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Contents.

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TABLE OF CONTENTS OF

Scientific American Supplement

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AMERICAN INSTITUTE FAIR.

The managers of the American Institute Fair, which is to be held from September 20 to November 4, at Madison Square Garden, intend to put forth special efforts to make this one of the most interesting fairs in the history of the institution. As our readers are doubtless aware, the American Institute is one of the oldest organizations of its kind in America. It is now verging on its seventieth year. During its long life it has been one of the most powerful factors in the promotion of invention and industry in the country. Many of the famous inventions of the past forty years received their first recognition at its hands, and to secure the institute medal was one of the most coveted indorsements which could be given. It is the intention of the board of managers and the general superintendent of the fair, Mr. Alfred Chasseaud, to make the department of engines and machinery the strongest in the whole exhibit. It is to include a very wide variety of prime movers, and particular attention will be given to stationary engines operated by steam, gas, water, or wind. There will also be a large exhibit of pumping machinery, steam fire engines, iron and wood working machinery, textile and paper machinery and that used for the manufacture of leather and rubber. We are glad to note that the fair is to be held in the capacious Madison Square Garden, and the scale on which it is to be carried out indicates that the renewed life and vigor which marked the operations of the institute last year is likely to be permanent.

THE ENGINEER MOTOR CAR COMPETITION.

The celebrated motor car competition organized by The Engineer, of London, has resulted, according to our contemporary, in a miserable failure, only five vehicles putting in an appearance at the Crystal Palace, London; and even this pitiful remnant of the original seventy-two entries was, in the opinion of the judges, so lacking in the qualities that go to make up a really useful and reliable motor that they made no award, and the six thousand dollars which was to have been awarded in prizes was handed back to the promoters of the competition.

The first offer of a prize of one thousand guineas was made about two years ago, and the conditions, as formulated a few months later, announced that prizes would be awarded "for the encouragement of manufacturers and designers of horseless carriages," The Engineer "believing that an important trade may be created in this class of machinery, and that the removal of the restrictions on the use of mechanically propelled vehicles will result in great benefit to the farmers."

In the course of a pessimistic editorial, The Engineer congratulates itself on the fact that although the essay has failed in its original purpose, it has "cleared the air" and shown the true facts concerning the so-called motor car industry in England. "There is at present no such industry. There is no such thing as a thoroughly satisfactory self-propelled vehicle. If a motor car of the kind existed, it would have been submitted for competition." Now these are sweeping assertions and not altogether warranted by the facts. In the first place the competition was narrowed down by the exclusion of all vehicles propelled by light oil or petroleum spirit, against which The Engineer has shown a persistent prejudice from the very first, although on its own admission "very little success had been obtained with vehicles which did not use petroleum spirit." This prejudice was so marked that it is not surprising that the subsequent offer of a special prize of five hundred and twenty-five dollars for vehicles using light oil failed to bring forward the manufacturers of what are admitted to be the only successful motor cars on the market. Everybody that keeps in touch with the motor car industry is well aware of the defects of oil-driven motors, and none more so than the makers themselves. But for The Engineer at this early stage of the work to sweep aside three-fourths of the inventors and their machines, and suppose that it can be determined by an ex cathedra mandate what shall and what shall not be the surviving type of motor car, may be agreeable to the traditions of that journal, but, as the recent fiasco has proved, will have a very small effect upon the motor car industry at large.

In defense of the course it took it is explained that it had no particular desire to develop pleasure carriages, as its "purpose was utilitarian," and it is pointed out that the unpleasant odor which comes from most oil motors would prohibit their commercial use in a crowded city. But in taking it for granted that this difficulty is incurable our contemporary assumes altogether too much, and the most that is proved by the attempted competition is that the motor car industry cannot be arbitrarily controlled so as to proceed along certain prescribed lines of development

Although The Engineer claims too much in stating that there is absolutely no motor car industry, it has done the British public good service in showing that the industry has no such proportions as to warrant the company-promoting speculations which have entrapped the unwary investor.

In the next issue of the SCIENTIFIC AMERICAN SUPPLEMENT we shall give illustrations and particulars of some of the motor cars which were present on the morning of the contest, including the two which received favorable mention from the judges.

FALL OF A NEW BUILDING IN NEW YORK CITY.

The collapse of a building on Fifty-second Street and Twelfth Avenue has again drawn attention to the risks which are liable to be incurred by the erection of massive water tanks on the top floors of a building. When the tanks themselves and the supports which carry them are properly designed, there is, of course, no more risk than is involved in carrying any other form of static load at the top of a building. As a matter of fact, however, this construction is too often very faulty and marked by an ignorance or carelessness, or both, which has brought many a well constructed building to grief. The most frequent disaster from roof tanks is that caused by a fire in the upper stories burning through the tank supports, and causing it to fall through the floors beneath. In the case of the Twelfth Avenue building the heavy load of the tanks was sufficient to bring about the collapse of an extraordinarily faulty building. The accident happened before the occupants had moved in, and it is owing to this circumstance that the death list is not a painfully large one.

The building, which was to have been used as a soap factory, is in the form of a hollow square, and measures about 200 feet on a side, the width from wall to wall being about 60 feet. It was five stories in height, and was built of composite construction, with cast iron columns and steel floor girders. On the lower floors the girders are 15 inch I beams, but on the fourth floor 24 inch I beams, with their flanges reinforced with two $\frac{5}{8}$ inch plates were used, the girders being made heavy to carry the weight of fourteen tanks, each of which with its full load weighed nearly eighty tons. The tanks were 13 feet square and 15 feet deep, and were placed in a double row on the outside of the building, one row of seven standing near the outer wall and the next row about ten feet from it and close against an interior row of columns. The collapse took place while the tanks were being tested for leaks. They were approximately full of water when, without any warning, five out of the seven in the outer row fell through the building, carrying the floors below with them, and, of course, throwing down the outer wall at the same time. The accident will call to mind the fall of the Ireland building, on West Broadway, where the same class of construction was employed, and although in that case the wreck was primarily due to faulty foundations, the debris showed all the usual defects in the cast iron columns.

The great gap in the outer wall is very suggestive as to the origin of the disaster, and a closer inspection of the wrecked iron work, and of the plan of construction as shown in the work which is still standing, makes it reasonably certain that it was the columns in this wall that failed. These columns were of square section, with flanges for bolting them together at the abutting ends. They were built within the wall, but considered as part of a framed structure for carrying weight, they were virtually without bracing. On one side, that next the tanks, they were theoretically held in the plumb position by the 24 inch I beams which were bolted to lugs cast on the columns, but on the other sides they had no metal connections whatever. The stiffening afforded by the I beams was of doubtful value, for the heavy load which they carried was transferred to the columns eccentrically by means of the small lugs above referred to. This would set up cross bending strains of a kind which are very undesirable in any member subject to compressive strains, and especially so when the material is cast iron.

In the course of some tests on full size cast iron columns recently carried out at the Yorkshire Engineering College, Leeds, it was found that, when the load was applied to side brackets or lugs such as we are considering, the column failed by a diagonal transverse fracture whose appearance indicated that it was the bending effect of the eccentric load that produced the failure. A load applied from the side cannot be treated as a load applied in the direction of the axis of a column, and a very liberal allowance should be made for this in determining the cross section of the member.

In addition to this predisposing cause, the throwing of the columns out of line is rendered easy in this form of construction by the unsatisfactory nature of the connections, which usually consist of simple flanges, in the present case held together by only four bolts. While it is true that this might be sufficient to keep the columns in line when there was no load or a light load upon them, the flimsiness of the connection is apparent when we remember that, in addition to the various floor weights, a load of over 40 tons of tank and contents was carried by each vertical line of columns. The danger of collapse will be evident if we consider the outer wall (which carried none of the weight) to be taken away. The columns would then be left entirely unbraced on three sides, perfectly free to buckle at the joints in the line of the wall, and only