

FOR NAVAL RESEARCH

Birthplace of tomorrow's Navy fighting ships will be the huge new towing tanks at Carderock, Md. "Baby" hulls of ships are given exhaustive tests to show the qualities of full-sized vessels long before they ever reach the stage of actual construction.

ENGINEERING

Navy's Huge Test Basin Is Now Nearing Completion

World's Largest Towing Basin for Studying Ship Models Located Near Nation's Capital; One Tank 1,000 Feet Long

THE WORLD'S largest naval testing laboratory is taking shape today as a key part of the program which is to guarantee the United States a navy second to none and an adequate merchant marine.

Out of solid rock at a 106-acre site near Cabin John, Md., have been hewn four basins in which models will be made to yield information on how vessels ranging from motorboats to battle-ships and ocean liners should be built.

The Navy is now beginning to move equipment into its David W. Taylor Model Basin at Carderock Naval Station, to give the \$4,500,000 testing plant its full name. Begun two years ago, the first basin will go into service sometime next summer.

Accuracy is the watchword in the testing laboratory, where hulls will be towed through the tanks by giant carriages traveling on specially designed and laid tracks. Instruments will measure pressures and pulls; cameras will note the waves created by the 20-foot model hulls; records will be carefully kept and analyzed.

When the entire station is complete, some three or four years hence, the Navy will have a testing laboratory officers believe will be the finest in the world for years to come.

The four basins are housed in a long windowless arched structure of special design. Artificial light is used throughout. Natural light is difficult to control and may mean poorer pictures of what goes on in the tanks. Natural light, besides, encourages the growth of animal and plant life in the water and would increase the difficulty of keeping the water clear.

Giant carriages of unusual design will tow the 20-foot models at speeds up to 25 miles an hour in the three larger tanks, or will guide those that are powered with one-horsepower electric motors.

Only the carriage for the largest tank—1,170 feet long, 51 feet wide, and 10 feet deep—is being ordered now because naval officers wish to study how well it works. It will be ordered this fall and will be ready by the time technicians have finished laying the heavy track on which it will run. Because of the great accuracy required, track laying takes about 15 months. Allowance must be made for the earth's curvature.

Though the carriage spans the tank, it will be driven entirely from a single rail, on which it will rest through four steel-shod wheels. A rail on the other side of the tank will serve only as a support to the narrow end of the tri-

angular steel structure. The carriage, to be driven by electric motors, will weigh 30 tons. This single driving track type obviates the difficulty of lining up the tracks on both sides of the tank.

The other basins are smaller, one measuring 960 feet in length and 20 feet in depth, another about 600 feet with a part in which studies of ships making turns can be carried out, and the fourth measuring only 140 feet in length. A falling weight system instead of a powered carriage will move models across the smallest tank.

The models and the equipment used in testing them are expensive—about \$1,000,000 is to be invested in Carderock apparatus. Eight-inch propellers, cast from type metal in wooden molds, for self-propelled models cost \$100 apiece. Costly though model testing may be, it saves untold millions because it is cheaper to change the shape of a model than to alter the ship itself. Such testing also saves money by making ships more efficient.

The Navy will be delighted to have visitors watch the tests, for no naval secrets will be betrayed. Secrecy does not enter the picture until the test data have been computed; those will not be released. Carderock's facilities will be open to merchant ship builders as well as to the Navy, provided the private concerns pay the cost of the studies.

Research Crowded Out

Extensive general research projects, as well as studies connected with specific ships, are also to be carried out at Carderock. Little general research can now be done at the overtaxed Washington Navy Yard basin, whose single small tank is crowded with hulls for the naval and Maritime Commission programs. It was at the Washington Navy Yard 20 years ago that the efficient bulbous bow made famous by Germany's S. S. Bremen and S. S. Europa was invented.

Complete machine shop facilities for building models and for keeping the station's expensive equipment in repair are provided in a laboratory and administration building that runs the length of the basin building. A naval museum is also to be established. Water for the tanks is pumped up from the Potomac River, which runs just below the site.

The National Advisory Committee for Aeronautics has a longer towing tank, 2,600 feet from end to end, at its Langley Field laboratories, but it is designed for studying an entirely different type of problem. There a rubber-tired carriage tries out flying boat hulls and

seaplane pontoons at speeds up to 80 miles an hour. Carderock's emphasis will be on regular ships.

American warships and merchant vessels have for years enjoyed good reputations as outstanding design achievements. Some of the ships now joining an augmented fleet have been praised lavishly by foreign experts who are ordinarily jealous of any other nation's naval activities. Ships to be built five years from now will be even more efficient. The credit for those vessels to come will go at least in part to this new Navy testing plant.

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PALEONTOLOGY

Skull of Biggest Monster Arrives in America

THE MASSIVE skull of the biggest prehistoric sea monster ever found, a 60-foot plesiosaur which swash-buckled the oceans 120,000,000 years ago when dinosaurs ruled the earth, has been assembled and prepared for exhibition at the Harvard Museum of Comparative Zoology.

Authorities described the beast as "the most amazing specimen of its kind known to the world." It was discovered by William E. Schevill of the Museum staff in an exposed ancient sea bed in Queensland, Australia. Others have previously been found in various parts of the globe but never one even approaching this one in size.

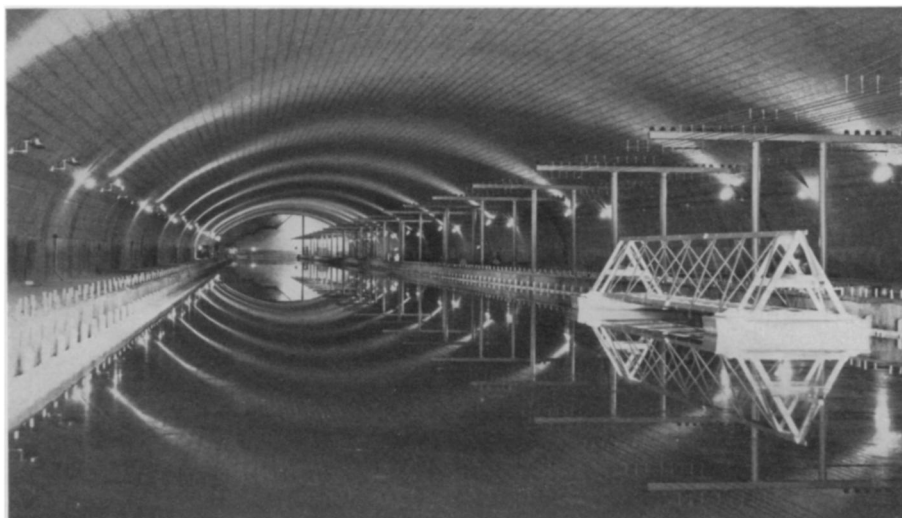
The skull measures 10 feet in length and three feet in height and has heavy alligator-like jaws studded with 92 interlocking spiked teeth from two to eight inches long. The specimen was prepared by George Nelson of the Museum staff.

Scientists have described the giant plesiosaurs as resembling in many ways the mythical sea dragons which terrified ancient mariners. They ranged in length from about 10 to 60 feet with long heads and stubby tails. They used four powerful paddle-like limbs to propel their tremendous turtle-shaped bodies through the water.

They were the greatest marine reptiles which ever lived, masters of their realms as the dinosaurs were on the land, and they roamed the great seas which covered most of the earth devouring fishes and reptiles in their mammoth jaws.

Both plesiosaurs and dinosaurs were confined to the Mesozoic era which extended from about 150,000,000 years ago to 100,000,000 years ago.

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TUNNEL-LIKE TANK

Perfect reflection off the water surface of the Navy's new towing tank at Carderock, Md., makes it hard to tell top or bottom of this interior view of the 1,170-foot tank. Sealed and air-conditioned, the tank will be the Navy's testing ground for models.

ASTRONOMY

Amateur Astronomers Can Make Vital Contributions

If You Have No Telescope, You Still Can Aid Science By Watching for Meteors and Occasional Aurorae

By **LESLIE C. PELTIER**

America's Foremost Amateur Astronomer

Eminent among American amateur astronomers is Leslie C. Peltier of Delphos, Ohio, toy designer by day and star gazer by night. Discoverer of seven comets in his 23 years of comet-hunting, his work is so valuable to astronomy that for the last 15 years Princeton Observatory has loaned him a fine six-inch retracting telescope for his self-appointed task of searching for comets and for studying variable stars. Mr. Peltier received honorary life membership in the Amateur Astronomers Association at its meeting in New York City, Aug. 19-20.

PROBABLY no other science has received so much advancement and development through the work of the amateur as has the science of astronomy. A large share of the important discoveries in the past were made by men who, whether from choice or necessity, earned their living at some entirely unrelated task.

But even the skill and genius of these earlier amateurs has far from exhausted the field and a wealth of opportunities still await those who have a genuine desire to be of service to astronomy.

For those with no other optical equip-

ment than a pair of good eyes there are dozens of meteors to be observed and plotted every clear night, there are occasional aurorae to classify and there is the ever-present Milky Way to scan in the hope of finding a new star.

Still more opportunities for original work are in store for the fortunate possessor of even a small telescope. The observing of variable stars is one of the most important fields of research in which the amateur can engage. Others may prefer the recording of sun spots, the careful watching of the surface markings of the brighter planets or the fascination of comet hunting. Those with a penchant for photography may wish to record auroral forms, meteor trains, or expose plates on the Milky Way in the hope of catching a nova in its early stages.

None of these astronomical by-paths requires any special mathematical training nor are large and costly instruments necessary. Of far greater importance is a plentiful supply of diligence and persistence.

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