pearance of the shooting-stars which nightly furrow the celestial vault, may be correlated with the principle of transformation of energy; and all the luminous, thermic and detonating phenomena attending the fall of such bodies in our atmosphere, seem to be fully accounted for by the enormous amount of heat thus generated by their passage through the air. According to this view, the shooting stars are nothing more than small meteoric stones which are volatilized and utterly dissipated in the upper regions of the atmosphere long before reaching the surface of the earth; only the larger masses ever come down, as such, to *terra firma*.

The origin of the luminous train seems to be due to the intense heat developed on the anterior surface of the moving mass, melting this portion of the same, and the fused matter being wiped off by the resisting air, streams back, forming the train of the meteor.

NUMBERS OF IGNEOUS METEORS.

It has been estimated that the number of meteors that enter our atmosphere per day cannot be less than 10,000,000. "If we include those smaller meteors which are seen only in the telescope, that number may be multiplied 20 or 40 fold." Those who were fortunate enough to witness the famous star-shower of the 13th of November, 1833, can well appreciate the vastness of numbers which entered our atmosphere in the course of a single minute of time. A single glance of the eye to the celestial vault, on that occasion, revealed thousands of these meteors traversing the heavens in various quarters.

Hence it is evident that the atmosphere which envelops our planet plays an important part in shielding its denizens from the destructive effects of these extra-terrestrial projectiles. But for the action of the air in arresting and destroying these meteors, we should be intolerably bombarded with them. The absence of an atmosphere about our planetary companion, the moon, must render her liable to be fearfully pelted with these minute celestial visitors.

COLORING METALS.—A foreign paper gives the following: Metals may be rapidly colored by covering their surface with a thin layer of sulphuric acid. According to the thickness of the layer and the duration of its action there may be obtained tints of gold, copper, carmine, chestnut brown, clear aniline blue, and reddish white. These tints are all brilliant, and if care be taken to scour the metallic objects before treating them with the acid, the coloring will suffer nothing from the polishing. On making a solution of 640 grains of lead acetate in 3,450 grains of water and warming the mixture to 88° or 90°, it decomposes and gives a precipitate of sulphuret of lead in black flakes. If a metallic object be immersed in the bath, the precipitate is deposited upon it, and the color produced will depend on the thickness of the deposit. Care must be taken to warm the objects to be treated gradually, so that the coloration may be uniform. Iron treated in this way has the aspect of bluish steel; zinc, on the contrary, becomes brown. On using an equal quantity of sulphuric acid instead of lead acetate, and warming a little more than in the first case, common bronze may be colored of a magnificent red or green, which is very durable. Very beautiful imitations of marble may be obtained by covering the bronze objects warmed up to 100°, with a solution of lead thickened with gum tragacanth, and afterwards submitting them to the action of the precipitate spoken of above.

"SAUCE for the goose is sauce for the gander," is now rendered: "The culinary adornments which suffice for the female of the race Auser, may be relished also with the masculine adult of the same species."

A SYRACUSE man announces that he has discovered a substitute for eggs. But the Detroit *Free Press* advises poultry raisers not to set their hens at any other than their usual business just yet.

SPONTANEOUS COMBUSTION BY ZINC

Dr. Hoffman has called attention to some curious cases of spontaneous ignition of hydrogen in air. The phenomenon has been noticed in factories where quantities of zinc were being dissolved in hydrochloride acid for the preparation of zinc chloride. Violent explosions took place when no flame was near; and it was eventually ascertained that the gas took fire spontaneously. It appears to be caused by fragments of very porous zinc, which, when lifted above the surface of the liquid during the violent evolution of the gas, and so brought in contact with hydrogen and air, act just as spongy platinum would do under the circumstances. The author recommends the performance of such operations in the open air. The ignition can be shown by treating a few kilogrammes of finely divided zinc with acid. The "zinc dust" may even ignite by contact with water.

A recent issue of the *Insurance Record* calls attention to the dangerous character of zinc dust, which appears to be imported into this country in considerable quantities for use in certain branches of industry.

The material presents the appearance of a gray powder, in an extremely fine state of division, in which condition it is largely used in the manufacture of paints. Chemically, it contains as much as 40% of metallic zinc dust, the remainder being oxide and carbonate. Another variety of the same commodity, known commercially as slate-colored zinc oxide, contains really very little or no oxide at all, being almost wholly a metallic dust, which, in the process of manufacturing zinc-white, has escaped combustion, and is deposited in the flues of the condensing apparatus. These products, the *Insurance Record* points out, are extremely apt to originate mysterious fires, if precautions are not taken to keep them from contact with moisture; for, owing to its very fine state of division, this metallic dust, in the presence of water moisture, will eagerly oxidize, and as this oxidation will be attended with a very considerable rise in temperature, the hydrogen gas evolved in the process may be inflamed, and, directly or indirectly, inflammable materials in the neighborhood may be ignited, and in this way the building or ship in which it happens to be stored may be destroyed, while the cause of the disaster may never be suspected. The *Record* points its moral by citing the case of the fire in the steamship *Lord Clyde*, in the year 1876, and which at the time attracted some attention. The facts in this case were about as follows: A number of casks of zinc dust were placed in the hold of the vessel, without any notice of the dangerous character of the material having been given to the owners of the ship. The casks, or some of them, by some means got wet, and within 12 hours after they had been put on board, the vessel was found to be on fire. When the source of the fire was discovered, the contents of one of the casks were found to be red-hot. As another contribution to the causation of what, for want of a better term, are called "spontaneous" fires, the facts above detailed are worthy of special attention.

A NEW system of exhaust valves for steam engines has recently been introduced in Germany, which has been pronounced by *Dingler's Poly. Journal* to embody an idea which may prove of great consequence. The admission valves alone are actuated from without by flat slide valves, moved by geared segments, while the exhaust is effected by two valves placed at the two cylinder covers, which are so connected with a double armed lever placed in the exhaust passage, that when the one valve is closed the other is opened. If, therefore, one exhaust valve is closed by the steam pressure, the other is opened to the exhaust steam, until the steam enters on the other side of the piston, which causes the latter valve to close immediately, while the other is opened full.

SOLIDIFIED HYDROGEN BY HYDRIUM.

The success which has been obtained in liquefying the gases thus far supposed to be permanent, it appears certain that not only liquefaction but also solidification has been achieved.

Pictet, in a very recent experiment with hydrogen compressed at 650 atmospheres, found, on opening the stop-cock, that the gas issued with a noise like that of a hot iron bar under water, and it had a steel-blue color. The jet suddenly became intermittent, and then there followed a sort of hail of the solid particles of hydrogen, which fell with violence on the ground and produced a crackling noise. Afterward the stop-cock was closed, and there was evidence that a crystallization of hydrogen took place within the tube; but when the temperature was again raised, the gas issued as a liquid.

M. Dumas, the President of the French Academy of Sciences, accepts these facts as full of confirmation of the theory, long ago advanced, that hydrogen is a gaseous metal. As water is an oxide of hydrogen, it follows from this that when a person drinks a glass of water, he imbibes a metallic oxide. *Nature*, in mentioning these performances, coupled with them another, which it regards as yet more remarkable from a scientific point of view. M. Pictet has been able to measure, with a very close approach to accuracy, the volume occupied by a given weight of oxygen in the liquid state; this was found to agree with the volume calculated for the solid or liquid gas, on theoretic considerations, by M. Dumas. By means of two Nicol prisms, M. Pictet observed the jet of liquid oxygen in polarized light, and found strong evidence of the presence of solid particles.

As in the chemical nomenclature the final ending "um" has been adopted for all metals, it is proper to call this metallic hydrogen, "Hydrium," a name which has already been used by the latest authors of German text-books of chemistry, even before hydrogen had been liquefied or solidified.

POISONOUS COLORS.—According to the *Chemical Review*, energetic steps are being taken in Switzerland against the use of poisonous colors. The Governing Council of Zurich has prohibited the use of all coloring matters prepared from the compounds of the metals lead, arsenic, copper, chrome, zinc, antimony, bismuth and mercury, for decorating articles of consumption or of clothing, or their materials; also paper for wrapping up chocolate, coffee, tea, chiccory, tobacco and eatables in general; toys, covers and cushions of children's carriages, carpets, curtains and window blinds, lamp screens, wafers, and table services. Poisonous organic matters, such as gamboge, picric acid, the aniline colors, especially magenta, are not to be used for coloring articles of food or drink, such as confectionery, jams, syrups, wines, etc. The same rule applies to the phenol colors. Imported articles containing such poisons may not be sold.

PERCEPTION OF BEAUTY.—I am never more convinced of the progress of mankind than of the sentiment developed in us by our intercourse with nature, and also (though this is generally admitted) with our scientific knowledge. We learn from age to see the beauty of the world; or what comes to the same thing, this beautiful creation of the sentiment of beauty is developing itself in us. Only reflect what regions, lovely as Paradise, there are over all Asia and Europe, and in every quarter of the globe, waiting to receive their fitting inhabitants—their counterparts in the conscious creature. The men who are now living there do not see the Eden that surrounds them. They lack the moral and intellectual vision. It is not too bold a thing to say that, the mind of man once cultivated, he will see around him the Paradise he laments he has lost. For one "Paradise Lost" he will sing a thousand that he has gained. —*Wm. Smith's Thorndale.*