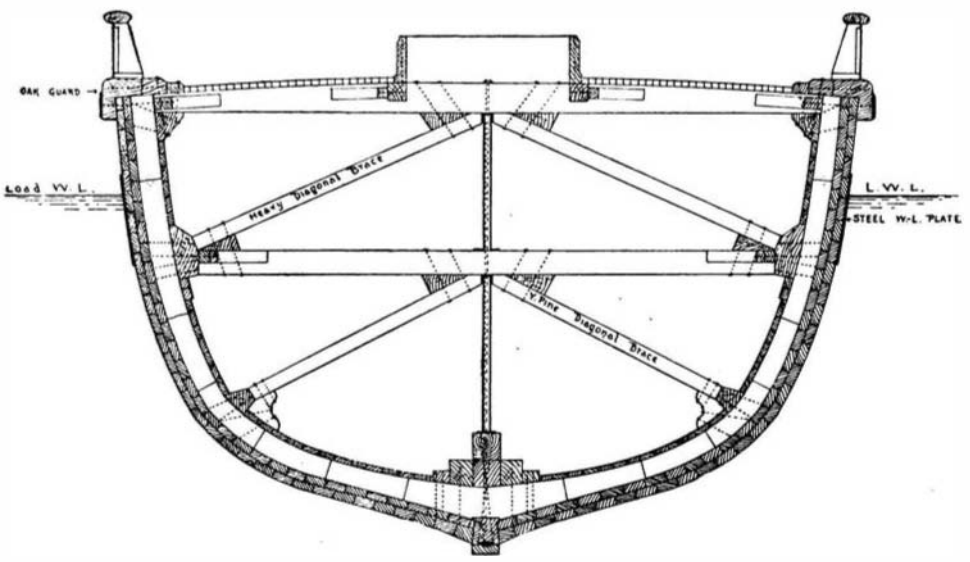
PEARY'S NEW SHIP FOR WORK IN ARCTIC SEAS.

All that experience and all that the cunning of the naval architect can suggest will be combined in Commander Peary's new ship, that he is having built in Maine for his final effort to reach the North Pole. Fashioned of unusual strength and girded and armored as was never Arctic craft before, it is Commander Peary's belief that he may be able to force his way through the interfering ice until he has carried his vessel within reasonably easy striking distance of the topmost point of the globe. His intention is to force the vessel as far north along the frigid shores of Grant Land as possible, and there, from this utmost land base, to make his dash by sledge across the great central polar pack. Apart from giving him a shore base a hundred miles nearer the pole than would Franz Josef Land, the coast-line will give him an easier line of retreat on the return trip. To carry his party and two years' supplies so far northward into the great ice barrier of that region, the new vessel will be strong enough to force its way successfully through the opposing floes, and, by reason of her great endurance and the power in her engines, be able to cleave a way where others have failed.

The new ship is not large, but she is of ample size for the work cut out for her, and everything has been done to make her handy and serviceable. Her principal dimensions are: length on load water-line, between perpendiculars, 161 feet; length over all, 181 feet; beam, maximum, at load water-line, 32 feet; beam, maximum, over guard strake, 34 feet, 2 inches; mean draft, 16 feet; full-load displacement, about 1,500 tons.

The structural get-up of the craft will be very massive, and the stem, sternpost, keel, keelsons, and frames will all be of very carefully selected white oak, fastened and secured with exceptional thoroughness. The frames, molded at heel 16 inches and at head 10 inches, will be spaced only 24 inches apart, from center to center. Immediately over the frames will be laid diagonal straps of steel, making a lattice lacing from bow to stern and from stern to bow, leaving rectangular openings between, six feet square. Outside, over the straps, will be laid a double course of 5-inch planking, the inner course of yellow pine or spruce and the outer course of well-seasoned white oak. Between the two courses will be spread a sheathing of tarred hemp or tarred canvas. The courses will be secured to the frames very thoroughly, and the outer course, after it has been most carefully calked, will be overlaid with extra heavy sheet copper. Inside, the frames will be covered with 3-inch yellow-pine ceiling, and the utmost caution will be exercised during construction to insure thorough water-tightness and to have the vessel warm and weather-proof. The beams will be of yellow pine, and likewise made of exceptional stoutness. The main deck beams will be spaced four feet apart, from center to center, or on every other frame. The lower beams will be spaced directly under the deck beams. As shown on the cross-section, all of these beams will be well anchored, and most extensively tied by numerous through-bolts riveted up inside. To provide still greater athwartship strength, each



CROSS-SECTION OF COMMANDER PEARY'S NEW SHIP.

beam will be supported by heavy diagonal braces of yellow pine, likewise well anchored and through-bolted. To give greater vertical stiffness, each beam will be supported by tie-rod stanchions of steel and wrought-iron piping, so arranged that they may be set up from time to time during construction, thus to provide against any sag developed in building and to insure a most rigid support. As can be seen, the craft is built to withstand very heavy pressures acting normally to the sides, bilges, and bottom; and the shape of her cross-section is such as to tend to raise the vessel out of water as the ice pack presses upon her below water. A heavy white-oak guard, 8 inches by 20 inches, will be worked abreast of the plank sheer from stem to stern, and so securely fastened to the frames, plank sheer, and waterway, that it will be able to support the weight of the entire ship. On the face and under side, this guard strake will be protected by a heavy angle-bar of steel. The purpose of this guard strake is two-fold: First, to add greatly to the longitudinal stiffness of the ship and, second, to serve to lift the craft out of water, either by jacks placed upon the ice or by the upward pressure of the ice pack itself catching under the counter of the guard. The first operation is to relieve the ship should she be frozen in—her own weight, in settling again, combined with the wedge-like form of bow and stern, being enough to break a wide crevasse in the ice, thus opening clear a way for progress. The second operation will be automatic, and will relieve the ship from the grinding, crushing effect of gathering ice packs in motion. To take the worst of the rub of passing ice, the bow, the stern, and the water-line will be armored. The bow protection will consist of 1-inch steel plating worked from the keel up to three feet above the water-line, and extending aft for ten feet. The stern protection will be of like strength, reaching from the keel up above the water-line, and extending forward for fourteen feet. The water-line armoring, extending completely between the bow and the stern protection, will be of ⅝-inch plating, 5 feet wide, one foot only being above board at load draft. The main deck will be planked with 3 inch by 4 inch yellow pine most carefully calked, and the hatch coamings, of stout white oak, will be nearly as high as the top of the bulwarks, thereby adding to the effective freeboard of the ship.

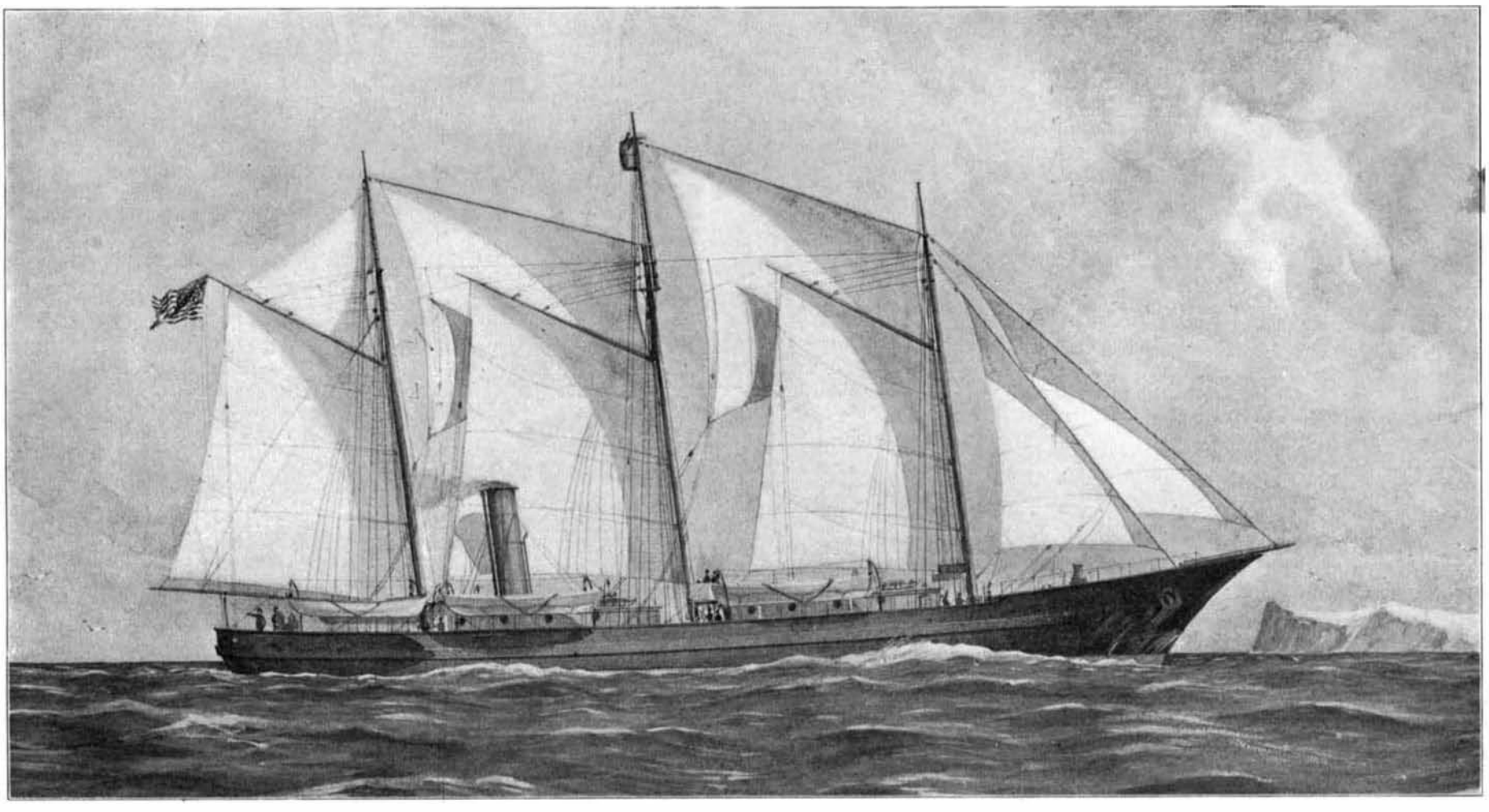
The vessel will carry two deck houses, and the forward one, which will be portable, will be large enough to accommodate Commander Peary, the scientific staff, and the officers of the ship. When the ship has reached as far north as it is possible to force her, this deck house will be carried ashore to serve as winter quarters, and, upon the departure of the sledge expedition, as a store-house for the more important supplies. The crew will be comfortably housed either in the fore castle or aft between decks, where accommodations will be provided for them. It is highly likely that the Eskimos and their dogs, which Commander Peary will take on at Whale Sound, will be housed under the forecastle; but this is a detail not yet settled.

The living spaces will be comfortably but very simply finished, and the ship will be heated by steam and lighted both by electricity and by oil lamps.

The motive power will consist of a single, inverted, compound engine, driving a single 10-foot screw, and steam will be supplied by two water-tube boilers. Under forced draft, the engine will be able to develop 1,400 indicated horse-power, and under natural draft, 1,200 indicated horse-power. The bunker capacity is 700 tons of coal; and at starting, the vessel will carry a deck load, in bags, of 150 tons more. With this supply, at a 10-knot cruising speed, she should be able to do between four and five thousand knots.

There will be a steam capstan and steam steering gear.

The vessel's rig is rather unusual, but is sufficient in



THE NEW SHIP WHICH COMMANDER PEARY IS BUILDING FOR HIS NEXT DASH FOR THE POLE.

spread of canvas to make her manageable under sail alone. The individual sails are designed to make it easy for a small crew to handle them. The standing rigging will be of galvanized steel wire rope. The foremast and the mizzenmast will be single sticks. A crow's nest will be carried on the maintopmast.

The hull of the new ship is building at the shipyard of McKay & Dix, Verona, Me., and complete will cost about $75,000. The engines and auxiliary, being constructed by the Portland Company, Portland, Me., will cost quite $45,000. The utmost dispatch, consistent with thoroughness, is to be devoted to turning the boat out by the early spring.

Some time in June or early in July, Commander Peary hopes to start northward, the ship's complement to consist of about forty persons, exclusive of Eskimos, and by the end of the Arctic summer he expects to have forced the ship to the far north shore of Grant Land. With the first return of light, he will start on his sledge journey over the great central polar ice pack, using the flower of the Eskimos for the rank and file of his party.

Commander Peary's indomitable will and physical force are wonderfully, though passively, graven in every line of the sturdy craft that has been designed to bear him farther north than ship yet has broken her way; and to Mr. William E. Winant, naval architect, much credit is due for the skillful manner in which he has planned to meet every contingency of that severe Arctic climate and service.

ARMOR AND WEAPONS OF THE DE DINO COLLECTION.—II.

(Continued from page 248.)

blade, hilt, and scabbard partakes of the goldsmith's art rather than that of the craftsman in steel. Great two-handed swords may here be found of dimension and temper that bear out the tales told of men cleft in twain at a single stroke.

But of all the knightly swords, the most valuable in the present collection, and the one that appeals strongest to our sympathies, is the magnificent blade of Aben Achmet. Sheath and steel are of rare Hispano-Moorish workmanship, resplendent with enamel and gold and silver filigree. It figured in a tragedy accompanying the fall of the house of Abencerrages and the ruin of Granada. Pathetically near the historic sword lies the elaborately-wrought Koran case of its liege, Boabdil the Unlucky, last of the long line of Moorish kings to reign in Europe. The pole arms of this period are characterized by brutal savagery curiously wedded to exquisite art. The heavy spiked mace, the enormous battle-axes and hammers, the torturing triple-edged pikes, amply justified the iron sheathing in which the warrior incased himself.

A curious and most interesting weapon is an elaborately gilded dagger, made in Germany in the latter half of the sixteenth century, and carrying a pistol concealed within its blade. The removable tip of the dagger forms the key which, inserted in the knob of the hilt, wound the wheel-lock. The latter is visible through the oblong opening at the upper end of the blade. A flint is attached to the under side of the band of *repoussé* that bridges the hilt. This bridge is movable, and, as it descends, it releases the spring that revolves the wheel, brings the flint in contact with the wheel, and sends a shower of sparks into the pistol beneath, discharging its bullet. The weapon is ingeniously contrived, and was no doubt highly prized by its owner.

Unlike the dagger, the Calendar hunting-knife, dated 1540, carries its firearm openly. Its German maker must have been proud of his clever handiwork, for boldly has he made it declare: "ICHENN .˙. HAD .˙. DISSE .˙. KOLLENDER .˙. GEMACHT." (Ichenn made this calendar.)

There is also exhibited a sword-cane once the property of Philip II. of Spain. It has a Toledo blade of wonderful temper. Still another remarkable piece has a pistol dated 1612, which displays a complete double battery. The mechanism of the ingenious wheel-lock is clearly seen.

The harquebuses and pistols show how far the love of ornamentation was carried. Inlay of pearl and ivory and overlay of gold and silver, *repoussé* and incised work cover the stocks. The metal work of the weapon, as well as its wheel-lock, key, and powder flask, show treatment akin to that of the goldsmith's art.

Among the smaller weapons are specimens interesting alike for their beauty and ornament, and for the ingenious devices that insure the attainment of their fatal purpose. The early firearms attracted much attention, specially those in which the mechanism of the old-time wheel-lock is visible. Prototypes crude and curious are here displayed of our modern rifle and double-barreled gun.

The finest specimen in the De Dino collection, so far as weapons are concerned, and, indeed, the finest specimen of its kind in the world, is a sword fashioned during the reign of Francis I. The hilt is wound with braided gold wire of extreme fineness and ends in the bust of a woman, the modeling and carving of which are perfect. Similar busts terminate the cross-bar, and a coiled serpent guards the end.

The exhibit of the helmets in the collection is likewise most comprehensive. Those who have read the previous article will recall the many types there illustrated. It may be fitting in this place, however, to call attention to the royal burginet of Henri II. of France. Its sides tell in rich relief of the victory of Hercules. The casque forms part of the gilded armor he wore when as Dauphin he visited his royal father, Emperor Charles, confined a prisoner of war in Madrid.

In the previous article some splendid specimens of armor in the collection were illustrated and described. Moving from case to case of the collection, one cannot help noting how fashion changed in these steel garments, even as it does in ordinary dress to-day. The earliest suits show shoes ending in a cruel spike, with other spikes projecting from the arm pieces. A swift thrust from a foot or elbow thus armed was likely to leave an indelible mark. Later the square-toed shoe, supple and flexible, by reason of its many plates, came into favor. It is to be seen in the royal suit of Philip II. of Spain, of bloody memory in England and the Netherlands. Over the heart is the cross of Calatrava and d'Alcantara. It is hard to reconcile the meaning of this symbol with the ruthless persecution its wearer instituted in the Protestant lands he sought to conquer. A large portion of this richly-decorated suit, as stated by Baron de Cosson, formed a part of the collection of the Madrid *Armeria Real.* From this armory nine

A Large Portion of This Highly-Decorated Suit Belonged to Philip II. of Spain. It Bears the Cross of Calatrava and d'Alcantara.

ARMOR AND WEAPONS OF THE DE DINO COLLECTION.

pieces of this suit were abstracted in 1839. The backplate, the breastplate (with its dependent pieces), footplate, and the defense of one forearm are added from a similar suit. The latter pieces formed part of the harness, of which parts are still preserved in the Madrid Armeria, which appears to have belonged to a member of the family of d'Onata. The suit was made in Germany about 1554.

Still another suit belonging to Philip II. is also displayed. Philip II. was painted in this second armor by Titian and Rubens. A century later, Velasquez used it in his portrait of Count Benavente, now in the Prado Gallery in Madrid. This armor was fashioned by a German artist about 1550. The numerous pieces of richly-decorated armor in the particular case containing the suit and in a neighboring case formed a complete panoply of which the parts could be changed according to the needs of its wearer. In the specimen illustrated, the tournament plates that reinforce the armor of the shoulder and face are added. The suit was probably made by Colman of Augsburg. The sword hilt in the left hand of the armor is of Spanish make, and dates from the middle of the sixteenth century. It is the work of Sohagun el Viejo of Toledo, the swordsmith of Philip II.

A very rare specimen is a florid and flamboyant suit with its grotesque visor mask. The puffing and slashing of the court dress of the day (1530) is imitated in the metal, and the anatomical lines are followed with admirable fidelity, even to the instep and gauntlet. Every vulnerable point is guarded; yet nowhere is the movement of the joint or muscle hampered in the slightest degree. The lightness of the plates indicates that the armor was designed for occasions of ceremony. The human face visor is rare. Baron de Cosson finds evidence regarding this armor (one of the most valuable of the collection) as having been a gift of the Emperor Maximilien to one of the dignitaries of his court. The left hand of the armor holds a Spanish sword made during the sixteenth century.

A remarkable harness is the jousting armor made by a German craftsman about 1500. This is an example of the most specialized form of jousting armor. Its weight is nearly 90 pounds. The helmet, weighing 22 pounds, was bolted to the breastplate, and is of sufficient size to enable the wearer to turn his head. The armpits were protected by large rondelles, and a shield fastened at a single point served as a mark for a lance thrust. The lance of this period was sometimes over 16 feet long (about 4 inches in diameter near the hand), and weighed nearly 40 pounds. It could not, therefore, be held very well, but had to be balanced between a separate "fork," attached to the breastplate, and a long arm riveted to the backplate. Such was the weight of the armor, and the rapidity of the charge, that a lance which struck squarely would be splintered. A barrier separated the jousters, and rendered armor for the legs unnecessary. The headpiece of a horse mounted under the suit illustrated indicates that the horses were sometimes blindfolded to prevent their shying.

Hydroplanes—New Forms of Gliding Boats.

This name, formed on the analogy of aeroplane, is suggested for vessels which, instead of floating in water, glide over its surface as sleighs glide over ice.

Two such gliding boats have recently been invented in France, one by the well-known constructor Ader, the other by Count Lambert. Ader's is a flat-bottomed boat provided with wings and tail like a bird's, which, when expanded, graze the surface of the water. Air at the pressure of one-twentieth of an atmosphere is forced under the wings and tail, raising them and the boat with them until the bottom just touches the surface. The resistance being thus diminished, the boat is driven forward rapidly by a submerged propeller.

Though the boat worked fairly well, it is too complicated and unwieldy for practical use, and has been presented by its inventor to the Conservatoire des Arts et Métiers, where it is to be preserved as the embodiment of an ingenious idea.

Count Lambert's boat is much simpler and more practical. It somewhat resembles a raft, being six meters long and three meters wide. Under the bottom are five planes, whose inclinations to the horizontal increase progressively from the first, at the bow, to the last, at the stern. When at rest the boat is submerged to a depth corresponding to its weight; but when the motor and propeller are started, the bow and then the stern are forced upward by the pressure of the water on the inclined planes until the boat is raised to the surface, over which it skims with astonishing velocity. At the first trials, in May of this year, it made 32 kilometers an hour with a 14-horse-power motor. A boat of ordinary construction would have needed 40 horsepower for such a speed, and the motor actually used would not have driven it faster than 15 kilometers an hour. In a later trial, after some alterations had been made in the machinery, the Lambert boat made a record of 34.5 kilometers (21.42 miles) an hour.

The screw works between two rudders which, of course, are very deep. The boat cannot move backward except very slowly, but this defect could be remedied by making the planes movable, and reversing their inclinations with the reversal of the screw.

It is obviously unsuited for rough water, but its simple construction and great speed with small consumption of power recommend it highly for use in harbors and rivers.

Here its sphere of usefulness is restricted, like that of any other screw-propelled boat, by shoal water and by vegetation; for though Lambert's boat has no appreciable draft when moving at full speed, its screw is deeply submerged when at rest. Screw-propelled boats also have the unpleasant property of fouling shallow waters and driving away fish.

All these disadvantages, in the case of the Lambert boat, can be obviated by replacing the water propeller by an air propeller.

The air propeller is not a new invention. It was used by Count Zeppelin in a boat designed to assist in the trials of his first airship, and was described and illustrated in these columns. An aluminium windmill about two meters in diameter, driven by a 12-horsepower motor, propelled this boat at the rate of 12 or 14 kilometers an hour, a performance nearly equal to that of boats with submerged propellers of the same horsepower.

A Lambert boat, or "hydroplane," similiarly equipped, should skim with ease over very shallow water and over or through vegetation.