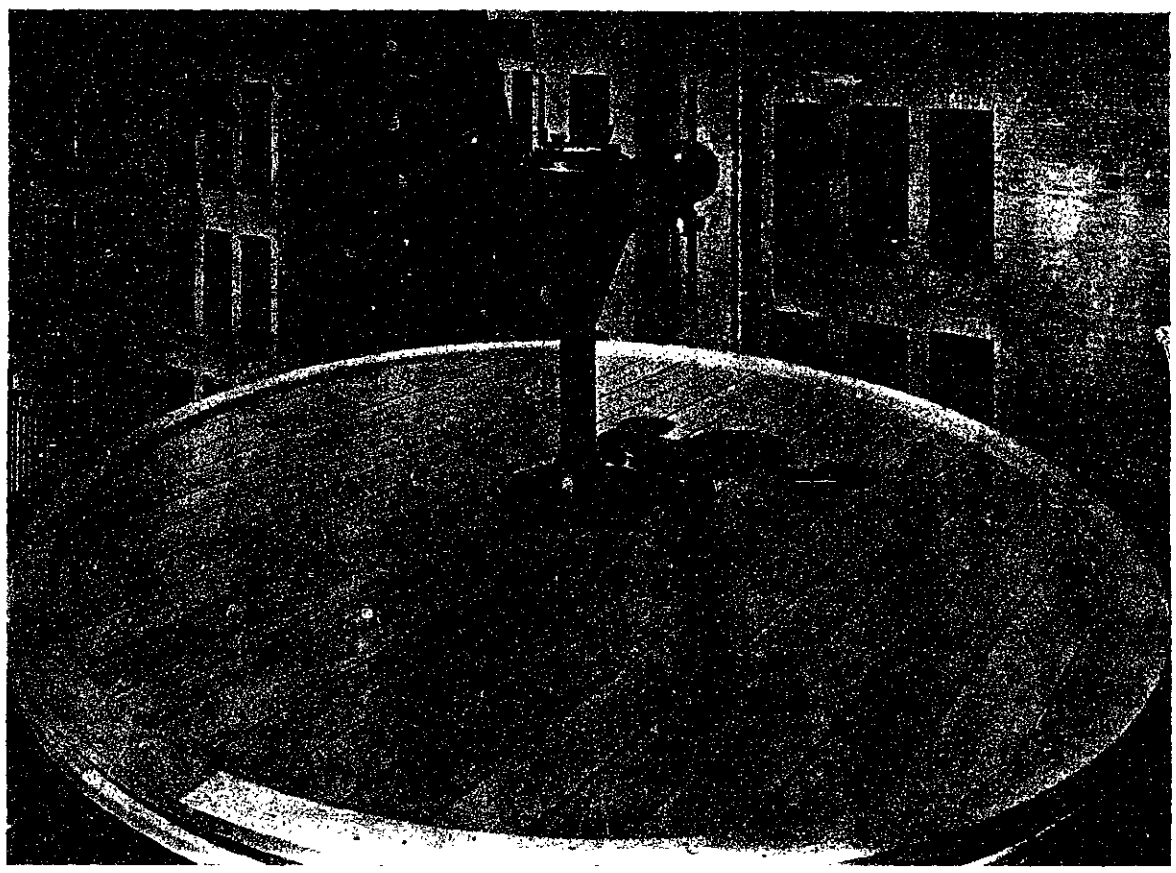

STANDARD NAVY COMPASS AND TURNTABLE.

COURSE XIII FROM THE UNDERGRADUATE VIEWPOINT

JUNIOR

At the beginning of the third year, when for the first time the bulk of the work lies in the Department of Naval Architecture, the characteristic which immediately makes itself felt is a sense of comparative freedom. It is impressed on your mind that the amount to be derived from the course depends on the individual student There are fewer formal recitations and the classroom exercises take on more of the character of discussions. In the drawing room the time taken for drawing depend more or less on the student since an indefinite amount of time can be spent while a result can be obtained in a comparatively short while.

A course such as Ship Design is valuable for many reasons beside the special problem itself. The problem of designing a ship to meet certain general conditions is given out, at once the student is thrown on his own responsibilities and interest is immediately aroused because of the possibility for originality.

It become necessary to get some idea as to the general design of vessels actually built for conditions similar to that which it is necessary to fulfil. Immediately great differences are apparent and the question comes up as to why such differences exist. To me the particular thing for which such a course is valuable is because to answer this question it is necessary to apply to a practical problem very nearly all the principles which have been learned before, and in this way to learn not only the application to the problem under consideration but also the general way in which such principles are applied. The other subjects taken become more real because it is continually necessary to apply them to the case in hand. Another advantage in having such a course is that the large amount of mechanical work which it appears necessary to go through with becomes much more interesting when applied to an original and not to a fixed problem.

The theoretical side of the work is more or less of the same nature, since it consists largely in an illustration of the way in which mathematics and physics are used when applied to the theoretical side of an engineering subject. It seems to me that the best feature of th course is the fact that it forces one to see things clearly in their relation to each other.

S. H. CORNELL, 1911.

SENIOR

Though there are many courses in the Institute that can boast larger numbers than Course XIII, it is really doubtful if there are many broader in scope along general engineering and scientific lines. During the first two years the instruction given is very similar to that in Course II; and in the third year, while Naval Architecture and Ship Drawing are taught, the course again closely follows Mechanical Engineering. Thus during the first three years the men receive much the same instruction as the Mechanical Engineers while they have the advantage of working in somewhat smaller classes. True, in many cases, their work deviates slightly from that in the larger course; but at the same time the work is along the same general lines, and it may well be said that a graduate in Naval Architecture and Marine Engineering carries with him the essentials of Mechanical Engineering. At the same time the student has taken the customary amount of general studies besides enough Electrical Engineering and Laboratory work to serve as a foundation for any electrical jobs that an engineer, not professing more than a general knowledge of such work might be called upon to perform. Other work in the Senior year embodies, among other things, Engineering Laboratory, Applied Chemistry, Machine Tool Work, Applied Mechanics (fourth term), and Foundry Work. While these subjects all serve for his profession they at the same time broaden his general knowledge to a great extent, which can not but be helpful to him in any work that he may undertake.

Ship design is of such a nature that it will help a man in any engineering work. A ship is one of the most complicated of structures, and is acted upon by the most varying of stresses. It is extremely difficult to ventilate, very hard to heat properly, its machinery may be of many types, and to cap the climax these things must comply with the strictest of rules to enable the owners to obtain suitable insurance rates. Thus it will be seen that the training in dealing with all of these problems at once is most complicated, and at the same time most instructive.

Marine Engines represent a class of machines that have been built for so many years in so much the same way that the fine points of design have been reached. Thus a man who can design a marine engine can well undertake the design of any ordinary steam engine Besides this course in reciprocating engines and engine room design, a course in turbine design is given in which calculations and drawings are made for "Parsons," "Curtis" and "De Laval" turbines. While these machines are also of the marine type the principals are such that they can be applied to the design of any turbine no matter what its particular use may be.

The subject "Naval Architecture," while of a very professional nature, is at the same time mathematical enough to offer the best of chances for a man to keep in constant touch with his mathematics; a thing which many graduates of the Institute complain they lost sight of before they graduated.

The openings for young men in this particular branch of engineering do not appear to be the best in Eastern United States at present, and consequently many men who have a love for ships and the sea do not take the course. In many cases this action is no doubt justifiable, but if a fellow turns to something else with no particular aim in view for the future it looks as though he were making a mistake.

It is said that this is an age of specialization, but at the same time it cannot pay to specialize too much; and for the man in doubt the broadest course can not but be the best. As shown above "Naval Architecture and Marine Engineering" is surely one of our broadest courses, because of the small sections the instruction can not help but be the best the Institute has to offer, and the work is of such a nature that it must appeal to any one with a mechanical turn of mind.

For the man who has chosen Naval Architecture as his profession, it is enough to say that Technology is considered by many ship builders abroad to be the best American school of Naval Architecture, that the United States Naval Constructors are given considerable of the same work, and that Institute men are prominent among naval architects and ship builders throughout the country.

M. P. ANDERSON.

SHIP CONSTRUCTION

(Continued from page 73.)

the same scale. When the lines are of approximately the right shape and as fair as can be, considering the small scale, the body plan is enlarged to a scale of one-quarter inch to the foot, the displacement figured, and the lines corrected if need be before the final fairing proceeds. The determination of the stability completes the work of the second term of the third year.

The fourth year work is devoted entirely to detail plans, computation of weight and strength, and the preparation of specifications.

The work is so planned as to throw the student largely on his own resources, thus allowing him to develop some originality. Each man works on the plans of his own ship independently of every other, and thus cannot be hampered by slow work and mistakes of fellow classmen as would happen if several worked on one set of plans. Of course each student cannot work out all details and weights in the time allowed, but he can do enough of this so that the remainder can be determined by comparison with the plans and computations already made by the Department and kept on file for this purpose.

Yacht Design.

A brief course is given in yacht design at the beginning of the first term of the third year, and serves the dual purpose of teaching the elements of fairing and of yacht design.

The student has some latitude in selecting the type of boat he prefers, but in general his choice is necessarily limited to a sloop of not over 35 ft. length over all. The boat must be disigned to the restrictions of the class chosen and the rating length as determined from the finished plans must fall within the limits imposed by the rules of the various yacht clubs. Lines, sail plan and the usual computations for displacement, centre of buoyancy, centre of lateral resistance, stability, etc., are completed, but time seldom permits of work on details of construction.

Model Making.

The department is fortunate in having a well-equipped model room where any sort of model work can be done.

The student has the privilege of making a model of the yacht he designs and is required to make one of the steamship he designs. The object of this is two-fold: first it gives him a clear conception of the form of boat which he would not be able to see from the lines alone without considerable experience, and secondly provides a model on which the shell plating can be laid off.

The process of model making is somewhat different from that usually adopted. The contours of the various waterlines are laid out on lifts and cut true to line. These lifts are then glued up and at frequent intervals a transverse cut is made to the exact shape of a particular cross-section. For this purpose a profiling machine has been especially designed. A template of thin oak is cut and trued to the exact shape of the transverse section and this is fastened to the frame so that it serves as a guide to a small circular saw driven by a motor. This saw cuts a path to the exact shape of the template and thus the glued up block is left with two sets of lines from which the student must fair away the surplus material. The accuracy with which these two sets of lines register is a gauge of the ac-

(Continued on page 77.)