Thus bodies may disappear in the process of solution so entirely that the microscope is impotent to detect them, to reappear when some other substance is added, to disappear again upon the addition of still another reagent, and so on ad infinitum. The deadly poison, which secretes itself in food or drink, is swallowed, and performs its work of death, reappears again in the test tube of the analyst to bear witness of poison that fewer homicides escape the punishment of their crimes when accomplished by such means than when death is procured by violence. The time was before the science of chemistry had made its present advances, when people might presence could be determined and when symptoms were the by a skillful pattern maker and molder. only evidence of poisoning. But that time has passed and modern science is now a very sleuth-hound on the track of those who attempt to take human life in this manner.

## MUSICAL INTERVALS.

The present musical scale, to which all modern musical instruments are attuned, has been made the subject of study by to be the most prominent. Tyndall, in his lectures on sound, touches very lightly upon this topic. He defines a musical sound to be one which "is produced by sonorous shocks which and their cheapness is gradually extending the demand for follow each other at regular intervals with a sufficient rapidithem. We predict that the time will come when most small ty of succession." The octave of any tone is produced by double the number of vibrations which produce that tone. The division of the interval of the octave into intervals including five tones and two semitones makes the modern diatonic scale. If the whole of this scale be divided into semitones, we have the chromatic scale of twelve semitones.

The discussion of this subject has lately been quite prominent. Several papers have been read upon it before the French Academy. M. M. A. Cornu and E. Mercadier have expressed the opinion that a single musical scale will not satisfy all conditions. They affirm that the intervals in a scale of melody are not precisely the same as in a scale of harmony. They remark that sounds that are pleasing in succession as melodies, are not necessarily pleasing when superposed as harmonies, and we may even be astonished that the intervals, hitherto considered the most perfect, as the octave, the fifth, and fourth, do not satisfy both conditions.

The ear detects faulty intonation in melody much more readily than in harmony, unless the volume of tone be subdued. Musical composers avail themselves of imperfect chords in passages where large volume of sound is employed, and powerful organs cover up discords that would be intolerable in instruments of less power.

The subject is beset with many difficulties. The instruments, which have been constructed with a view to remedy the defects of those which require what is called temperament in tuning, have never become popular. They have required too complex mechanism, and new systems of notation and fingering.

We believe that the maxim, "let well enough alone," may this subject Are not the instruments we now possess sufficiently accurate in their intonation to satisfy the refined ear? We think they are, and that in this respect they had better be let alone.

There is little doubt that instruments may be devised that would add to the resources of the orchestra, and that there is submitted to this injustice. still room for improvement in the action of such instruments as require a keyboard as well as in other respects. There is also room for improvement in the mechanism of brass instruments, especially those known as valve instruments; but we think an attempt to reach any further refinement of intonation unnecessary and impracticable.

## PROGRESS IN THE ART OF CASTING METALS.

Immense as have been the advances in all kinds of mechanical work during the last half century, it is quite doubtful whether any other department has more to boast of than the art of casting metals. Readers not yet on the downhill of life can recollect the clumsy, rough-surfaced castings which thirty years since formed the best work the founderies could then produce. Now the finish and lightness of hollow ware, stove castings, etc., leave little to be desired.

Since that period the application of this art to architectural purposes, has grown into a vast industry. The casting of stoves has also developed a trade of great proportions. There is scarcely a town in the United States large enough to find a place in a general map of the country that has not its a place in a general map of the country that has not have foundery, where job work of all kinds, stoves, plows, and other agricultural implements are made.

It has struck my mind that the "asbestos roofing" would suit in Western Texas. There is no pinery west of the Color-whole western would is settling up.

But progress in this art is not confined to the increase in the amount of work done, but is none the less remarkable in the methods of doing the work. It would be difficult to devise a form so complex that an experienced founder would hesitate to undertake it. We, not long since, had occasion to have a peculiar form of pattern executed in a brass foundery and model shop. It was apparently so difficult to make, that though it was desirable to have it cast for the sake of economical manufacture, we consulted the foreman of the shopa first-class mechanic—in regard to the practicability of con structing patterns that could be molded. His reply was, "If you consider it desirable to cast this piece in its present form, it must be cast so."

"But can you cast it so?"

"It is many years since anything has been brought to this shop that we could not cast, and we don't intend to have such an event occur now. Let us make the patterns and we will make the casting.

The piece was cast to our entire satisfaction.

It is within our recollection that the casting of iron cylinders with brass linings has been introduced, a process now successfully practiced in casting pump barrels, and cylinders for other hydraulic machines. Within that time also malleable castings have been brought nearly to perfection. We were shown a few days since a quantity of small castings, said to have been made of a species of steel, which had been against the homicide. So great certainty attends the detection | heated and hammered and bent and twisted, in a manner that showed they were in no respect inferior to forgings in strength and malleability. These castings were made in Scotland. We also saw lately a specimen of skill in molding and casting brass, being nothing less than a continuous chain be deprived of life by subtle poisons with little fear that its with hooks at each end, which had, as a curiosity been made

Neither must we omit to mention the perfection to which the casting of statuary, both of iron and bronze, has been brought. Some of these are models of artistic beauty, both in design and finish. The casting of small articles of malleable metal, is also largely on the increase, and people are beginning to learn that such articles are not necessarily liable to break because they are cast. Time was when cast eminent scientific men, among whom Helmholz may be said iron was unfit for any purpose where much strength was required, but the malleable castings of modern times are often better than the same articles made of wrought iron, articles of iron will be cast, and forging will be the exception, instead of the rule as at present.

> The amount of scientific research and experiment now being brought to bear on the real nature of iron and steel and the improved methods of manufacturing these most important metals, can hardly fail to produce as great improvements before the close of the present century as have taken place already. It may even yet be found possible to cast edge tools of as good quality as those now forged from steel

#### ONE-SIDED RECIPROCITY ABOUT PATENTS.

We have received through our correspondent at Montreal a copy of the proposed patent bill for the Canadian Dominion, introduced by Hon. Mr. Chapias. We have examined the bill with some care, and regret to state that it retains the only feature which has hitherto rendered the Canadian patent sys tem odious; viz., excluding all non-resident alien inventors from the right to take patents. Canada is the only civilized country on the face of the earth that refuses to accord a spirit of reciprocity in respect to patents for new inventions. Omission to do this can only be explained by the fact that the Canadian people desire to prey upon the ingenuity of our own and other inventors. If Canada will abolish her patent system entirely, then we shall have no reason to complain; but the Government carefully enacts a patent system to grant patents: to resident subjects, but as respects the rights of aliens they must reside in the country for one year next preceding the application, and make oath to the invention as original.

This system is a libel upon justice; and we sincerely hope that the Canadian Parliament will modify the bill before it aptly apply to those who are engaged in the discussion of finally becomes a law. We hope, also, that our Government will not enter into a new treaty of reciprocity with Canada without insisting upon a recognition of the right of American inventors to take out patents in the Dominion.

We call the attention of the Secretary of State to this matter. We insist that our men of ingenuity have long enough

# USEFUL MEN ... PERSONAL SKETCHES.

If our country has any one need to supply, it is that of men who are willing to devote themselves to the propagation of truth and the diffusion of useful knowledge. It is therefore with much pleasure that we introduce to our readers an extract from a letter recently received at this office from Rev. J. M. Baker, of Fayettville, Texas. He says:

I have been detained from superintending the construction of a new model of my "Universal Cultivator," by the protracted sickness of my wife. She died last week in the triumph of

I am extensively known in Mississippi, Louisiana, and Texas as an itinerant minister, and could act as an agent for any laudable invention, or newspaper, etc. My plan will be to travel in a two-horse rockaway, preach on the Sabbath, lecture during the week on Agriculture, and sell patents and act as an agent, should you or any of your friends want an agent in Texas, Louisiana, or Mississippi. For my standing and respectability I would refer you to "Bangs' History of Methodism," minutes of the Ohio conference, 1817. In the his-Methodism," minutes of the Ohio conference, 1817. In the history, the "M," by oversight of my friends, was left out and my name appears as "Job Baker." For my present standing I refer you to Isaac G. Johns, Editor of the Galveston Christian Ligantics.

ado river, in Texas. The whole western world is settling up. Shingles range from \$6 to \$8 per thousand.

It will be evident to all our readers that this correspondent, Mr. Baker, is one of those rare citizens, who is willing to make himself generally useful.

The letter of Mr. Baker, reminds us of a subscriber—another of that rare and useful class—who formerly resided in Iowa. In writing to us upon some business matters he stated that on week days he was "farmer, glazier, and homeopathic physician, and on Sundays a preacher of the blessed gospel."

Of the same class of useful citizens, though not a preacher is Mr. George Sibbald, of Preston, Md., who has made several inventions, but owing to misfortunes he has not been able to obtain means sufficient to perfect and patent them, and desires to obtain the assistance of a partner for that purpose. Mr. Sibbald's narrative of the misfortunes which have over-

taken his family are peculiarly touching. He says

I have only a few days ago executed powers of attorney required, and it will t with gentlemen of high standing to prosecute the recovery of ful in private houses.

our grandfather George's estate-three millions of acres of land. The original deeds are lost, but all the records show

I cannot even pay for an advertisement for a partner to bring out such an invention as my high-pressure air engine. Oh! if you could only even advertise for me, a few lines, on credit, how kindly I would take it. Other papers have often advertised for my father—many columns—about his claims, etc., on long credits, for hundreds of dollars. Our family is one of the most ancient and largest owners of real estate, and of ships and mills, in the country. We are descended from the ancient family of Sibbalds, of Scotland, and my brother in-law's family, from the ancient Setons of Scottish history; his grandfather was Sir Andrew Seton; and my mother's house is related to the Lord Norths, of England; her great-grandmother was Lady North; and she is also connected with the Snowdens of Wales, England. We all have our family arms; that of the Sibbalds is a cross argent on an azure field; and the motto on the several branches is beautiful. The Seton arms are a sword and crescent and lilies. The sword was given by Robert Bruce for service in the "Holy Wars." My mother's arms are stars and shells, and a peacock crest. I seal this letter with my grandfather's silver seal, having his initials—a bequest to meand for whom I am named.

Sometimes thoughts pass through my mind that this government is a failure, and that the "Japanese Prince," who is reported to have "laughed himself to death" at the idea of a people attempting to govern themselves, was not so foolish after all. I have long thought that we shall, finally, have an Empire, and that the alleged prophecy of James Hoag, the Quaker, will yet be entirely fulfilled, as truly as the fore part has been. I have seen so much corruption and injustice among politicians, and have suffered so much, that excuse me gentlemen if I have given but a moment's place to such passing thoughts. I sometimes think that the rebellion of this country against "old England," was wrong, and that Providence has repaid us in the same manner, perhaps; and that perhaps the best thing might be to go back to old England, and unite again under the "cross flag" of the greatest of nations—to prevent more civil wars and ruin.

There is something anomalous in this case of Mr. Sibbald. Here is a gentleman of honorable lineage struggling with the direst misfortunes, when the records clearly show, as he asserts, that he is an heir to an estate of three millions of acres. No wonder, when such injustice is allowed, that the sufferer should turn his attention to the mother country where his ancestry runs almost upon royal lines. We should be glad if the publication of this brief story of the Sibbald family should result in bringing assistance to this ingenious de-

### Spontaneous Ignition of Fireworks.

Mr. R. Trevor Clarke, in a communication to the Times on the frequency of fires in pyrotechnical manufactories—which he thinks may, in many cases, be attributed to the spontaneous combustion of that class of fireworks called colored fires observes, "That these compositions, the active agent in which is chlorate of potash, occasionally 'go off of themselves,' has long been known, but, I believe, no definite information on a subject so important, has ever been laid before the public. Herewith I send you, what I know of my own knowledge in the matter: Firstly, mixtures of chlorate of potash, sulphur, and black oxide of coppor are almost certain to ignite sooner or later, at uncertain periods, after mixing, and without premonitory phenomena. Secondly, mixtures of chlorate of potash, sulphur, and nitrate of strontia, in quantities larger than about an ounce, will frequently take fire within a few hours after they are made. When nitrate of baryta is substituted for strontia, the liability is nearly as great. When sulphuret of antimony or charcoal is added, the liability is greatly lessened, but probably not entirely done away with. Thirdly, when any of these compositions have become damp and ineffective from the deliquescent nature of the salts employed, and are submitted to too much heat for the purpose of drying them, they will suffer a peculiar and sudden decomposition followed by actual ignition. In the second case mentioned, decomposition is manifested by the evolution of an orangecolored gas, which hangs as a cloud or vapor over the compound. If the desiccation of the salts has, been thoroughly effected prior to mixing, and the atmosphere be in a damp state from weather or any other cause, the mixture, unless at once secured from moisture, will often ignite in an hour from the making. In the third case, as soon as the temperature rises to a certain hight, the mass begins to hiss and bubble, suffering a kind of fusion, accompanied with the production of the gas or vapor before alluded to. Of the nature of this vapor, which smells both of chlorine and nitric oxide. I am ignorant. The action is probably catalytic, and induced by the energetic absorption of moisture from the air. Our chemists could do no better service to the community than by investigating this matter thoroughly."

## How to Use Carbolic Acid.

A Canada paper states that Messrs. Salt of Birmingham, have constructed a very ingenious and well-designed apparatus for the vaporization of carbolic acid, by means of which that valuable disinfectant can be diffused through the rooms of a house without any of the disadvantages attending its use in its ordinary liquid state. The apparatus consists of a receptacle for the acid covered by a finely perforated lid. Beneath the receptacle is an air chamber, and beneath this chamber is a recess for a spirit-lamp. Two or three tablespoonfuls or more of carbolic acid, if in the liquid form, or a portion of the crystals having been placed in the upper receptacle, the lamp is lighted, and in a few moments the acid begins to evaporate and the vapor is diffused into the atmosphere of the apartment through the perforated plate. The apparatus will be found an excellent addition to the sick room, where it is found desirable to use carbolic acid as a disinfecting agent; Its great advantage is that it can be so manipulated as to keep the atmosphere charged with a distinct but not unpleasant odor of the acid, by increasing or diminishing the supply as may be required, and it will thus be found particularly handy and use-