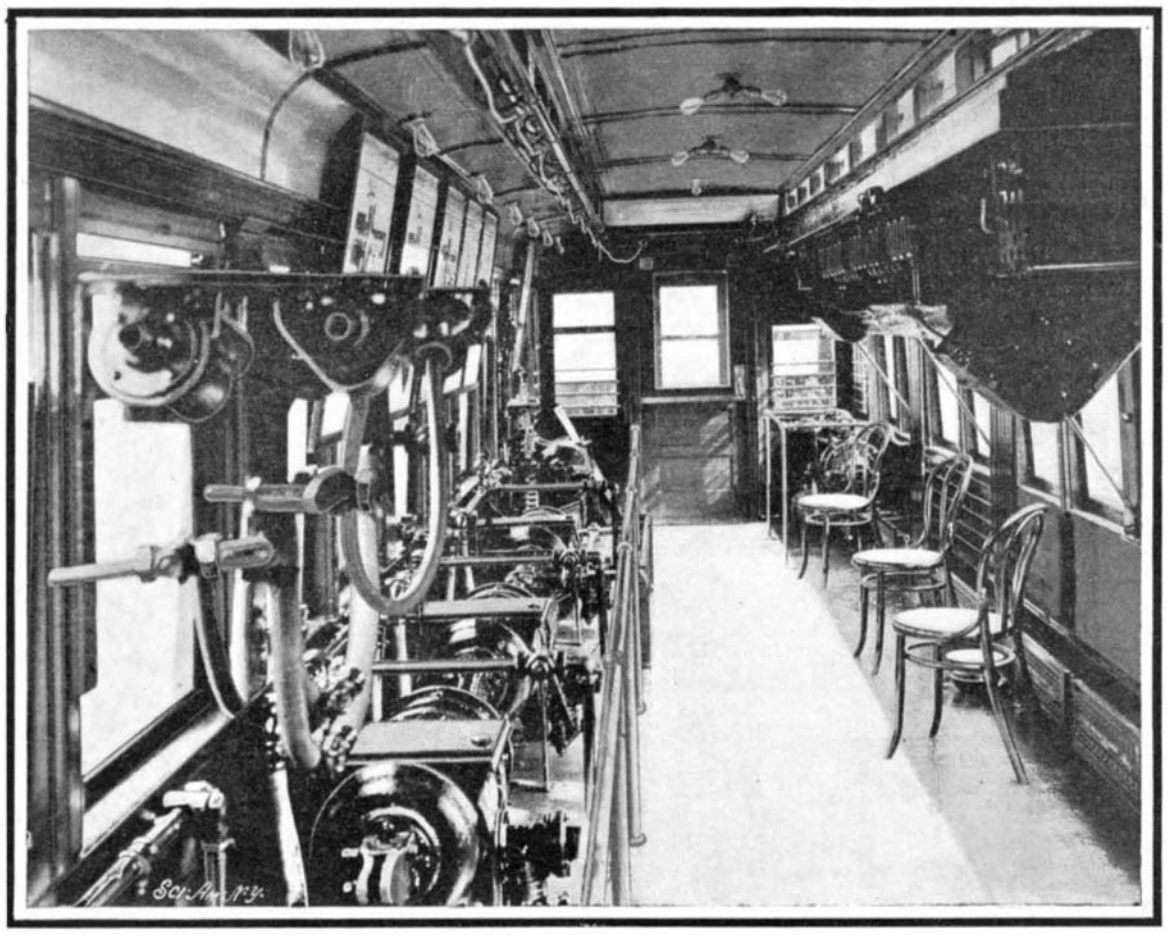
the unaided eye presents simply the appearance of a fine, almost colorless fuzz.

A fourth photograph represents a model, natural size, of another hydroid. The original of this model is a deep purple in color and exhibits in a striking way the peculiar flower-like beauty so characteristic of organisms belonging to this class. The last two photographs are of models of organisms similar to one or the other of those described above and the similarity is easily seen.

For courtesies extended in furnishing the information contained in the foregoing account, we are indebted to Dr. Dahlgren, of the American Museum of Natural History.

THE NEW YORK SUBWAY INSTRUCTION CAR.

That the man in charge of a train to run in New York's Subway may be entirely competent to fulfill his responsible position, the Interborough Rapid Transit Company is using an instruction car, where the prospective motorman may be taught something of the construction and operation of the apparatus he is to handle. In this instruction car, the applicant is shown the use and mode of operation of every piece of mechanism that will come under his charge, is taught how to handle it and what to do in almost every emergency that can arise.



INTERIOR OF THE CAR USED FOR THE INSTRUCTION OF NEW YORK SUBWAY MOTORMEN.

The school car is similar to the regular service cars to be run in the Subway, with the Sprague-General Electric multiple unit system of control. The apparatus is uncovered for demonstration purposes wherever possible—master and air-brake controllers, contacters, reverser, pump governor, switch-board, and the like. Portions of the apparatus underneath the car have, where possible, been placed inside of it to facilitate the explanation of their operation. In the case of the motors, motor resistance, and air pumps this, of course, was thought to be neither feasible nor necessary.

In addition to the regular equipment the car contains a complete air-brake outfit for a six-car train, operated from the brake controller which is used to make the men familiar in all details with this complicated mechanism. It contains, moreover, a defective triple valve, the presence of which the men must detect after a certain amount of teaching. To facilitate the instruction there are additional parts, such as the auxiliary reservoir and the brake cylinder, with portions of the metal cut away to permit the instructor to explain their operation fully. A triple valve similarly cut away, and connected in tandem with another operating triple valve, fully demonstrates the working of this complicated piece of mechanism. To supplement all this a series of colored drawings show the details and operating positions of every important piece of apparatus. A section of contact rail with the rail shoe is used to teach the men what to do in case of trouble there. An automatic car coupler and drawbar is installed for a similar purpose. A complete set of controller and air-brake couplings is employed to demonstrate their use in operation or emergency.

The safeguards in the system used are manifold, and so complete that only a rather inventive mind can conceive any situation which the prospective motorman has not been taught to meet. Should the motorman release the controller handle while it is in a running position, not only would the current be immediately shut off but the emergency brakes would at once be set and the train brought to a stop. Should he attempt to reverse his motors while running, the same thing would happen. The controller is automatically governed and no matter how fast the handle is turned, the motors are started at a certain fixed speed. Should the contacters adhere or fuse, the current is automatically shut off. Should the motorman not see or ignore a signal to stop, the brake is automatically tripped and the train brought to a standstill. The train may be run from any motor car, or any motor car may be cut out and used as a trailer. The wiring insulation is as nearly perfect as it can be made, and the steel cars are fireproof.

The prospective motorman is thoroughly drilled in the school car by a competent instructor not only in use of the mechanism but also how to act in cases of emergency. This personal teaching is supplemented by an excellent book of instructions containing about 150 questions and answers of a practical nature, with cuts and explanations of all the apparatus. This the motorman is expected to study closely and thoroughly. From time to time his knowledge of its contents is tested in examinations. Should he be of an inquiring turn of mind he is further allowed the privilege and opportunity of entering the shops and studying the entire system in detail, as much as he desires.

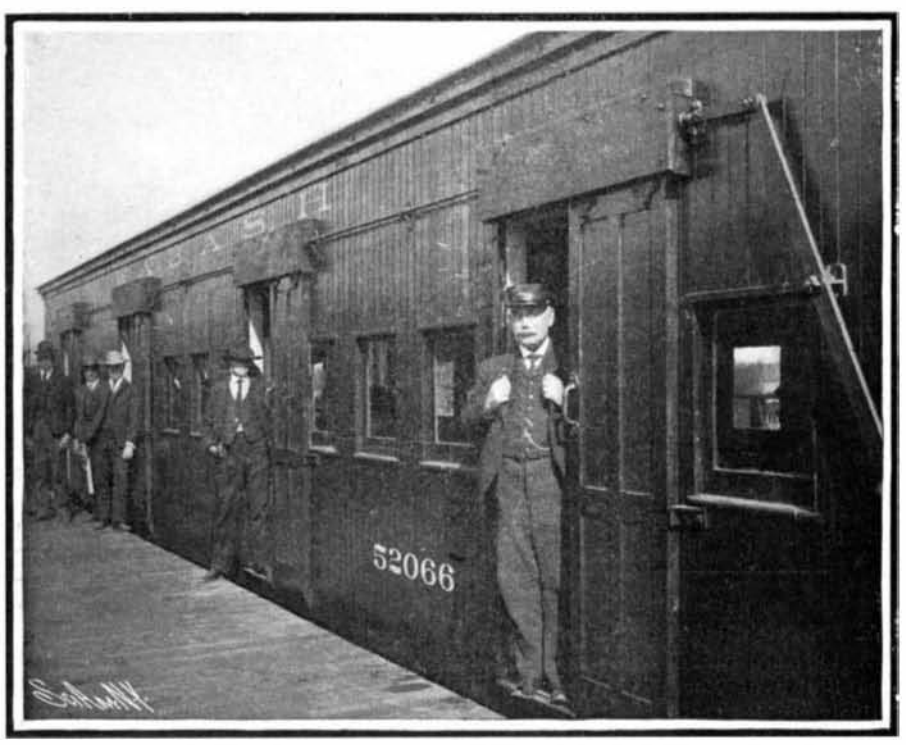
SIDE-DOOR COACHES FOR WORLD'S FAIR SERVICE.

BY CHARLES ALMA BYERS.

The use of side-door coaches for quick service on railroads is rapidly growing into popularity. The advantages pointed out some time ago by the SCIENTIFIC AMERICAN of side doors for passenger coaches over end doors have been fully realized. Actual experiments have clearly shown the theory that a train of coaches thus constructed can handle a crowd of passengers much more quickly to be absolutely practical. The first real test of this theory was made by the Illinois Central Railroad at the Chicago Exposition in 1893. That experiment proved satisfactory in every way, and as a consequence the Wabash Company has followed suit by using coaches of such construction for its shuttle trains between the Union Station and the World's Fair grounds at St. Louis. The construction of the Wabash's side-door coaches, however, differs slightly from that of those used by the Illinois Central. This difference is noticeable mainly on the interior. Instead of an aisle on each side, there is only one through the center, as in the ordinary coach. This is probably an improvement so far as affording more space for seats is concerned, but the plan undoubtedly detracts from the real object of the side doors—that is, of allowing the cars to be the most quickly filled and emptied. Another difference is that the Wabash's coaches have only four doors on each side, or eight in all, while those used by the Illinois Central had ten to the side, or a total of twenty. This is also a feature in which the Illinois Central surpassed in the matter of constructing a coach so as to be more quickly filled and emptied. Nevertheless, the time which is required for filling or emptying a Wabash coach of passengers is remarkably short as compared with the ordinarily constructed car.

The length of the Wabash coach is 50 feet and its seating capacity 92. Straps, however, are provided for standing passengers, as in a street car, and if neces-

Interior of the Side-Door Car.



View Showing Side Doors and the Lever by Which They Are Opened.

SIDE-DOOR COACHES FOR WORLD'S FAIR SERVICE.