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THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 226,
For the Week ending May 1, 1880.

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ELEVATED CITY RAILROADS.

The decision of the Superior Court against the Metropolitan Elevated Railroad Company, in the recent trial case, attaches a new interest to the subject of rapid city transit. This suit was brought by Dr. Caro, the owner of a house on Fifty-third street, to recover damages sustained by the passage of the elevated road in front of his dwelling.

This street is hardly surpassed for fine residences and beauty by any in the city. The effect of the elevated road has been to reduce the market and rental value of property on its line. When the road was first constructed the best houses were rapidly emptied of their occupants, and even at a great reduction in rent were difficult to fill with tenants. The people along the line of the railway have now become more accustomed to the railway nuisance, yet nearly the same reluctance holds to renting or locating on those avenues or streets where the railway exists. The injury done to property owners on such a street as the Fifty-third is no trifling consideration.

The case we have cited has been argued by eminent counsel. The former decision of the court was in favor of the company; it claimed the right to the use of the street, even though by a new and unusual way, as by cars propelled by steam upon an elevated road.

The Superior Court has decided that the rights of real estate owners extend beyond the limits of the street to the exclusion of whatever may tend to depreciate their property or render their homes unpleasant, unless properly remunerated. The case will doubtless pass to the Court of Appeals for final decision.

The concurring opinions of Judge Speir and Chief-Justice Curtis are elaborate, covering the grounds claimed by plaintiff. They set forth that plaintiff is owner of the premises in Fifty-third street, and as such is entitled to their undiminished enjoyment and advantage. The law protects property owners in these rights against everything that may injure their property or render their homes unpleasant. No one has a right, even on his own premises, to do aught that would injure the property of his neighbor. The decision in this case is to the effect that noxious gases, disturbing noises, shutting out air and light, are, in point of law, real invasions of the owners' premises. They depreciate greatly the market and rental value of the property, and render the dwelling less pleasant as a home.

Should the Court of Appeals decide that the company shall fully remunerate the property holders along the line of the road, the final expense must fully equal, if not exceed, the original estimate of the underground line.

The recent decision has affected the price of the company's stock, and should the Court of Appeals render an adverse decision, it can but affect still more the company and the market value of the property of the elevated railroad.

THE WIRE GAUGE.

The want of a uniform and generally accepted system of numbering and grading the different thicknesses of wire and sheet metal has for a long time been felt as a serious inconvenience, both by manufacturers and consumers. For particular purposes, or in filling large orders, where it is worth while to figure for the size of wire to a very small fraction, it is not unusual to have it drawn to a size designated by so many thousandths of an inch, but dealers are required to keep a certain stock of standard sizes, and it is for the interest of manufacturers to have a uniformity of usage as to what shall be meant when a certain size of wire or thickness of plate are called for. We have not, in this country, had so much confusion, from the use of different gauges, as has been experienced in England, where, under what is known as the "Birmingham wire gauge," more than a dozen different scales of numbers are used to arbitrarily designate different sizes of wire, from those about half an inch in diameter down to the finest wires drawn. There is a pretty close agreement between several of these gauges for most of the numbers, but no one is acknowledged as a standard, and, unless the actual size as well as the number is given when ordering wire, mistakes and misunderstandings frequently occur. What the manufacturer may furnish as one number the dealer may, by using another scale, sell as quite a different size, and, in times of active competition, the opportunities to do this are frequent.

The present system of designating the sizes of wire by numbers has grown up with and been modified according to the development of the manufacture. What is known as No. 1 is supposed to have been originally so designated as representing the wire made from the first passing of the rough metal through the draw plate, with such facilities as were in use before steam power was employed in wire making. Nos. 2 and 3, and the following sizes, were each proportionately smaller, according to the results obtained by using similar means in drawing the wire down, the higher numbers representing constantly diminishing sizes. To designate thicknesses larger than No. 1, one or more ciphers are now used, according to the increased diameter. By this system the different sizes varied from each other irregularly, both in diameter and in weight of metal, but the trade had become so large, and the common sizes so well known by their numbers among mechanics and dealers, before any determined effort was made to introduce a uniform standard scale, that the task is now one of more than ordinary difficulty.

At a recent meeting of the Society of Telegraph Engineers, London, England, the differences between well-known wire gauges was made the subject of an elaborate report by a committee which had been appointed especially for that purpose. It was shown that there was an urgent necessity for some standard, and that the gauge, to be adopted should not vary materially from the present gauges principally used, which were "based on long practical experience, had become thoroughly rooted in technical language, and were well adapted to the practical requirements of trade." All of the principal gauges were referred to, and tables given showing the sizes, with percentage of reduction in weight and differences in size for the various numbers. Two general classes were made: empirical gauges or those in which the gradations between the respective sizes were formed by arbitrary differences; and geometrical gauges, in which the various sizes were fixed by perfectly uniform decrements of weight from size to size. The "Stubs" gauge, which is used to a considerable extent in this country, is one of the former. The committee say that, though very irregular in many of its gradations, it has been distributed in large quantities throughout the world, and "may perhaps be considered the most authoritative gauge in common use." Of the geometrical gauges, that made by Brown & Sharpe, which is called the "American" gauge, is spoken of as in all respects excellent, except that the greatest inconvenience would arise from its introduction, because the sizes are so much smaller than those of the Birmingham gauge. The Brown & Sharpe gauge starts with 0·46 of an inch as No. 0000; then multiply each diameter by 0·890522 (or deduct 10·9478 per cent) to form the next succeeding size, the numbers varying regularly in size and weight, and, of course, in electrical conductivity. As being preferable to this gauge, however, because the sizes more nearly approach those of the ordinary Birmingham scale, the committee recommend the Clark gauge, in which the intervals are so arranged that each size is exactly 20 per cent less in weight than the preceding one. By this scale the diameter diminishes by 10·557 per cent for each number as the sizes grow smaller, or increases by 11·803 per cent as they are enlarged; and, as with all geometrical gauges, a person knowing the size of one number can readily calculate that of any other. A sufficient number of intermediate sizes to fill all requirements for general use can be made by using half and quarter sizes, the thickness of which can be determined with precision. The committee strongly recommend this gauge for general adoption, as, beside, giving all the advantages of a geometrical scale, all the principal sizes in use conform very closely to its gradations, except in the lowest and highest numbers. It is as follows, the sizes being given in decimals of an inch:

No. of gauge.	Decimals of inch.	No. of gauge.	Decimals of inch.	No. of gauge.	Decimals of inch.
000	492·1	10	129	22	033·8
00	440 2	11	115·4	23	030·2
0	393·7	12	103·2	24	027·1
1	352·1	13	092·3	25	024·2
2	315	14	082·6	26	021·6
3	281·7	15	073 9	27	019·4
4	252	16	066·1	28	017·3
5	225·4	17	059·1	29	015·5
6	201·6	18	052·8	30	013·9
7	180·3	19	047·3	31	012·4
8	161·3	20	042·3	32	011·1
9	144·2	21	037·8		

Although we have not experienced the trouble from the use of a multiplicity of gauges which has been felt by foreign manufacturers, there can be no doubt that, if we are ever to have any export trade in manufactures of metal goods, the general adoption of some geometrical standard, which would be known and acknowledged in all parts of the world, would be of great advantage. We have such a standard for American use in the gauge now largely used here, but with this is used also the "Stubs" gauge, and what is called "the old English;" and, between them all, mechanics and engineers are constantly giving orders for specific sizes, measuring by the thousandth part of an inch, as they would not feel called upon to do if there was a recognized standard of properly graded sizes.

THE FRACTURE OF THE DUILIO'S 100-TON GUN.

Following hard upon the bursting of the Thunderer's 38-ton gun and the experimental destruction of its companion to discover the secret of that disaster, there comes a still more remarkable failure of one of the largest guns ever constructed. During a series of experiments with the 100-ton Armstrong guns of the Italian ironclad Duilio, March 6, to test, not the guns, for they were considered as beyond suspicion, but the smooth working of the accessory machinery, one of the guns gave way in a manner altogether novel and unexpected.

The Armstrong guns, as our readers are all doubtless aware, are built up by the shrinking of a dozen or more massive coils of wrought iron upon a steel tube forming the bore. These coils overlap, and are designed to resist the circumferential strain of the exploding charge. The need of anything more than the friction of the coils upon each other and the tensile strength of the inner steel tube, to resist the longitudinal strain, does not seem to have entered into the maker's calculations. And just here is where the system failed. It was found after the disaster, in which several men were more or less seriously injured, that the gun had not burst, in the ordinary acceptation of the term; the interior steel tube had been entirely fractured across at the point where the enlarged powder chamber begins to slope toward the lesser part of the bore—the shoulder of the powder chamber, as it may be called. The rest of the gun, composed of various tubes made of coiled wrought iron, had simply disengaged itself as a glass stopper might be drawn out of a bottle, and the tubes were not broken in the slightest degree. Each one appeared to be as sound as