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 posactive mind into a new and interesting channel.

# RADIATION OF HEAT.

heat by convection and conduction, endeavoring to place in a j sodium, radiates but one color, so rock salt, even at a low temprominent light some popular errors upon these subjects, and | perature, emits but one kind of heat. It is monothermic, as the defeat of France, the first rank in military provess among mistakes in the construction of steam boilers, refrigerators, its vapor is monochromatic. etc., resulting from such errors. It will not be amiss to notice the third way by which heat is transmitted, namely, peculiar rock salt heat, heat which is not more absorbed by a attention full of instructive interest in this connection. As a radiation.

The term, radiation, itself indicates the chief peculiarity of in thickness. this mode of transmission. All the so-called radiant forces, as heat, light, attraction, etc., act from a center outwards, and | therefore does not, as Melloni supposed, allow all kinds of all other things being equal, they act equally in all directions, | heat to pass through it with equal facility. the straight diverging lines in which they act being called rays. It must be borne in mind here, that the word center, ; its less power of absorption for different kinds of heat, but as used above, is not employed in its strict mathematical upon the fact that it radiates only one kind of heat, and consense, but rather means the source from which the heat or light is derived, as these modes of motion may often be gen-|substances send out heat containing only a small fraction or erated wholly upon the surfaces of bodies.

apparently absolute space, a medium called "ether" has been by it, but pass through with undiminished intensity. From supposed to exist, and although this hypothesis most admira- this we may infer that every substance is diathermanous, bly accounts for the principal phenomena of radiation, and only because it radiates but few waves of quite definite length, changes in the direction of radiation by refraction and reflec- and consequently absorbs only these, allowing all the others tion, and though this fact gives such an hypothesis a strong to passthrough. claim to the very general acceptance it has received, still we must remember that it is not a demonstrated fact.

dwell upon this point, as we wish only to notice some of the vapors, or those of potassium, which, as is well known, yield most leading facts of radiation, considered in their practical a nearly continuous spectrum. application to the arts, and some facts which have been recently discovered.

already alluded several times to this error, and shown its this heat can pass through a rock-salt plate 20 mm. in thickfallacy, and we will not dwell upon it now. Suffice it to say ness. This may doubth as be easily explained with reference that only when the source of heat is placed in a circulating to the quantity of heat which fluor spar emits in comparison medium, does heat even appear to rise.

or gaseous medium, will radiate heat in all directions, the in-temperatures. This behavior is however probably connected tensity of the heat at any point being to the intensity of the with the great reflecting power of fluor spar for rock-salt heat. heat at any other point inversely as the squares of the respective distances of the points from the radiating body. radiated at 150° C., the spectrum would, if rock salt were the This is a fundamental law of radiation, which experiment radiating body, exhibit only one luminous band. It sylvin bas demonstrated beyond dispute.

Experiment has also demonstrated that heat radiation is extended, but would still occupy but a small portion of the affected by the physical characters of the surfaces of the : spectrum which the heat radiated from lamp-black would radiating bodies, and this point is of considerable importance form." 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 tary of the Interior." 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.

rolling metal. A hammered copper vessel is therefore not as against agents for irregularities, and we have reason to know rapid a radiator of heat as a cast one. We have often heard people wonder why copper sauce pans tinned on the interior, in one particular case of a Washington agent, who had vioare 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 pronally, the heat cannot pass through them faster than the clients, and in maintaining a false correspondence in relation evaporation of their contained liquids can convey it away. | to the progress of business within the Patent Office. 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 Office business to an irresponsible and drunken clerk. The refining, etc.

be prop

We will close the present article by transcribing the results spirit of its citizens by a most brilliant military success he obtained :

"Different bodies at 150° C. radiate different kinds of heat, These kinds of heat are more absorbed by a substance of the sibilities, as we are confident such examination will lead his 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. We not long since briefly discussed the communication of Just as its ignited vapor, or that of one of its constituents, pared for the emergency.

> "Rock salt even when quite clear, emits, together with its plate of rock salt 80 mm. in thickness, than by one 20 mm. | fair, candid review of the situation, we commend it to their

"Rock salt absorbs very powerfully the heat it radiates. It

"The great diathermancy of rock salt does not depend upon sequently absorbs only this one, and that almost all other none of the rays which rock salt emits. But all rays which Although, to explain the radiation of heat and light through differ from those radiated by any substance, are not absorbed

"Sylvin (native chloride of potassium) behaves like rock salt, but is not monothermic to the same extent. In the case It is not, however, necessary to our present purpose to of this substance also an analogy exists with its ignited

"Fluor spar completely absorbs pure rock-salt heat. We ought, therefore to expect that the heat which it emits will A common error is the idea that "heat rises." We have be equally absorbed by rock salt. Nevertheless, 70 per cent of with that of the rock salt; still it is possible that fluor spar at A heated body, placed within a space void of any liquid  $150^\circ$  emits rays other than those which it absorbs at ordinary

"If it were possible to produce a spectrum of the heat were used as a radiator, the spectrum would be much more

### THE COMMISSIONER SUSPENDS A PATENT AGENT FOR GROSS MISCONDUCT.

recognize any person as a patent agent, either generally or

but during all that time, so far as we know, the penalty has not been inflicted until now upon any agent practicing before The power of radiation is diminished by hammering and the office. Some complaints, however, have been made and his death will be severly felt in Sweden. that ex-Commissioner Foote had occasion to regret his leniency lated 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

George W. McSill, 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 Commissioner, however, refused to accept this answer, inas-All, or nearly all the heat existing upon the surface of the much as all the correspondence of the firm appears to have been carried on in McGill handwriting; and the order of the

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 wasthen, 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 pre-

Should the present war result, as now appears likely, in the nations of Europe must be accorded to Prussia.

Our readers will find the article to which we have called 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 bete 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 Section 17th of the Act approved July 8, 1870, provides, for the arrangement of a permanent exhibition of the products that for gross misconduct the Commissioner may refuse to of Swedish industry, in Berlin. He made numerous journeys into foreign countries, the results of which have been pubin any particular case; but the reasons for such refusal shall lished in Sweden-and among his papers have been found be duly recorded and be subject to the approval of the Secre- an extensive correspondence with nearly every chemist of note of the present century; among his letters, are 268 from The Commissioner, indeed, has had this power since 1861, 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,

# 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 portion to the sides. The metal is thus consolidated, and Washington City, who are charged on seven distinct counts about 48 hours, two parts of bisulphide of carbon, fourteen being brightly tinned on the inside, and kept bright exter- with the crime of misappropriating the moneys of their 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 soluearth, may be properly traced to the radiated heat of the sun, bood carlies of the sun, bood carlies of the sun, and This heat converted into various forms of force, or, according Commissioner is, "that the said firm of McGill, Grant & Co., tions of caustic soda and potasn, or cold surprise acid, and the superstance of the sublimed unchanged. The authors have from practicing before the Patent Office in any and all cases." not had time to investigate the action of this inter-sting com-McGill has appealed to the Secretary of the Interior to ex-pound upon silver salts, ammonia, nor its physiological relaamine his case, and the matter is to undergo further investiof it.

to many modern thinkers, "modes of motion," is reconverted as well as the said George W. McGill, be hereafter excluded 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 gation by that official, who directs that the publication of the well as in medicine, and hence we have given a full notice would fall upon a square foot of surface placed at right angles order be suspended.

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 the general discussion of its causes and probable political fall upon the surface.

account of some investigations made by the celebrated Mag- the Prussians. nus-whose death we recently announced-on heat radiated : previous to his death.

### THE PRESENT EUROPEAN WAR.

struggle now going on between France and Prussia. While cidedly the best explanation we have yet seen of the causes

#### ACTION OF SULPHURETED WYDROGEN ON THE SYSTEM.

Max Schaffner has recently made some observations on the Doubtless all our readers are deeply interested in the great 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 atheat falling on a square foot of the earth's surface when the | effect upon European affairs is foreign to the scope of our pa mosphere containing a very small quantity of sulphureted sun is in the zenith. And were the sun to remain stationary | per, we cannot refrain from calling attention to an article hydrogen, the symptoms are loss of appetite and headache. in the zenith for twelve hours, 2,796,768 foot-pounds would | copied from the New York Times of August 17, which is de- The suddenrespiration of a large quantity of the gas produces immediate insensibility, as if the person had been shot by a The last number of Silliman's Journal of Science contains an of the recent disasters to the French army and the success of bullet, all the muscles become rigid and motionless, the eyes are staring, and the lungs give out a rustling sound. Brought In our tour through Prussia in 1867 we were most deeply into the open air, and the head washed with cold water, the at low temperatures. It is supposed this was his last work impressed with the great military strength of the nation. patient revives in a few minutes, and complains of lassitude, 1 Not only had this kingdom at that time added to the martial but not of any pain. Too long delay in such an atmosphere