

NAVIGATION AT THE ROYAL TECHNICAL COLLEGE, GLASGOW.

THE steady diminution in the supply of officers for the mercantile marine, which has been going on for the past few years, is becoming a serious problem to shipowners. The average number of certificates as second mate granted annually by the Board of Trade has fallen from 1132 to 746, or 34 per cent., during the last fifteen years, and as a considerable wastage in the number of candidates takes place during the compulsory period of qualifying sea service between the granting of this initial certificate and that of master, it follows that there is a corresponding reduction in the number of officers qualified to fill the higher ratings on board ship.

The governors of the Royal Technical College, Glasgow, being impressed with the desirability of providing improved facilities for instruction in nautical subjects, established in 1910, with the financial assistance of the City Educational Endowments Board, a School of Navigation.

The instruction offered has been eagerly taken advantage of during the two years' existence of the school, but mostly by students out of their apprenticeship stage. It has, however, been felt all along that a development on the lines of practical as well as theoretical training was necessary. At present parents who send their sons into the mercantile marine deprive them of opportunities of higher education that in universities and technical colleges are offered to youths who enter other professions.

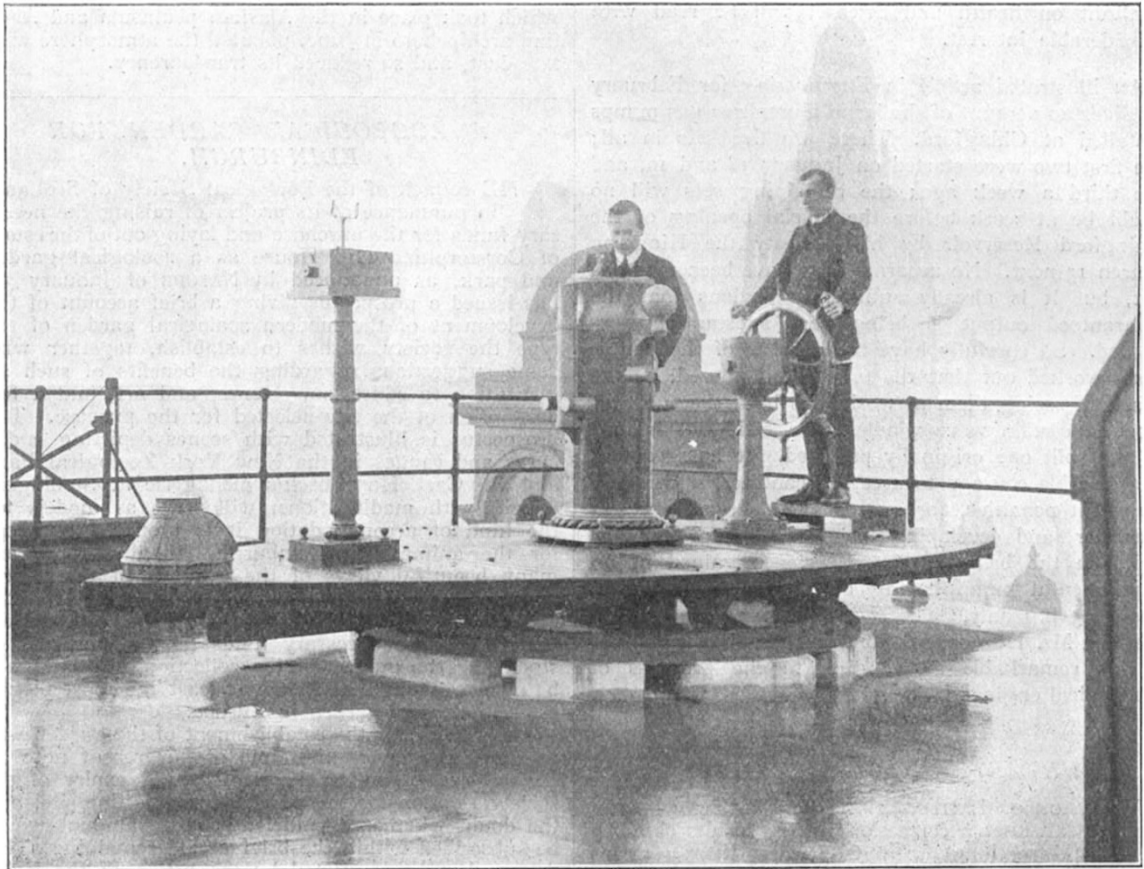


FIG. 1.—Deviascope (Royal Technical College, Glasgow).

This state of affairs has been brought about by the disappearance of the sailing ship and by the reluctance of shipowners to carry apprentices in steamers. It is partly due also to the fact that the requirements for the essential certificates of competency have within recent years been made more exacting, and the subjects increased, so that candidates who would have been capable of passing the old tests find the higher standard now demanded a serious obstacle. Further, the great increase in shipping tonnage has created a large demand for qualified officers, there being only some 30,000 to man our mercantile marine fleet of some 9000 vessels, figures which go to show that the navigator's profession is by no means an overcrowded one.

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In order, therefore, to coordinate theory and practice, the governors have arranged to provide a two years' course of training as marine cadets for lads who have just left school and have reached the stage of the Scotch intermediate leaving certificate.

The winter session will be devoted by the cadets to the more theoretical side of their subjects, whilst attending the classes in the college. The summer will be spent afloat on board the seagoing training steamer *Vivid*, a vessel of 550 tons, which has now been acquired from the Admiralty. The ship will be commissioned in April each year, and, having bunker capacity for a steaming radius of 3000 miles, she will be capable of making extended voyages. Dormitory, dressing and bathroom accommodation is being pro-

vided for fifty cadets, who, in addition to performing the ordinary routine work of the ship, will be instructed in the duties of the navigator and seaman as required on board a first-class modern ship. Strict discipline is to be maintained on board, and the cadets will be at all times under the supervision and guidance of the instructors. The addition of the *Vivid* to the equipment of the school provides opportunities for the practical testing of the theoretical work of the lecture-room under actual seagoing conditions, and the vessel, in fact, furnishes the laboratory which in every other department of applied science has long been considered an essential adjunct to efficient instruction.

In framing the scheme of instruction, the governors of the college have kept in view the fact that owing

BIOLOGICAL WORK IN INDIA.

ALTHOUGH the mosquito-destroying capacity of the small cyprinoid fishes known to the Spanish inhabitants of Barbadoes as *milliones* appears to have been considerably overestimated, naturalists in India are convinced that many of the smaller fresh-water fishes of that country play an important rôle in this respect. Experiments have been carried on for the last few years by officials of the Indian Museum with the view of procuring exact details on the subject, and the result is a report, published by order of the Trustees, on "Indian Fish of Proved Utility as Mosquito-destroyers," drawn up by Capt. R. B. S. Sewell and Mr. B. L. Chandhuri, in which eleven species are scheduled with such descriptions and

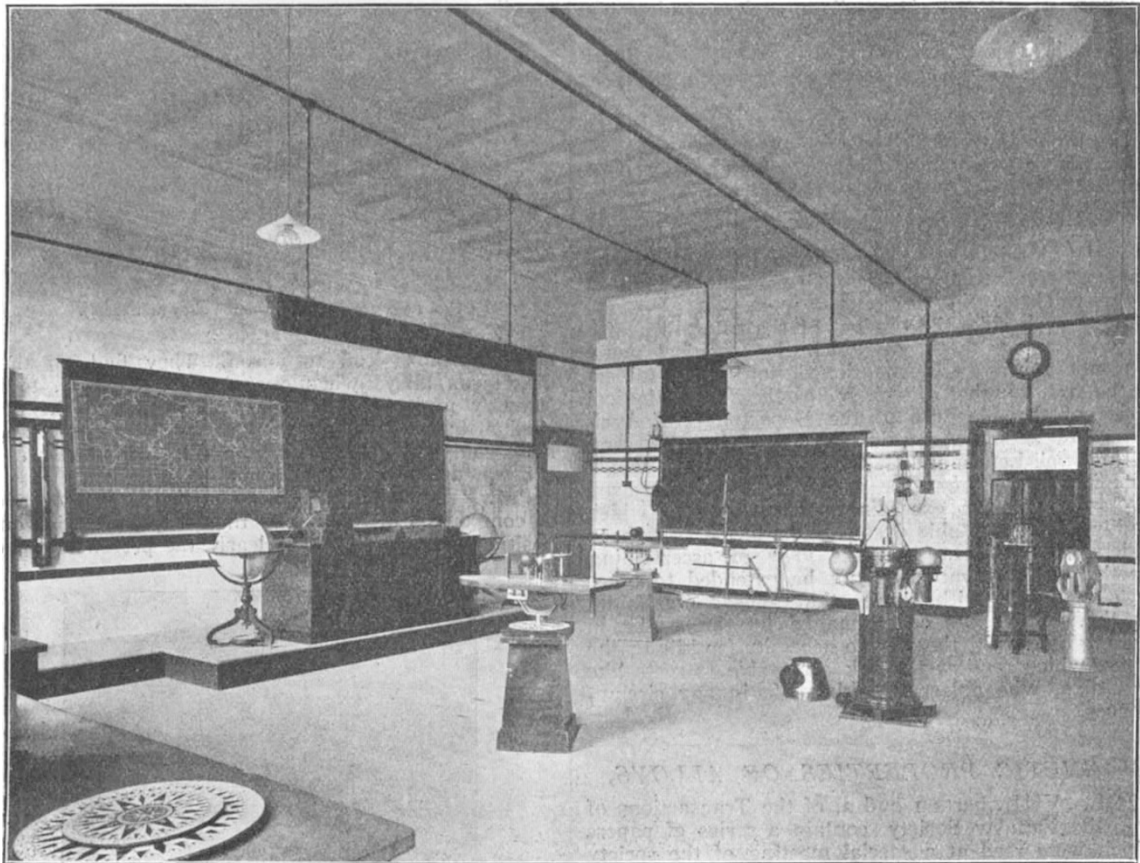


FIG. 2.—Navigation laboratory of the Royal Technical College, Glasgow.

to increased competition and the consequent necessity of saving every mile of distance and minute of time, the ingenuity of the shipbuilder, engineer, and man of science has provided the modern navigator with instruments of precision undreamt of in the earlier days of steam navigation—instruments the proper use of which demands a sound knowledge of the principles underlying their construction and a careful training in their manipulation.

The course of training has the support of the leading shipping firms, as it is recognised that the cadets who have gone through the full course will be of immediate value on board ship, instead of, as at present, wasting at least the first year of their apprenticeship picking up the elements of their profession in a haphazard fashion.

illustrations as render their identification easy. What, if any, practical results ensue from the investigation remain to be seen.

An issue of the Entomological Series of the Memoirs of the Department of Agriculture (vol. ii., No. 9), forming the second part of life-histories of Indian insects, records the results of investigations carried on at Pusa on the early stages of two species of Rhynchota and eight of Coleoptera. The memoir is illustrated with coloured plates, and, as mentioned in the preface, Mr. D. Nowrojee, to whom the investigation was entrusted, is to be congratulated on the manner in which he has carried out a difficult task.

Beautifully executed illustrations in colour are likewise a feature of a second article on insects