Artificial Grindstones.

We have already noticed in this journal the success which has attended the application of Mr. Ransome's beautiful process to the manufacture of artificial grindstones—a success which is so marked that there seems little doubt that the use of natural stones for grinding purposes will eventually become the exception instead of the rule. Among other firms, Messrs. Bryan Donkin & Co., the well-know engineers, of Bermondsey, have tried experiments which very decisively prove the advantages of the artificial over the natural stones. Messrs. Donkin were first supplied with a pair of Mr. Ransome's artificial grindstones in December last; and early in the present year they carefully tested these stones and compared their efficiency with some Newcastle stones at their works. Both the natural and artificial stones were mounted in pairs on Muir's plan—a system in which the peripheries of the two stones of each pair rub slightly against each other, with a view of causing them to maintain an even surface—and the two sets of stones were tried under precisely the same circumstances, except that the Newcastle stones had a surface speed more than 20 per cent greater than that of the others.

The trials were made as follows: A bar of steel, ¾ in. in diameter, was placed in an iron tube containing a spiral spring, and the combination was then arranged so that the end of the bar projecting from the one end of the tube barely touched one of the artificial stones, while the other end of the tube rested against a block of wood fixed to the grindstone frame. A piece of wood of known thickness was then introduced between the end of the tube and the fixed block, and the spiral spring, being thus compressed, forced the piece of steel against the grindstone. The same bar of steel was afterward applied in the same way, and under precisely the same pressure, to the Newcastle stone, and the times occupied in both cases in grinding away a certain weight of steel from the bar were accurately noted.

The results were that a quarter of an ounce of steel was ground from the bar by the artificial grindstone in *sixteen minutes*, while to remove the same quantity by the Newcastle stone occupied *eleven hours*, and this notwithstanding that the surface speed of the latter was, as we have stated, more than 20 per cent greater. Taking the 20 per cent greater speed of the Newcastle stone into account, it will be seen that the 11 hours run by it were equal to 13¾ hours at the same speed as the artificial stone, and the proportional times occupied by the two stones were thus as 16 minutes to 13¾ hours, or as 1 to 52, nearly!

Such a result as this is something more than remarkable, and it is one which would scarcely have been credited, even by those who made the experiments, if it had not been fully corroborated by subsequent experience in the working of the artificial grindstones. Since the experiments above described were tried, Messrs. Donkin have set another pair of the artificial stones to work, and these, which are now in regular use, have given more satisfaction than those first tried. The saving in time, and consequently, in labor, effected by the use of the artificial grindstones is, in fact, so great that Messrs. Donkin have determined to use these stones exclusively in future; and we may add that the artificial stones are so much preferred by the workmen that those men, even, who are employed in shops at some distance from that in which the stones at present in use are situated prefer taking the trouble to go to them to using the Newcastle stones in their own shops. In addition to their great efficiency, the artificial grindstones possess the advantages of being able to be manufactured of any size, and of any degree of coarseness of grain, and they can thus be specially adapted to any particular class of work, while the process of their manufacture insures their being of uniform texture throughout, and free from the flaws and hard and soft places found in natural stones. Altogether, we believe that the general adoption of the artificial grindstones is merely a matter of time.—*Engineering.*

Mutability of Species.

In a recent communication to the Geological Society of Paris, M. A. Gaudry pointed to some striking facts favorable to the theory of the mutability of species. The sand pits in the environs of Paris, and indeed all drift deposits in general, are very rich in remains of the mammoth or primitive elephant, and of the *elephas antiquus*. These remains chiefly consist of molar or back teeth, in which characteristic differences may be easily recognized. They consequently pertain to two different species, and in order to ascertain whether there exists any close parentage between them, M. Gaudry goes back to the pleistocene period, which lies between the upper tertiary or pliocene, and the drift strata. Now the pleistocene forest-bed of Norfolk contains a quantity of molars of each of the above species, but it also comprises others slightly differing from both, and also intermediate between those of *elephas antiquus* and *elephas meridionalis*, the latter ceasing to exist when the former and the mammoth begin. These again disappear after the drift, and are followed by other species. Here then we perceive a succession of species, each of which have sprung from the preceding one. During the tertiary period there existed a breed of horses to which palcontologists have given the name of *hipparion;* they had small lateral fingers, thus forming a link between pachydermata and solipedes, which latter was considered perfectly distinct so long as the genus *equus* was characterized by a single finger at each foot. Now, Mr. Owen, on examining the horses' teeth found in the cavern of Oreston, discovered that the *equus plicidens* to which they belonged was intermediate between the hipparion and the present horse. In the *equus plicidens* the enamel of the teeth presents more folds than in the living breed but in the molars found in our gravel pits, M. Gaudry has perceived gradations between those presenting many and those presenting fewer folds, whence he concludes that our horse is a descendant of the *equus plicidens*. A hippopotamus, the remains of which were discovered at Grenelle a few years ago, appears not to differ materially from the race that now inhabits the rivers of Africa; and yet at the time the owner of these venerable relics was disporting himself in the Seine, the climate was much colder here than it is now; so that Mr. Gaudry concludes with great plausibility that, if we had the whole skeleton, some differences would probably appear.

HOUSE'S IMPROVEMENT IN TRUNKS.

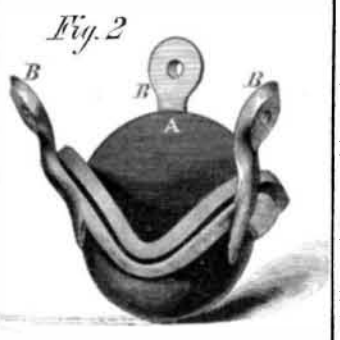
Whether unjustly or not, the porters and baggage men employed at our hotels and railroad stations have been characterized as "baggage smashers," a term for which the trunk makers may be partially responsible. Wherever the fault may be it is certain that much damage and injury to

Fig. 1

property, often of a fragile nature, ensues when one is compelled to travel. Almost invariably a severe blow on the corner of the trunk will break the back or burst the trunk. The object of the contrivance shown in the accompanying engravings is to prevent a portion, at least, of this damage by providing cheap but efficient guards. One of these is seen detached in Fig. 2, and its application to a trunk exhibited in Fig. 1.

A frame of malleable metal—either malleable iron or cast brass—encompasses a triangular cup of thick vulcanized rubber, shown plainly at A, Fig. 2. This cup is formed with a flange which rests on the bars of the metallic frame. Each of the three prongs, B, of the frame have screw holes by which the shield is attached to the corners of the trunk. The appearance of the trunk or chest when these are attached is clearly exhibited in Fig. 1 without the necessity of further reference.

Fig. 2



It is easily seen that these fixtures can be quickly secured to any trunk, chest, valise, etc., and while preventing the jar and breaking of the trunk or its contents, render both more secure. To those who travel—and everybody travels more or less nowadays—this simple device will recommend itself. The elasticity of the rubber and its resistance to abrasion insures great security.

It was patented Feb. 1866, by J. A. & H. A. House. For particulars J. C. Gillmore, agent, may be addressed at No. 26, Fourth Avenue, New York city: Mr. Gillmore sells either the trunks with improved attachment or furnishes the shields to trunk manufacturers.

The First Steam Voyage Across the Atlantic.

The importance of the navigation of the ocean by steam first came to be fully realized in this country in the year 1818. Many scientific men doubted the feasibility of such navigation, but there were a few men of intelligence and enterprise who had the greatest faith in its practicability. Among this latter class was Mr. Scarborough, of Savannah, Ga., the senior partner of the firm of Scarborough & Isaacs, one of the leading commercial houses in the South. In 1818 Mr. Scarborough, willing to show his faith by his works, came to New York and made purchase of a ship of about 350 tuns burthen which was then on the stocks, determinated with her to settle the mooted questions as to the ability of steam vessels to successfully navigate the ocean. The ship was named the *Savannah*. Mr. Scarborough then engaged the services of Captain Moses Rogers, a person we are informed "of great mechanical skill and ingenuity, who had been familiar and identified with the experiment of Fulton." Captain Moses Rogers was placed in charge of the engine and machinery of the *Savannah*. An able and faithful sailor was now wanted to navigate the vessel, and such a man was now found in Captain Stevens Rogers of this city. Under his command the *Savannah*, having been duly equipped with engine and machinery, steamed out of New York harbor on the 27th day of March, 1819, bound to Savannah on her trial trip, which was most successfully made.

On the 26th of May in the same year she left Savannah for Liverpool, making the trip in twenty-two days, during eighteen of which she was propelled by steam power. From Liverpool the *Savannah* went to Copenhagen, Stockholm, St. Petersburgh, Cronstadt and Arundel, and from the latter port returned to Savannah, making the passage in twenty-five days.

The log book of the *Savannah* was sent to the Navy Department in 1848. Captain Stevens Rogers is yet living in this city. For a number of years past he has been collector of city taxes, but at the election in June last he was suspended. It has been often suggested that it would be no more than a simple act of justice on the part of the government to settle a pension upon the pioneer of ocean steam navigation, but no active steps have as yet been taken to accomplish the substantial recognition of his services.—*New London Star.*

Editorial Summary.

THE GLACIAL EPOCH.—At a late meeting of the New York Lyceum of Natural History, Mr. J. W. Reid presented a paper on the drift deposits of the United States. He accounted for the intense cold necessary to produce the immense glaciers of that period by the precession of the equinoxes, which, every 10,500 years, has the effect of transferring the great oceanic waters from one hemisphere to the other, the sun at that period remaining eight days longer in one hemisphere than in the other. At present, the winters of the southern pole are eight days longer than with us; an ice continent more than twice the area of Europe has formed there, and a map will show the great preponderance of water in the southern hemisphere. The extreme of cold at the Antarctic pole was reached in 1248, since which date the climate has been growing milder, while north of the equator it has been growing colder, and but ten thousand years remains before the temperature which twenty thousand years ago formed glaciers reaching to the top of Mount Washington, will be the prevailing one of North America.

ROSY AURORA.—Among the latest explanations of the red glow and splendor of sunrise and sunset, which has been given, is that of Dr. E. Lommel, in Poggendorff's *Annalen*, in which he shows it to be an effect of diffraction of light as viewed through a series of dark or partially dark screens. He lays it down as an axiom that a point of white light, viewed through a sufficient number of groups of screens, appears not merely reddish itself, but also is surrounded by a still more strongly red-colored aureole of diffracted light. The lower strata of the atmosphere is full of minute corpasaular bodies—dust, organic and inorganic, carbon or watery particles—which serve as dark screens, and when the sun is low, the rays traversing a long range of atmosphere, undergo diffraction, and by superimposition of adjacent points of light, the effect of redness is deepened. A mere red glow, without brilliance, is occasioned by solid particles, as we see the sun red when viewing it through smoke, aqueous vapor, when present in the air, makes a diffused reddish light.

A GRAND ENTERPRISE.—The French government contemplate a new and vast project, which if carried out will be of incalculable importance to that nation. This is to enlarge the *Canal Deux Mers*, so that large vessels may pass directly from the Atlantic ocean to the Mediterranean, without passing under the guns of the fort of Gibraltar. At present the canal connects with the Garonne river at Toulouse, and falls into the Mediterranean near Agde; the river reaching the ocean at Bordeaux completing the chain of communication. In order to fill the canal when it is enlarged, it is proposed to intercept the innumerable mountain streams, from the Pyrenees and mountains of Auvergene, and imprison them in huge reservoirs whence the water can be drawn as needed.

TESTING SWORD BLADES BY MACHINERY.—The Austrians fasten the sword by its haft into a frame and submit it with a known and adjustable velocity, to a certain number of strokes at the mid length of its edge against a block of beech wood. The sword is also subjected to a slanting or glancing blow at a given angle and velocity against the side of a cylinder of hard wood. The edge is tested by blows against a piece of wrought iron of a given breadth, and proof of the blade's elastic temper is obtained by bending and suddenly releasing it within certain limits. The peculiarity of these trials is that the nature and extent of every test is determinative and may be made adjustable.

PRESERVING GRAIN by storage in a vacuum is a plan recently recommended by an English gentleman, Dr. Louvel. This gentleman proposes constructing large sheet iron cylinders, which are to be filled with the wheat or corn, and the air exhausted as far as possible by an air pump. The inventor has placed in a cylinder of the kind, wheat that had lain in a river for twenty-four hours, and become saturated with moisture. At the end of five days it was found in excellent condition, and made first rate flour and bread. A more practical application of this plan seems to be for the preservation of ship's biscuit from weevils and other parasites.

THE insuring of steam boilers and other property affected from explosions is the object of a new company recently started at Hartford, Conn. Heretofore, there have been no companies in this country which have issued policies covering this class of risks, although in England they have been in successful operation for a number of years. We are very glad that manufacturers and others requiring the use of steam can now insure themselves against loss in event of an accidental explosion, if fire does not ensue from the result. The name of the new company is the Hartford Steam Boiler and Inspection Company. Capital $500,000.