enough upon the subject to get a glimpse of possibilities in this direction which an expert might easily develop.

We trust that Mr. Graham, who has done so much for the cause of brief writing in this country, will examine these possibilities, as we are confident such examination will lead his active mind into a new and interesting channel.

RADIATION OF HEAT.

We not long since briefly discussed the communication of heat by convection and conduction, endeavoring to place in a prominent light some popular errors upon these subjects, and mistakes in the construction of steam boilers, refrigerators, etc., resulting from such errors. It will not be amiss to notice the third way by which heat is transmitted, namely, radiation.

The term, radiation, itself indicates the chief peculiarity of this mode of transmission. All the so-called radiant forces, as heat, light, attraction, etc., act from a center outwards, and all other things being equal, they act equally *in all directions*, the straight diverging lines in which they act being called rays. It must be borne in mind here, that the word center, as used above, is not employed in its strict mathematical sense, but rather means the source from which the heat or light is derived, as these modes of motion may often be generated wholly upon the surfaces of bodies.

Although, to explain the radiation of heat and light through apparently absolute space, a medium called "ether" has been supposed to exist, and although this hypothesis most admirably accounts for the principal phenomena of radiation, and changes in the direction of radiation by refraction and reflection, and though this fact gives such an hypothesis a strong claim to the very general acceptance it has received, still we must remember that it is not a demonstrated fact.

It is not, however, necessary to our present purpose to dwell upon this point, as we wish only to notice some of the most leading facts of radiation, considered in their practical application to the arts, and some facts which have been recently discovered.

A common error is the idea that "heat rises." We have already alluded several times to this error, and shown its fallacy, and we will not dwell upon it now. Suffice it to say that only when the source of heat is placed in a circulating medium, does heat even *appear* to rise.

A heated body, placed within a space void of any liquid or gaseous medium, will radiate heat *in all directions*, the intensity of the heat at any point being to the intensity of the heat at any other point inversely as the squares of the respective distances of the points from the radiating body. This is a fundamental law of radiation, which experiment has demonstrated beyond dispute.

Experiment has also demonstrated that heat radiation is affected by the physical characters of the surfaces of the radiating bodies, and this point is of considerable importance in the arts. Kettles, with smooth polished bottoms, transmit heat to the liquids contained therein much less rapidly than those the bottoms of which are blackened and rough. A steam boiler well lagged, and having the lagging inclosed by polished sheet metal, retains its heat better than by the use of the lagging alone.

Dark colored bodies radiate heat more rapidly than light colored ones. They also absorb heat to a greater extent than light colored and polished bodies. Ice would keep much longer in a bright tin pail than in a dark and roughened one. The polishing of stoves, while it improves their appearance, diminishes their radiating power.

The power of radiation is diminished by hammering and rolling metal. A hammered copper vessel is therefore not as rapid a radiator of heat as a cast one. We have often heard people wonder why copper sauce pans tinned on the interior, are preferred over all others by professional cooks. The reason is that they do not absorb and transmit heat so rapidly as vessels of iron or tin plate. They are hammered out by the coppersmith, who leaves their bottoms quite thick in proportion to the sides. The metal is thus consolidated, and being brightly tinned on the inside, and kept bright externally, the heat cannot pass through them faster than the evaporation of their contained liquids can convey it away. Thus a cook may have twenty different sauces all boiling at once, and yet he has no fear that any of them will scorch. The same reason is doubtless the basis of the favor with which copper is regarded for vessels used in distilling, sugar refining, etc.

All, or nearly all the heat existing upon the surface of the earth, may be properly traced to the radiated heat of the sun. This heat converted into various forms of force, or, according to many modern thinkers, "modes of motion," is reconverted into heat motion again in the combustion of coal, and other chemical reactions, in friction, electric resistance, etc.

Sir John Herschel and M. Pouillet found that, were no heat absorbed by the atmosphere, about 83 foot-pounds per second would fall upon a square foot of surface placed at right angles to the sun's rays. Mr. Meech estimates that the quantity of heat cut off by the atmosphere is equal to about 22 per cent of the total amount received from the sun. M. Pouillet estimates the loss at 24 per cent. Taking the former estimate, 64·74 foot-pounds per second will therefore be the quantity of heat falling on a square foot of the earth's surface when the sun is in the zenith. And were the sun to remain stationary in the zenith for twelve hours, 2,796,768 foot-pounds would fall upon the surface.

The last number of *Silliman's Journal of Science* contains an account of some investigations made by the celebrated Magnus—whose death we recently announced—on heat radiated at low temperatures. It is supposed this was his last work previous to his death.

We will close the present article by transcribing the results he obtained:

"Different bodies at 150° C. radiate different kinds of heat. These kinds of heat are more absorbed by a substance of the same kind, as the radiating body, than by others, and this absorption increases with the thickness of the absorbent.

"There are substances which emit only one or a few kinds of heat, others which emit many kinds.

"To the first of these belong rock salt when quite pure. Just as its ignited vapor, or that of one of its constituents, sodium, radiates but one color, so rock salt, even at a low temperature, emits but one kind of heat. It is monothermic, as its vapor is monochromatic.

"Rock salt even when quite clear, emits, together with its peculiar rock-salt heat, heat which is not more absorbed by a plate of rock salt 80 mm. in thickness, than by one 20 mm. in thickness.

"Rock salt absorbs very powerfully the heat it radiates. It therefore does not, as Melloni supposed, allow all kinds of heat to pass through it with equal facility.

"The great diathermancy of rock salt does not depend upon its less power of absorption for different kinds of heat, but upon the fact that it radiates only one kind of heat, and consequently absorbs only this one, and that almost all other substances send out heat containing only a small fraction or none of the rays which rock salt emits. But all rays which differ from those radiated by any substance, are not absorbed by it, but pass through with undiminished intensity. From this we may infer that every substance is diathermanous, only because it radiates but few waves of quite definite length, and consequently absorbs only these, allowing all the others to pass through.

"Sylvin (native chloride of potassium) behaves like rock salt, but is not monothermic to the same extent. In the case of this substance also an analogy exists with its ignited vapors, or those of potassium, which, as is well known, yield a nearly continuous spectrum.

"Fluor spar completely absorbs pure rock-salt heat. We ought, therefore to expect that the heat which it emits will be equally absorbed by rock salt. Nevertheless, 70 per cent of this heat can pass through a rock-salt plate 20 mm. in thickness. This may doubtless be easily explained with reference to the quantity of heat which fluor spar emits in comparison with that of the rock salt; still it is possible that fluor spar at 150° emits rays other than those which it absorbs at ordinary temperatures. This behavior is however probably connected with the great reflecting power of fluor spar for rock-salt heat.

"If it were possible to produce a spectrum of the heat radiated at 150° C., the spectrum would, if rock salt were the radiating body, exhibit only one luminous band. If sylvin were used as a radiator, the spectrum would be much more extended, but would still occupy but a small portion of the spectrum which the heat radiated from lamp-black would form."

THE COMMISSIONER SUSPENDS A PATENT AGENT FOR GROSS MISCONDUCT.

Section 17th of the Act approved July 8, 1870, provides, "that for gross misconduct the Commissioner may refuse to recognize any person as a patent agent, either generally or in any particular case; but the reasons for such refusal shall be duly recorded and be subject to the approval of the Secretary of the Interior."

The Commissioner, indeed, has had this power since 1861, but during all that time, so far as we know, the penalty has not been inflicted until now upon any agent practicing before the office. Some complaints, however, have been made against agents for irregularities, and we have reason to know that ex-Commissioner Foote had occasion to regret his leniency in one particular case of a Washington agent, who had violated the confidence of the Office by writing to the clients of another agency during the pendency of the application.

The case brought to the notice of Commissioner Fisher was that of a firm styling themselves "McGill, Grant & Co.," of Washington City, who are charged on seven distinct counts with the crime of misappropriating the moneys of their clients, and in maintaining a false correspondence in relation to the progress of business within the Patent Office.

George W. McGill, senior member of the firm, entered a general plea that the irregularities in the practice as complained of, were the result of having intrusted their Patent Office business to an irresponsible and drunken clerk. The Commissioner, however, refused to accept this answer, inasmuch as all the correspondence of the firm appears to have been carried on in McGill handwriting; and the order of the Commissioner is, "that the said firm of McGill, Grant & Co., as well as the said George W. McGill, be hereafter excluded from practicing before the Patent Office in any and all cases."

McGill has appealed to the Secretary of the Interior to examine his case, and the matter is to undergo further investigation by that official, who directs that the publication of the order be suspended.

THE PRESENT EUROPEAN WAR.

Doubtless all our readers are deeply interested in the great struggle now going on between France and Prussia. While the general discussion of its causes and probable political effect upon European affairs is foreign to the scope of our paper, we cannot refrain from calling attention to an article copied from the New York *Times* of August 17, which is decidedly the best explanation we have yet seen of the causes of the recent disasters to the French army and the success of the Prussians.

In our tour through Prussia in 1867 we were most deeply impressed with the great military strength of the nation. Not only had this kingdom at that time added to the martial spirit of its citizens by a most brilliant military success against Austria, but it was evident that in point of military organization, in the character of her arms, and the *morale* of her troops, she was then, as now, the most formidable military power in Europe.

In a letter published in this journal in August of that year we expressed the belief that the people of Prussia anticipated another war. Whether that surmise was correct or otherwise, certain it is that the event has found them fully prepared for the emergency.

Should the present war result, as now appears likely, in the defeat of France, the first rank in military prowess among the nations of Europe must be accorded to Prussia.

Our readers will find the article to which we have called attention full of instructive interest in this connection. As a fair, candid review of the situation, we commend it to their attention.

THE USE OF TORPEDOES FOR COAST DEFENSE.

It appears that the Prussians, not having a navy equal to the French, have laid a regular network of torpedoes along their Baltic coast, and at the mouths of the rivers Ems, Weser, and Elbe. Both classes of torpedo are said to be in use, the charge being in general dynamite, which, although a dangerous, is a fearfully explosive material. Many of these torpedoes are believed to be mechanical, and, if so, are exceedingly dangerous to both friends and foes. Others are arranged on the ordinary electrical principle, and are perfectly safe except when the electric communications are established. Thus the navigation of the coast, with its rivers and harbors, is quite open to the friendly ship. The merchantman fleeing like the dove from the hawk may safely steer over and among the hidden mines; yet the next moment, by the mere turn of a key, the channel may be effectually closed to the pursuer. The torpedo is the war ship's *bête noir*. The proudest iron-clad that ever floated is powerless against these submerged volcanoes.

Many English sailors remember the Russian torpedoes during the Crimean war. Harmless and insignificant as they were, yet they caused a good deal of trouble; and if they had only been on half or quarter the scale of the present mines, several English ships would be now lying in Baltic mud. We shall not be the least surprised, therefore, some morning to hear of the sudden disappearance of a nautical belligerent.

DEATH OF PROFESSOR PALMSTEDT.

The death of this distinguished chemist, the friend and cotemporary of Berzelius, occured at Stockholm, on the 6th of April, 1870, at the advanced age of 85. He devoted his long life to the good of his country. For twenty four years he was director of the polytechnic school at Gothenburg, and was thus enabled to introduce into Sweden the inventions and improvements of other countries. Technology and agriculture were his chief studies. He was the leading spirit in the organization of new schools and public exhibitions, and at the time of his death was actively engaged on a committee for the arrangement of a permanent exhibition of the products of Swedish industry, in Berlin. He made numerous journeys into foreign countries, the results of which have been published in Sweden—and among his papers have been found an extensive correspondence with nearly every chemist of note of the present century; among his letters, are 268 from Berzelius, which will be published by his executors, and doubtless throw much light on the history of chemistry.

He was a true patriot, an unselfish scholar, a useful man, and his death will be severly felt in Sweden.

SCIENTIFIC INTELLIGENCE.

TETRABROMIDE OF CARBON.

Messrs. Bolas and Groves have succeeded in preparing the tetrabromide of carbon for the first time, by heating together in a sealed tube, at a temperature of 150° C. (302° F.), for about 48 hours, two parts of bisulphide of carbon, fourteen parts dry bromine, and three parts iodine, and subsequently distilling the product off of a caustic soda solution, dissolving in hot spirits, and allowing to crystallize.

The tetrabromide of carbon is a white solid, crystallizing in lustrous plates, and melting at 195° F. It has an ethereal odor, somewhat resembling that of tetrachloride of carbon, and a sweetish taste—nearly insoluble in water, but easily dissolved in ether, bisulphide of carbon, tetrachloride of carbon, chloroform, bromoform, benzole, petroleum, and hot alcohol. It is not particularly acted upon by aqueous solutions of caustic soda and potash, or cold sulphuric acid, and with care can be sublimed unchanged. The authors have not had time to investigate the action of this interesting compound upon silver salts, ammonia, nor its physiological relations. It may prove to be a valuable salt in photography, as well as in medicine, and hence we have given a full notice of it.

ACTION OF SULPHURETED HYDROGEN ON THE SYSTEM.

Max Schaffner has recently made some observations on the action of sulphureted hydrogen that are worthy of publication, as the facts are not generally known.

When a workman remains for days or weeks in an atmosphere containing a very small quantity of sulphureted hydrogen, the symptoms are loss of appetite and headache. The sudden respiration of a large quantity of the gas produces immediate insensibility, as if the person had been shot by a bullet, all the muscles become rigid and motionless, the eyes are staring, and the lungs give out a rustling sound. Brought into the open air, and the head washed with cold water, the patient revives in a few minutes, and complains of lassitude, but not of any pain. Too long delay in such an atmosphere would be certain death, and probably a painless one. In one instance a workman who had been rendered insensible by the gas, on his recovery had his combativeness so much aroused that he attacked the bystanders, and was with difficulty kept in bounds. The action of the gas upon the eyes is to inflame them; they become red and swollen, and finally closed, with severe pain. As a remedy, a wash composed of one third of a grain of corrosive sublimate in three ounces of water, was applied.

A mixture of air and sulphureted hydrogen is remarkably explosive. A wire heated red hot and allowed to cool until its color is dark, is sufficiently hot to occasion the explosion of the mixture. The presence of a small quantity of water vapor will prevent the ignition of the gases. Great care should be observed in factories where sulphureted hydrogen is likely to be produced, as its action is subtile, and liable to occasion unexpected explosions as well as loss of life from its poisonous effects upon the system.

PREPARATION OF OXYGEN GAS.

Robbins' method for the preparation of oxygen gas without the aid of heat, has been modified by Böttger, and is represented as affording a pure gas as readily as hydrogen can be made from zinc and dilute sulphuric acid. He takes equal weights of peroxide of lead and binoxide of barium, in a tubulated retort or flask, provided with a safety tube, and pours on weak nitric acid (9° B.); the evolution of oxygen takes place regularly, and the reaction is explained as follows: Binoxide of hydrogen is first formed, and this is at once decomposed by the peroxide of lead, and pure oxygen is liberated. The mixture of the dry lead and barium salt will keep in a well stoppered bottle, and thus the necessary reagents for the evolution of oxygen can be always on hand.

DU MOTAY'S METHOD OF PRODUCING HYDROGEN.

Dr. C. Widemann gives in the *Journal of Applied Chemistry* the latest and most economical method for the manufacture of hydrogen gas on a large scale, invented by Tessie du Motay, and explains why the old way of decomposing steam by live coals cannot succeed. The reason why water cannot be burned as a fuel with any economy is stated as follows: "First, because in the generation of steam a great quantity of latent heat is absorbed; second, because the vapor produced at temperature of 100° C., requires a considerable quantity of free heat, in order to raise it to the temperature at which it will be decomposed, and this heat must either be taken from a special apparatus for super-heating, or it must be furnished by the incandescent coal which it ought to decompose; third, because the retorts containing the carbon which decomposes the water, when brought to a red heat, and exposed directly to the steam, soon become damaged and unfit for use."

He might have added that in most cases the iron of the fire box or grates, or the nozzel of the blower is what is burned up in the production of hydrogen in this way.

Du Motay overcomes all of these difficulties in a very ingenious manner. He discovered that the hydrates of soda, potash, strontia, baryta, or lime, when mixed with charcoal, coke, anthracite, pit coal, peat, etc., and heated to redness, are decomposed into carbonic acid and hydrogen, "without further loss of heat than that due to the production of the carbonic acid and hydrogen."

The hydrates can be used indefinitely, provided they be moistened and regenerated after each operation. No special apparatus for the generation of steam is necessary, and the retorts are less liable to attack. The operation is analogous to the manufacture of carbureted hydrogen by the distillation of coal.

The invention is scarcely inferior in importance to the discovery by the same chemist of a cheap method for the manufacture of oxygen, and if the two processes can be combined, we are in a fair way of obtaining oxyhydrogen gases for metallurgical and other purposes.

With such a source of heat as this constantly at hand, the manner of reducing all metals from their ores will be revolutionized, and many metals which are now with difficulty worked, will at once become available.

IODINE FROM CHILI SALTPETER.

Professor Wagner, in his reports, says that the manufacture of iodine from Chili saltpeter already amounts to 30,000 lbs. per annum. The method invented by Thiercelin for its reclamation from the crude material is as follows: The mother liquors resulting from the manufacture of saltpeter are treated with a mixture of sulphurous acid and sulphite of soda, in proper proportion, and the iodine will be precipitated as a black powder. The precipitated iodine is put into earthen jars on the bottom of which are layers of quartz sand, fine at the top, and coarse at the bottom; from this it is removed by earthen spoons into boxes lined with gypsum, and a greater part of the water thus removed. It is sometimes sold in this impure state, or further purified by sublimation.

The Great Fire in the Woods near Ottawa.

As we are preparing for the press we receive news that the great fire in the woods near Ottawa, Canada, has completely surrounded and now seriously menaces the city. Much property has been destroyed, and quite a number of lives have been lost. North of the city, one and one half miles from the suburbs of Hull, containing all the saw mills and a vast quantity of sawed lumber, the flames are distinctly visible. If the fire reaches the lumber at Hull nothing, it is thought, can save Ottawa from destruction.

MECHANICAL MOVEMENTS.—We are in receipt of a large number of solutions to mechanical problems, published on page 71, present volume. These will all receive due attention at our earliest convenience.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

This learned body commenced its annual session at Troy, N. Y., on the 17th of August.

The Vice President took the chair, and in response to the address of welcome delivered by the Hon. John A. Griswold, thanked that gentleman for his generous recognition of the association, and took the opportunity to review briefly the work of the society, tracing its first incipient beginning in 1840, when it took being in the study of geology and natural history. In 1848 it was reorganized on a broader basis, and the mathematical sciences were comprehended in its investigations. During the four years of the rebellion no sessions were held, but in 1866 it was reorganized at Buffalo, and has achieved most important results since that time. The association to-day misses some of its most honored members. Silliman, Hare, the Rogers, Bache, Hitchcock, and Emmons are no more. Sickness holds others in bonds. Prof. Agassiz, though well enough to take the mountain air, is not yet strong enough to be with us, and Prof. Dana is too feeble to come. Prof. Henry is in Europe, and thus we lose some of our strong men. But we have strength left. There are young men here who are an honor to the cause. It must be clearly understood that this association is not a close body, designed only for the select few; it is more democratic: it enrolls all who take an interest in science, and assures all a candid hearing, no matter what his creed or country. This is the fourth time we have met in this great State, and it is proper that this Empire State should be considered by the representation of American science. It was the first State in the Union to organize a complete system of geological and natural history surveys of its territory, and is therefore classic ground for the student of those sciences. To Troy we look with interest for the success of our meeting, on account of the Rensselaer Polytechnic School—the pioneer of the kind in America—and which, having seen half a century of prosperity, is now more active than ever. To the chemist and metallurgist the extensive iron works here offer great fields for special study, such as few others in the world can equal. Here applications of science render the conversion of ore an ascertained art, and no longer a venture of empiricism. Here also are those famous Bessemer steel works, of whose wonders we have all read, and whose importance is not limited to the production of steel, but, studied by the aid of the spectroscope, throws new light on the chemical and physical constitution of the sun and the furthest nebulæ. These things are mentioned to show that the practical is dealt with by this association.

The work of organization was then resumed, and the following committee appointed: Prof. John Tarry, Prof. E. D. Cope, A. Gray, E. N. Horsford, Prof. Hillyard, and Prof. Winchell. These are on special business before the convention, and all gentlemen of great scholarship, more than half of them presiding over most important colleges.

The Convention then divided into sections, as follows: A, Mathematics and Physical Sciences; and B, Geology and Natural History; each meeting at different places for discussion and business. Section B completed its organization before adjournment, by electing as chairman Prof. Asa Gray; Secretary, Prof. Hartshorn; Sectional Committee, Profs. Hall, Morris, and Hyatt; Committee to unite with Common Nominations, Profs. Dale, Moses, Dalrymple, and White.

Among the papers read on the 18th, and up to the time of our going to press, the only ones of much popular interest, are one on the Isothermals of the Lake Region, by Prof. Winchell, and Notes on the Condors and Humming Birds of the Equatorial Andes, by Prof. Orton.

The paper read by Prof. Winchell provoked earnest debate. The paper embodied the results of careful and prolonged observation at various localities in the region west of the great lakes as far as Nebraska. The Professor used in the illustration of the subject nine isothermal charts for several of the summer months, and winter, autumn ,and spring year mean minima and extreme minima. The professor indicated the wonderful changes in temperature caused by the great lakes in the contiguous country. The cooling influence, science attests, is exerted chiefly on the west side of Lake Michigan and the warm on the east, which depends again on the prevailing winds in summer along the shores of the lake from the east of the meridian in summer, and west of it in winter. In July, for example, the cooling influence on Lake Michigan deflects the isothermal 140 miles, while to the west of the lake they are deflected 400 miles. In January, the mean temperature on the east side of the lake is from four to six degrees higher than on the west side. The isothermals for spring show a marked cooling influence exerted on the west side, and those for the autumn a warming influence on the east side, the joint effect of which is to render the growing season six to thirteen days longer on the east side than on the west side of the lake. The most marked effect and the most surprising is felt in times of *extreme* weather, especially if cold. The isotherm of mean and extreme minima run almost literally north and south along the shore of Lake Michigan. The most excessive cold at Mackinac for a period of 28 years is not on the average greater than at Fort Riley, in Kansas, 480 miles further south. At Chicago it was one degree less than for eleven years. The isothermals for the year might be expected to show no resultant of lake influences. On the contrary, it demonstrates wonderfully the wavering influences excited on the east side; this because the liquid temperature is above that of the contiguous land. Several causes account for the increased heat of the water. The great depth of the lake (900 feet) is sufficient to secure 18 degrees of increased temperature from the earth's heated interior. This, diffused through the waters of the lake, would result in an equal and average elevation of temperature sufficient to cause the phenomena witnessed in the temperature.

In his paper, entitled "Notes on the Condors and Humming Birds of the Equatorial Andes," by Prof. James Orton, of Vassar College, said no bird has suffered more from the hands of the curious and scientific than the condor. Exaggerated stories of its size and strength continue to be published in our text-books, as, for example, that it carries off children, and that the expanse of its wings is from 15 to 20 feet, whereas it is not capable of lifting from the ground over a dozen pounds, and it is doubtful if any specimen ever measured 12 feet. Neither Humboldt nor Darwin found one over 9 feet, but an old male in the Zoological Garden, of London, measures 11 feet.

Whether this greatest of unclean birds is generically distinct from the other great vultures is yet a question among ornithologists, some including in the genus *Sarco ramphus*, the California and King vultures. My own observations of the structure and habits of the condor incline me to say it should stand alone. It is also very certain that, contrary to the usual supposition, there are *two* species of condor on the Andes. The brown kind has been considered the young of the royal black; but it is evidently distinct. The reasons for this belief were given in detail by Prof. Orton.

The largest condors are found about the Volcano of Cayambi, near Quito, and most commonly around vertical cliffs. It is often seen singly soaring at a great hight in vast circles. It never flaps its wings except in rising from the ground. Humboldt saw one fly over Chimborazi; I have seen them sailing at least 1,000 feet above the crater of Pichincha. It a marvelous eater. I have known a condor of moderate size to devour in one week a calf, a sheep, and a dog. It will eat everything but pork and cooked meat. The only noise it makes is a hiss like that of a goose. Incubation occupies about fifty days, ending in April. The young cannot fly till they are over a year old, for up to that time they are as downy goslings. While moulting, they are fed by their companions, moulting time not being uniform. There is a singular difference between the sexes, the eyes of the male being light brown and in the female bright red. The females are also smaller in size, and want the crest and wattle. The toes are less prehensile than those of other Raptores. Professor Orton also gave some new facts respecting the Hummers of the Andes as the result of his own observations. The group *Polytminæ* comprises nine tenths of known species. Their headquarters seem to be New Granada. Many of them are restricted to very narrow localities. Of the 430 species known, 84 are found in Ecuador. If the wanton destruction of specimens for decorative purposes continues, several genera will soon be exterminated.

Nidification is uniform at the same altitude and latitude. In the valley of Quito it occurs in April. The nest is built in six days. Some are cup-shaped; others hang like a hammock by spiders' webs, while the long-tailed species constructs a purse-shaped net. Prof. Orton here exhibited several specimens to show how strikingly the nests of the Andean species differ from those of our own hummer—the latter being covered with lichens, and the former invariably with moss. The usual number of eggs laid is two, and these are of a pinkish hue. Incubation lasts twelve days at Quito, and there is but one brood a year, though two in Brazil.

Models for the Patent Office.

Under the new law the Commissioner may, at his discretion, dispense with models when application is made for a patent, but he does not propose to relinquish the requirement except in cases where the invention can be clearly understood without a model. In dealing with our clients we shall be very careful to advise them when we think a model may be dispensed with. Examiners as a rule are opposed to doing away with models, and the case must necessarily be a clear one before they will consent to act without them.

ALASKA FURS.—Notice has been received at the Treasury Department of the arrival of the steamer *Alexander* at San Francisco, from Alaska, freighted with the seal fur product of 1869. She brought 60,992 skins taken on the island of St. Paul, and 24,969 skins taken on the island of St. George, making a total of 85,901 skins, upon which the owners are required to pay a tax to the United States of one dollar upon each skin. The same vessel brought 1,688 fox skins from the same islands, but as the law imposes no tax upon these the question has been submitted to the Treasury officials as to allowing them free of duty.

THE CHASSEPOT AND THE NEEDLE-GUN.—A private letter from an Englishman, dated "Saarbrücken, says: I can't help reiterating that in all the shooting there has yet been the Prussians have had out and out the best of it. Nothing could be worse than the Chassepot at short ranges. We see the Frenchmen spitting on their cartridges, sticking their fingers into their guns, and giving every possible sign that, after a few shots, the Chassepot gets so foul they don't know how to treat it."

CLOGGING OF BOLTING CLOTHS.—Messrs. Glen & Wright, of Atlanta, Ga., referring to a letter from a correspondent complaining of the clogging of bolting cloths, state that the Godfrey Patent Flour Cooler Bolt and Cleaner meets every exigency of the case.

INVENTORS who desire to know in advance respecting the novelty of their inventions, can have a careful preliminary examination made at the Patent Office for a fee of $5. Address (inclosing sketch and description) the publishers of this journal.