Tesla on Subway Dangers.

The New York *Sun* of June 16 printed the following letter from Mr. Nikola Tesla:

The flooding of the subway is a calamity apt to repeat itself. As your readers will remember, it did not occur for the first time last Sunday. Water, like fire, will break loose occasionally in spite of precautions. It will never be possible to guard against a casual bursting of a main; for while the conduits can be safely relied upon under normal working conditions, any accidental obstruction to the flow may cause a pressure which no pipe or joint can withstand.

In fact, if we are to place faith in the gloomy forecasts of Commissioner Oakley, who ought to know, such floods may be expected to happen frequently in the future. In view of this it seems timely to call to public attention a danger inherent to the electrical equipment which has been thrust upon the Interborough Company by incompetent advisers.

The subway is bound to be successful, and would be so if the cars were drawn by mules, for it is the ideal means of transportation in crowded cities. But the full measure of success of which it is capable will be attained only when the financiers shall say to the electric companies: "Give us the best, regardless of expense."

It is to be regretted that this important pioneering enterprise, in other respects ably managed and engineered, should have been treated with such gross neglect in its most vital feature. No opportunity was given to myself, the inventor and patentee of the system adopted in the subway and the elevated roads, for offering some useful suggestion, nor was a single electrician or engineer of the General Electric and Westinghouse companies consulted, the very men who should have been thought of first of all.

Once large sums of money are invested in a defective scheme it is difficult to make a change, however desirable it may be. The movement of new capital is largely determined by previous investment. Even the new roads now planned are likely to be equipped with the same claptrap devices, and so the evil will grow. "Das eben ist der Fluch der boesen Thut, das sie fortzeugend Boeses muss gebaeren."

The danger to which I refer lies in the possibility of generating an explosive mixture by electrolytic decomposition and thermic dissociation of the water through the direct currents used in the operation of the cars. Such a process might go on for hours and days without being noticed; and with currents of this kind it is scarcely practicable to avoid it altogether.

It will be recalled that an expert found the percentage of free oxygen in the subway appreciably above that which might reasonably have been expected in such a more or less stagnated channel. I have never doubted the correctness of that analysis and have assumed that oxygen is being continuously set free by stray currents passing through the moist ground. The total amperage of the normal working current in the tunnel is very great, and in case of flooding would be sufficient to generate not far from 100 cubic feet of hydrogen per minute. Inasmuch, however, as in railway operation the fuses must be set hard, in order to avoid frequent interruption of the service by their blowing out, in such an emergency the current would be of much greater volume and hydrogen would be more abundantly liberated.

It is a peculiar property of this gas that it is capable of exploding when mixed with a comparatively large volume of air, and any engineer can convince himself by a simple calculation that, say, 100,000 cubic feet of explosive might be formed before the danger is discovered, reported and preventive measures taken. What the effect of such an explosion might be on life and property is not pleasant to contemplate. True, such a disaster is not probable, but the present electrical equipment makes it possible, and this possibility should be, by all means, removed.

The oppressiveness of the tunnel atmosphere is in a large measure due to the heat supplied by the currents, and to the production of nitrous acid in the arcs, which is enhanced by rarefaction of the air through rapid motion. Some provision for ventilation is imperative. But ventilation will not do away with the danger I have pointed out. It can be completely avoided only by discarding the direct current.

I should say that the city authorities, for this if for no other reason, should forbid its use by a proper act of legislation. Meanwhile, the owners of adjacent property should object to its employment, and the insurance companies should refuse the grant of policies on such property except on terms which it may please them to make.

New York Electrical Society.

The New York Electrical Society held its twenty-fourth annual meeting at the Café Boulevard on the 14th inst. The meeting was preceded by a dinner to which 80 members and their friends sat down. In the absence of President F. J. Sprague in Europe, Vice-President F. C. Bates, in a short speech, touched on some of the special features of this season's work of the society, and referred to the evidences of the wider representation which the society is now securing. Mr. Bates noted as of pleasing significance the fact that one of the tables, containing over 20 guests, was occupied almost entirely by telephone men. Furthermore, members of nearly every branch of electrical industry were to be found in the company present. There was, however, one most important section, that of street railway work, which ought to be more fully represented in the membership of the society, and it was gratifying to believe that in this direction the placing of Mr. H. G. Stott on the nomination list was a happy augury. The finances and the membership list of the society were in sound and vigorous condition, and there were even now signs that the coming year will be the most successful in the history of the society. More than half of an exceptionally fine series of lectures had already been arranged for, and the organization of plans for an active compaign in the adding of new members was well on the way. Mr. Bates concluded by congratulating the society, not only on its gratifying present, but also on its possibilities in the near future.

The secretary's report showed that 46 members had been elected during the season; the loss by death had been 4, by resignation 25; 10 had been dropped, and the total existing membership was 636. The report of the treasurer showed a steady improvement in the finances of the society. The officers elected were: President, Mr. W. S. Barstow; vice-presidents, Messrs. H. G. Stott, Putnam A. Bates, Max Loewenthal. (The vice-presidents elected in 1904 for two years are Messrs. Albert F. Ganz, Louis B. Marks, W. S. Rugg.) Secretary, Mr. George H. Guy; treasurer, Mr. H. A. Sinclair.

An excellent musical programme was admirably supplemented by the artistic singing of Mr. Charles Stuart Phillips.

Single-Phase Railroad from Vienna to Baden.

The Austrian Siemens-Schuckert Works in Vienna are about to install the single-phase system on the Vienna-Baden line of the "Vienna Local Railroad." This line is at present operated partly with steam and partly with direct current. It is mostly double track with standard gauge, and has a total length of about 17 miles, the steepest grade being 2.75 per cent. and the smallest radius of curvatures 54 ft. The trains run into the centres of the two cities, using the rails of the city tramway systems. Within the two cities for a length of line at about 2½ and 1¼ miles respectively direct current is used at 500 to 550 volts.

For the line between the two cities, which is about 13 miles long, single-phase current at 500 volts is to be used. The power plant, which is at a distance of about 1¼ miles from Baden, contains two single-phase alternators, each of 200 kilovolt-amperes, at 100,000 volts, a direct-current machine of 165 kilowatts at 550 volts, and two fly-wheel motor-generators, consisting each of a 150 kilovolt-ampere, 10,000-volt synchronous motor, a 100-kw. direct-current machine and a fly-wheel weighing 11 tons. There is also installed a storage battery. The voltage of the alternating current is lowered from 10,000 to 500 in six transformer stations placed along the line, each containing an oil-cooled, 110-kilo-volt-ampere transformer.

Each motor car has two four-wheel trucks and carries four series single-phase motors of a type made by the Siemens-Schuckert Works, and rated at 50 hp. There are provided series connection and shunt connection with resistance regulation, for use as well on the direct current as on the alternating current portions of the road. For the alternating current portion there is also provided a transformer with six voltage ranges, three being used for raising and three for