumulates so as to fill it nearly to the brim. As the flow from the iron notch decreases, the iron and a small quantity of cinder or slag, which has been chilled by coming in contact with the cold surface of the trough, adhere to its sides and bottom. When the molten iron on the hearth is about exhausted the blast is increased, and the material left on the hearth is blown out through the iron notch into the sand trough. This also cools in the trough, and thus is formed what are known as "trough-runners," consisting of iron and slag, which have been forced through the iron notch by letting on the blast, as just mentioned.

A cupola furnace is one used for melting pig iron for the purpose of casting it into useful forms and articles. It constitutes part of the equipment of a foundry. In shape it is generally a hollow cylinder. The iron is melted by substantially the same process as the ore in a blast furnace. The cupola furnace has an iron notch, but no cinder notch, because there is generally so little cinder or slag in pig iron as to render such an opening unnecessary.

In order to reach the merits of the controversy it is necessary to obtain a definite idea of what, if anything, the appellants are entitled to under their patent. The specifications are ambiguous in respect to the particular kind of slag which is to be used in the process therein described—that is to say, whether it is the slag drawn off through the cinder notch or the runners which are left in the trough through which the molten iron is discharged from the iron notch of a blast furnace. It appears, however, from the evidence that the use of the latter only is contemplated, the former containing such a very inconsiderable quantity of iron as to be valueless.

We observe, in the first place, that the patent cannot be held to cover the discovery that the slag which is to be used in the process described in the specifications contains so large a percentage of good metallic iron that it can be profitably extracted by again smelting it.

The evidence shows beyond controversy that for many years before September 18, 1873 (the earliest date assigned to the discovery or invention of the complainant), it had been well and generally known that the trough runners contained a large proportion of metallic iron, and they were broken up and resmelted in blast furnaces. They were thrown into the furnace with scrap iron and iron ore, and smelted in the same manner. It was formerly a notion among old-fashioned furnacemen that the use of this material injured the furnace and deteriorated the quality of the iron produced; but this conceit had been exploded long before the date of appellant's patent, and the runners and other heavy slag were used habitually in many blast furnaces, as above stated.

Secondly. The appellant cannot claim as any part of his invention the use of a cupola furnace for the purpose of resmelting trough runners and heavy slag. The evidence in the record shows that as early as the year 1844, at the Jackson Furnace, in Venango county, Pennsylvania, which was a blast furnace, a cupola furnace was erected and used for the purpose of smelting heavy slag, from which was manufactured plow points and hollow ware, such as skillets, pots, and Dutch ovens. Sometimes the product was made into pig iron. This cupola furnace was thus used for three or four years. The fact of such use was public; no effort was made to keep it secret, and it was known in the language of the witnesses, "all around the furnace."

It is therefore abundantly shown in the record that before the date of complainant's patent or of his invention the smelting of trough runners and other heavy slag in cupola furnaces was practiced and well known.

Thirdly. The method of making slag granulous or spongy, by passing water or air through it when in a molten state, is not new, nor is it claimed to be new. Besides, there is no evidence that this process is used by the appellees.

Fourthly. The method of charging the cupola furnace and of smelting the slag as described in the specification of appellant's patent is as old as the art of making pig iron, except, perhaps, the sprinkling of scale or black oxide of iron on the top of the coke, and this is not done by the appellees.

Fifthly. The appellant does not claim that his invention covers a cupola furnace. A review of the case shows, therefore, that appellant did not first discover the value of furnace runners or heavy slag for resmelting; that he was not the first to smelt them and use them for running into pigs or castings, either in a blast furnace or a cupola furnace, and that there is nothing new in his process of smelting which is used by the appellees.

All therefore that is left for his invention to cover, and which appellant can claim as infringed by the appellees, is the employment of a cinder notch or hole in a cupola furnace to draw off the cinder when the furnace is employed in smelting furnace-runners or heavy slag. But if the testimony of unimpeached and uncontradicted witnesses is to be believed, as early as June, 1872, at Beaver Falls, Pennsylvania, a cinder notch was used by the Beaver Falls Co-operative Association in a cupola furnace when employed in smelting furnace-runners.

But even if the application of a cinder notch to a cupola furnace was first made by the appellant, the question remains whether, standing alone, it implies invention and is patentable.

We think this question must be answered in the negative. Neither a cupola furnace nor a cinder notch is new. The use of a cinder notch for drawing off cinders from a blast furnace is as old as blast furnaces themselves. The function which the cinder-notch performs in the process covered by the appellant's invention is precisely the same for which it is used in a blast furnace. In smelting slag in a cupola-furnace it was found that the molten cinder accumulated and floated on the top of the molten iron. The application to a cupola-furnace, for the purpose of drawing off the cinder, of the cinder notch used in the blast furnace to accomplish the same end, would occur to any practical man. When applied to a cupola furnace the same function was performed in the same way by the same means. In making this application there was no invention. (*Pearce* vs. *Mulford*, 102 U. S., 112.)

We are of opinion, therefore, that the application of a cinder notch to a cupola furnace for the purpose designated is neither patentable nor new, and that all the other parts of the process and appliances covered by appellant's patent were old and well known long before the date of his alleged invention and the patent therefor. The complainant was not the first inventor, either in fact or in law, of the discovery or invention described in his letters patent. The patent is therefore void, and the decree of the circuit court dismissing the bill was right and must be affirmed.

MISCELLANEOUS INVENTIONS.

An instrument for training and strengthening the muscles used in writing, for the use of learners, and also to correct bad habits of penmanship, has been patented by Mr. Horace Forbush, of New York city. The invention consists in a spring-slide provided with a handle for being held, and fitted so as to be moved in a manner similar to writing and to enforce correct position of the operator's hand.

Mr. James M. Hendershot, of Atchison, Kan., has patented a flexible spout for loading cars with grain from grain-elevators, and of the particular construction and arrangement thereof in connection with a wooden spout leading from the elevator. The spout or conduit is made of rings tapering, or sections hinged together in sets, the hinges of the sets being arranged on different diametrical lines of the spout.

A novel well-bucket, patented by Mr. William T. Hendricks, of Athens, Ala., consists of a bucket provided with pivots and a pail-frame made of a single piece of metal, and having a ring secured between the lower ends of its side pieces. By means of the frame the bucket is supported in such manner that the contents of the bucket may be easily emptied into another vessel by simply turning the bucket on its pivots.

A novel pole-rest for annealing-ovens, patented by Mr. Niles Granger, of Saratoga, N. Y., consists in providing the ordinary pole-rest bar of annealing-ovens with a bracket in which is pivoted a stand or support for a grooved wheel. In using the invention the pole, instead of being supported directly on the bar, rests in the groove of the wheel, which, by reducing the friction of the pole, lessens the noise and labor of packing the ware.

Telegraphic Progress in England.

Lecturing recently on "Electricity and the Electric Telegraph," at Kensington, Mr. Robert W. Johnston, Postmaster of the Eastern Central or "City" district, quoted some of the statistics of the Postal Telegraph system, which are interesting and instructive at the present moment. He showed that whereas the earliest telegraph of which we have any account required a separate wire for each letter of the alphabet, and that in the first really practical telegraph two wires were necessary for the transmission of a single message, as many as four messages can now be sent on a single wire at the same time—that the 6,000,000 telegrams forwarded by all the companies in their palmiest days had increased to more than 31,000,000 forwarded by the Post Office last year, and that whereas it might be remembered when the charge for a message from Edinburgh to London was something like 12s. 6d., it was now possible to telegraph from Scilly to Shetland, or from Jersey to John o'Groat's for 1s. Fifty thousand miles of wire in 1870 had increased to considerably more than 100,000 in 1882; 2,200 instruments worked by all the companies had increased to nearly 9,000 worked by the Post Office; and 2,500 telegraph offices under the old *régime* had increased to more than 5,500 under the new. Four thousand persons of all classes employed by the companies had increased to nearly 12,000 employed by the Post Office, and of these about 1,600 were women, of whom 600 are employed in the Central Telegraph Office alone. As to the transmission of news for the press, the Post Office had converted into an attractive monopoly what used to be a rather repulsive combination on the part of the old telegraph companies, and on one occasion quite recently as many as 750,000 words, equal to 350 average columns, had been transmitted from the Central Office alone. The lecture, which was of a thoroughly popular character, was illustrated by specimens of most of the instruments in use by the Post Office, as well as by a working model of the pneumatic tube system, telephones in circuit, and some minor experiments with the electric light.

THE ethereal oil of *Satureja montana*, L., is an orange yellow liquid having a specific gravity of 0·7394; $\alpha_D = -6{\cdot}5^\circ$. On shaking this oil with dilute sodium hydrate a phenol is obtained which was recognized as carvacrol. The oil contains 30 to 40 per cent of carvacrol. The hydrocarbons boil at 172° and 182°, and appear to be terpenes.—*A. Haller in Comptes Rendus*, xciv., 132.