The Chicago Case of Skin Grafting.

The remarkable attempt to graft a section of skin from a boy's leg upon the thigh of his sister, described in a late issue of the SCIENTIFIC AMERICAN, unhappily proved a failure. The skin refused to adhere, shriveled, and became dry and hard. The narrow connecting hinge of skin was so sharply folded back that the life of it was destroyed, the circulation being cut off by the pressure which could not be avoided.

The brave boy who had made the sacrifice for his sister's sake was willing to endure another trial, but the physicians decided against it. It was thought best to make the second trial with the skin of a lamb, as soon as the burned child's strength should be sufficiently recruited. The proposed plan of operation is this: A mould of the lamb will be taken in plaster of Paris, so that the animal can be kept perfectly still in juxtaposition to the sufferer. Then the skin of the lamb, closely shorn, will be flayed for the space of 6 inches by 2½, leaving the skin uncut at one end of the strip. Under this loosened strip of skin a piece of soft white silk will be placed to keep the wound clean and facilitate the formation of blood fibers. When the "sprouting" is sufficiently advanced the silk will be removed, and the fibrous inner coating of the lambskin will be applied to the wound of the child, the lamb being bound as the boy was. Great confidence is felt in the success of the new method.

THE ACME CUBE PIPE TONGS.

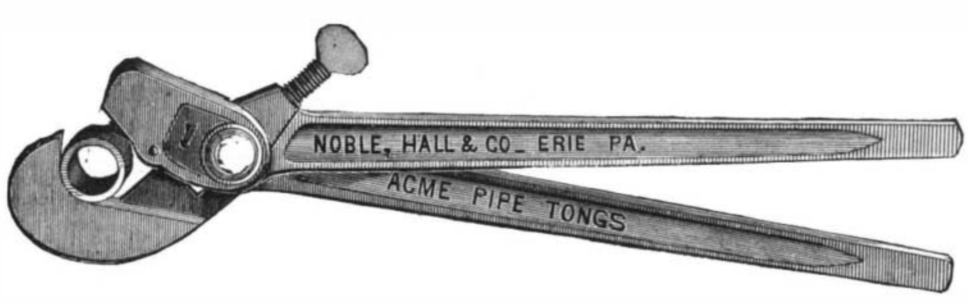
These tongs, which were patented March 18, 1879, are manufactured by Messrs. Noble, Hall & Co., of Erie, Pa. The main features are shown in the engraving.

The rivet or pin has a bearing on each end. This construction gives a firm bearing and avoids the twisting which is usually so destructive to ordinary tongs which has but one bearing, thereby saving the pin from wearing and breaking, besides the bit is held square and in line with pipe, which gives it a good hold or bite.

The check piece on one handle has a recess formed in it for receiving a cube or bit of hardened steel. This bit is held with one of its cutting edges directly or a little above the center of the pipe, whether the pipe is large or small.

It will be noticed that the cube has twelve available cutting or holding edges, so that as one edge becomes dulled by use, the tapering pin, which holds cube in, can be taken out and a sharp edge of cube placed toward pipe for use, until all of the twelve edges have been used. Then when all of the holding edges have been worn, the cube may be sharpened by grinding, and when entirely worn out, can be replaced by a new one at a slight cost. This patent also covers a flat bit, which has only eight holding edges. One of the jaws is made adjustable with a thumb screw, to adapt the tongs to different sized pipes.

This firm also make tongs of the same general character without the adjustable jaw and with flat bit. The manufacturers claim that for strength, durability, cheapness, and lightness, these tongs have no equal in the market. For circulars and prices, address Noble, Hall & Co., Erie, Pa.



THE ACME CUBE PIPE TONGS.

Severe Hail Storms.

Not a summer passes that we do not hear of hailstorms of "unprecedented severity" in many parts of our broad land. This summer is no exception to the rule. Perhaps the most remarkable fall of hail, thus far reported, occurred in Warren County, Mo., July 1. The extent of the storm was about 20 miles by less than 1 mile in width, the heaviest fall of hail covering about 2 square miles. Mr. G. O. Hardeman, of Gray's Summit, assures us that the hail-stones were of various shapes, and ranged in size from that of a hazelnut up to blocks of ice 10½ inches long, 5 inches wide, and ½ inch thick. The hail fell to a depth of 5 or 6 inches on a level, and in places where it was drifted against houses or fences it reached a depth of a foot or more. The damage done was very great, the ice smashing not only windows, but sashes and blinds; and the roofs of all the houses in the path of the storm were so injured that new roofs had to be put on. All growing crops were destroyed, and nearly all the poultry in the region were killed, besides many hogs. The horses, mules, and cattle exposed to the storm were badly bruised; some had their eyes knocked out, and others were so seriously battered as to be unfit for use for several days. Forest trees were greatly injured, the bark being torn from the sides exposed to the storm.

Cast Iron Car Wheels.

Cast iron car wheels, as is generally known, are little used in Europe, and are generally regarded there as very dangerous, and especially unfit for use under passenger cars. We might suppose this opinion to be founded on ignorance, were it not that some cast iron wheels have been used for many years, especially in Austria, there being some Hungarian iron works famous for the "chilling" property of their iron. But as, in spite of this long experience, the opinion prevails there that cast iron wheels are not only inferior, but positively unsafe, so much so that we believe many companies will not permit cars with cast iron wheels to pass over their roads, though loaded with freight for stations on or beyond their lines, it has naturally been supposed in this country that the European chilling iron must be greatly inferior to ours. But it now seems questionable whether the cast iron car wheels in Europe are not quite good and safe. An Austrian engineer, Mr. Emil Stotzer, foreman of the shops of the Empress Elizabeth Railroad at Linz, calls attention to the fact that during the past winter, which in Europe was an exceptionally severe one, while the cases of *tire* breakages amounted to thousands, and not a few accidents were due to this cause, so far as is known there was *not a single case* of the breakage of a cast iron wheel, at least not one which interrupted traffic. In view of this he suggests that the prevailing prejudice against cast iron wheels should be abated, and that a great deal might be gained if at least all the freight cars that have no brakes should be provided with cast iron wheels, but thinks that experiments should be made with cast iron wheels under brakes also. He mentions the use of cast iron wheels under passenger cars in this country, but seems not to understand how general this use is, and that of the 496,718 cars reported by "Poor's Manual" as the stock possessed by our railroads in 1879, probably 495,000 have cast iron wheels.—*Railroad Gazette.*

Pressure of Wind.

The question of the amount of pressure to be assigned to wind in calculating the stability of structures does not, hitherto, appear to have received in England any satisfactory solution. Recent events have sufficiently demonstrated its importance, and yet we find that the President of the Institute of Civil Engineers and one of the railway inspectors of the Board of Trade are both agreed that no definite rule exists on the subject. These gentlemen, Mr. W. H. Barlow and Colonel Yolland, in their recent report on the loss of the Tay Bridge, say: "In conclusion, we have to state that there is no requirement issued by the Board of Trade respecting wind pressure, and there does not appear to be any understood rule in the engineering profession regarding wind pressure in railway structures; and we therefore recommend that the Board of Trade should take such steps as may be necessary for the establishment of rules for that purpose."

It is perhaps natural that Colonel Yolland and Mr. Barlow should consider that the Board of Trade is the proper authority to decide upon this doubtful point, as to this department has been intrusted the testing of the safety of railway structures, and the strains to which iron and steel may be subjected, before the public are allowed to pass over them. The Board of Trade, moreover, possesses a recognized authority to which all engineers are obliged to defer. However, Mr. Rothery, the other member of the court of inquiry, does not take this view of the matter. His opinion is very clearly expressed in his separate report. Referring to the paragraph in the report of his colleagues quoted above, he says: "I cannot, however, join in that recommendation, for it appears to me that, if there is no understood rule in the engineering profession regarding wind pressure in railway structures, it is for the engineering profession, and not for the Board of Trade, to make them. I will add that, if I rightly understood my colleagues at our last interview, they concurred with me in the conclusions to which I had come, that there might be a maximum wind pressure of from 40 lb. to 50 lb. per square foot, and this not only over a few feet, but over the whole extent of a span of one of the high girders, and I gather as much from their report. And, if so, seeing that it is the practice in France to allow 55 lb. per square foot for wind pressure, and in the United States 50 lb., there seems to be no reason why a similar allowance should not be made in this country."

The question really belongs to the science of meteorology, and can only be settled by the examination of careful observations, taken with accurate instruments, and extending over a series of years. It might be interesting to ascertain upon what grounds the French and American engineers have fixed upon the values they assign to wind pressure; but we think that sufficient data exist in this country to arrive at an independent conclusion.

Any one might be led to suppose, from the vagueness of the views expressed on the subject, that there were no records in existence in England on the rate or force of the wind. On turning, however, to the meteorological observations of the Royal Observatory at Greenwich, printed by the Government in a yearly volume with the various other observations, we find most valuable information, both on the daily rate and maximum force of the wind. For the purpose we are dealing with, the maximum force is the quantity required. It is true that, given a certain velocity, it is easy to deduce, by means of a simple formula, the corresponding pressure. A formula used for this purpose on the Continent is: Pressure in kilogrammes per square meter $=\frac{11}{100}$ (meter per second)^2, which converted into English measures, is: Pressure in lb. per square foot $=\frac{21}{10000}$ (foot per second)^2. Unfortunately, however, the observations of velocity are only given in the form of the total distance traversed by the wind during the whole of each day, as measured by the revolutions of an anemometer; and this is the only form in which the motion of the wind is recorded in many observations. This would merely enable us to calculate the average wind pressure throughout the day, which is quite a different thing to the maximum pressure. The wind on very stormy days blows frequently in gusts, and what we require to know is the force or pressure of the strongest gust which has occurred as far back as the observations extend. For instance, for determining maxima wind pressures, the observations at the Radcliffe Observatory at Oxford in past years are of little value, as, for example, though on one occasion, April 14, 1867, the wind, as recorded by the anemometer, traveled at the rate of 1,004 miles in the day, which furnishes an extremely high average speed for a whole day, it appears from the Greenwich observations that no unusual pressure occurred on that day. At Greenwich Observatory, fortunately, the maximum pressure each day has been recorded for several years. We have looked through the published records of the Observatory for the years 1865, 1866, 1870, and 1877, the three first being years during which we knew some severe storms had taken place, and the year 1877 being apparently the latest record hitherto published. In the year 1866, the maximum pressure of wind occurred in January, and amounted to 32 lb. per square foot, and in February and December it reached 30 lb. per square foot. It was in the month of January of that year that the London foundered in the Bay of Biscay during a violent storm. The greatest pressure of wind in 1867 occurred on the 8th of February, amounting to 41 lb. on the square foot. This great pressure, however, was nearly reached again on the 12th of March in the same year, when a pressure of 40 lb. was recorded. The maxima pressures in January and October of that year were 35 lb. and 30 lb. respectively. In 1870 four records are given, in different months, of the pressure being more than 30 lb., no actual figure being given; and on three other occasions in that year the pressure reached that amount. The highest pressure in 1877 was 32·6 lb. in the month of November. It is evident from this brief glance at the Greenwich Observatory records that the pressure of 30 lb., adopted by some eminent engineers, is considerably too low to be received as a standard maximum pressure, and that even 40 lb. is insufficient. It is possible that a thorough examination of the whole of the Greenwich observations might indicate a higher maximum even than the one we have given. Also, it must be borne in mind that Greenwich Observatory is not situated near the sea, or in a specially exposed position, so that a maximum recorded there might be exceeded in some other places. In a treatise on "Meteorology," by Dr. Loomis, an American professor, published in New York, the velocity of the most violent hurricane is stated to be 100 miles per hour, with a corresponding pressure of 49 lb. per square foot, which may, perhaps, be the basis upon which American engineers have founded their rule of taking 50 lb. as a maximum. Professor Rankine, however, states, in his "Treatise on Civil Engineering," that the maximum pressure of wind observed in Great Britain amounts to 55 lb. per square foot. The rule followed in Belgium is to assume a wind pressure of 275 kilogrammes per square meter for places on the sea coast, and 176 kilogrammes for places inland; which, converted into English equivalents, amounts to 56 lb. per square foot on coast, and 36 lb. inland. With these facts before us we feel bound to concur in the opinion expressed by Mr. Rothery; and we consider that English engineers should no longer hesitate to accept 55 lb. per square foot as a possible pressure of wind in very exposed situations, and to design structures in future, subject to this consideration, with a proper margin for safety. Also, we hope that all observatories will follow the example of Greenwich, and record daily the maximum pressure, and not merely the average daily velocity, so that a valuable collection of facts relating to the pressure of wind may be constantly accumulated.—*Universal Engineer.*

Deflection of Iron and Steel Rails.

In the *Comptes Rendus* of the Paris Society of Civil Engineers is a paper by M. Tresca, giving the results of some experiments on the deflection of iron and steel rails between the limits of elasticity and rupture. They show that, for these two metals of ordinary commercial character, the coefficient of elasticity is nearly the same, thus confirming certain special experiments in 1857 and 1859 upon Swedish iron, and cementation steel made from such iron. M. Tresca finds that the limit of elasticity for a given bar may be extended in proportion to the strain to which it had been previously submitted, and that the elastic limit may be pushed almost to the point of rupture without the coefficient of elasticity having varied in any perceptible degree. The metal, when it comes from the workshops, is in a state of instability, which disappears only by use; it becomes, by means of the actions to which it is successively submitted in its employment, more homogeneous and more elastic, but at the same time a little more flexible.