YANKEE TRICK MAY AID THE DEUTSCHLAND TO ESCAPE

Way Out Is Narrow, but It Has Been Followed Before by Submarine Equipped to Run Like Huge Crab Over the Ocean Bed

COURAGE, cleverness and resourcefulness brought the U boat freighter Deutschland safely within the capes of the Chesapeake. Captain Koenig scored to the admiration of most people and to the manifest disgust of the Allies' sea patrol. Can he again foil his national foes, now alert and grimly determined to balk his dash for home? Has the wily Teuton more tricks to draw upon that will serve him well when the time comes to try to outwit his would-be captors?

Even the sluggish must be aroused by the problem that confronts Capt. Koenig. The hare escaped the hounds once, but the noses of the pack are close to the only exit from the hole into which their quarry has dodged. The odds are apparently against the underwater freighter's making good again.

The path of escape is narrowed now, and a telltale trail would mean well nigh certain destruction or capture. Under these conditions, can the cunning skipper of the Deutschland get out of the Chesapeake undiscovered by running submerged until he has gained a good offing in the open sea? As U boats ordinarily go the instinctive answer is "No." But something has happened lately that may alter these prospects both to the dismay of the waiting enemy craft and to the astonishment of the world at large. Such may be the fruit of Teuton initiative and Yankee inventiveness combined.

According to news accounts of recent date, Simon Lake hastened to Baltimore intent upon libelling the Deutschland if she embodied any of the Lake patented features. In fact, it was charged that the great Krupp concern has appropriated Lake's ideas in the building of military submarines, and while the courts of the fatherland were not unbiased, the arrival of the Deutschland in American waters seemed to offer an opportunity to test the force of American patent laws. But instead of friction the unexpected happened.

The rival interests promptly proceeded to pave the way for a union of efforts, and now it is announced there is to be an international company formed for the operating of a line of undersea cargo carrying ships. In other words, Simon Lake is to add his practical experience in the field of underwater craft of commerce, and by the cooperation of Yankee and Teuton the interference of Germany's enemies with these subaqueous traders is to be substantially neutralized. And how is this possible? The answer is in part a matter of record: a performance that dates back to the time of the war with Spain in 1898.

It happened then that Simon Lake was cruising about above and below water in the Chesapeake with the first of his submarines of commerce, a boat designed primarily for subaqueous salvage. Military use had nothing to do with the inspiration for that craft. Mr. Lake was seeking a shorter cut to financial glory; he was bent upon recovering a part of the millions of dollars worth of sunken treasure that the sea had swallowed in preceding decades.

His objective simplified his task. He had no ambition to produce a vessel capable of simulating the agility of a fish, as do the bulk of modern submarines when travelling under the surface. He took for his model the less ambitious crab; a creature content to swim at the surface or to crawl modestly along upon the sea bed.

The Argonaut, for so his boat was named, was a vessel of unique getup. It did not boast storage batteries, but nevertheless it was able to travel both at the surface and along over the bottom, while utilizing the propulsive effort of its gasolene engine. The boat was of modest dimensions, and decidedly ingenious in a number of particulars.

Forward the circular hull was divided into two chambers, one forming an air lock and the other a diving bell, this being effected by filling the larger chamber with air at a sufficient pressure to allow the opening of a bottom door, while holding the enveloping water at bay. This permitted divers to pass out from the Argonaut when she was at rest on the bottom. To facilitate running upon the sea bed the submarine was provided with two supporting wheels, one of them attached to the rudder and capable of being moved from side to side to steer the vessel. The propeller still provided motive power just as it did when navigating at the surface.

During the time that Mr. Lake ran up and down the Chesapeake he travelled under water a distance of many hundreds of miles and learned just how advantageous was his system of navigating upon the bottom. By controlling the amount of water ballast he was able to regulate the boat's weight upon the sea bed, and thus to accommodate the load to either a hard or soft bottom, or the presence or absence of strong currents. As he explained it:

"If we wished to steer we could run that course submerged more accurately than a surface boat feeling her way in a fog or battling with rough weather, because we travelled upon a medium that did not change like the waves of the surface water. At the bottom there is quiet, and the sands of great stretches of the Chesapeake and our seaboard are as smooth as a macadamized road."

It is a coincidence, of course, that Mr. Lake built his Argonaut at Baltimore, and likewise a matter of chance that he explored so thoroughly the length and breadth of the floor of the Chesapeake, but it is a fortunate thing for the German undersea freighters that the subaqueous voyaging of this inquisitive Yankee carried him out through the capes of the Chesapeake and along the contiguous coast. Just what is likely to happen is probably dawning upon the reader. Indeed, probability becomes a virtual certainty in view of the present conditions and recalling a particular performance on the part of the Argonaut.

Again Mr. Lake tells the story of his exploit: "We headed toward Cape Henry, steering by compass, and I guess that we must have travelled as much as ten miles on the bottom. We took ranges by occasional glimpses at the surface, and in that distance we came up possibly three or four times. Upon each return to the surface we found ourselves directly on our range or bearing.

"That gave me an idea and turned my attention momentarily from the commercial to the possible military use of such a boat. I knew that the army had covered the approaches to Fort Monroe with submerged defences in the form of observation mines capable of being fired from controlling stations on shore. I believed I could demonstrate that a boat like the Argonaut could approach those mine fields, sever the cables by sending a diver out from the diving compartment, and thus clear the way for a dash on the part of hostile craft.

"I asked the military authorities to permit me to demonstrate that fact, but those gentlemen would not grant permission. Nevertheless I was determined to satisfy myself upon that point, not by cutting any of the cables, but by entering the mined zone unobserved. Accordingly I slipped away from Fort Monroe one afternoon and got out beyond the capes of the Chesapeake.

"Toward dusk I submerged her and headed straight in for Old Point Comfort and its protecting guns. The only thing above water was my sighting hood, and purposely I kept the Argonaut's speed down to a slow pace so that this means of observation would not create a betraying wake. I was able to advance her undiscovered right through an unsuspecting fleet of sailing vessels.

"Those craft were continually illumined by the searchlights at Fort Monroe, and not one of the schooners escaped the inquiring beams of those watchful eyes. Nevertheless the Argonaut neared her goal steadily without detection, and I did not blow out her water ballast and rise light to the surface until I was in the very middle of the mine fields. The surprise was complete—the men of the coast artillery had utterly failed to discover my approach."

As originally installed, the so-called bottom wheels were attached to the keel and rudder of the Argonaut much like the casters of a table. Because they were not flexible in a vertical direction and without give they proved in the end unsuited to the service designed for them, especially when the boat was running on a hard seabed and below storm tossed waters. Contrary to the belief of the bulk of technical men, Mr. Lake found out in the most practical fashion possible that the undertow or up and down motion of the water is not confined to the surface, but extends in some circumstances scores of feet downward. It was just this sort of undertow that caught the Argonaut upon one occasion and pounded her upon the hard submerged sand so violently that the jaws in which the bottom wheels were hung were smashed like things of china.

This led later to his pivoting his wheels so that they were cushioned by hydraulic plungers, and with this improvement he was able to run submerged with his modified Argonaut without fear of harmful jarring. Thanks to this alteration, the nice control of dead weight by means of water ballast and the form of the bow, Mr. Lake found that it was entirely practicable to surmount obstacles fifteen feet high, the Argonaut rising over them in the water like a hunter taking a hurdle.

Judging by the information already available relating to the structural getup of the Deutschland, and assuming that her sister ship the Bremen and others said to be in course of building are substantially identical in principle, it is manifest that the German constructors have adopted an inner or pressure resisting hull of circular cross section. This form is the simplest and withal the strongest for a given weight of metal. Undoubtedly it is perfectly safe for the Deutschland to submerge to a depth of 150 feet if occasion require. Therefore the question is, Where and how far could a submarine with bottom wheels travel on the Atlantic seabed when forced to elude an enemy patrol and seeking to enter or to leave a port?

Naturally, for the present, interest centres about the mouth of the Chesapeake. The gap between Cape Charles on the north and Cape Henry on the south is a matter of twelve-odd miles, and once that line is crossed outward bound the seabed dips so easily that the twenty fathom line is more than twenty miles off shore from Cape Henry light. Not only that, but this contour extends well seaward up and down the coast for scores of miles.

It must be remembered that the British and French naval forces patrolling the coast are on their mettle. The commerce raiders that have slipped into Norfolk and Newport News did so by following the unbeaten track of shipping when approaching the Chesapeake capes and then making a dash for port when the way appeared clear. Just the same, their venturesome commanders have not dared to take their ships out again, and all because the enemy sentinels closed in for the purpose of preventing their exit.

The underwater freighter has increased the determination of the watchers out at sea, and it is said that submarine catchers with grapnels and entangling steel mesh are to block any further activities on the part of the German subaqueous cargo carriers. But the Allies will have a lot of trouble in spreading a curtain of this sort of sufficient reach.

To begin with, their sea patrols cannot trespass within our national waters. Therefore a bottom travelling submarine issuing from the capes of the Chesapeake submerged has a fair chance to dodge her would-be captors. She can turn either north or south and run far inside of the three mile limit and in this manner flank her enemy. By following such a course the U boat freighters should be able to reach the open sea and be off for the Fatherland by choosing a route that would keep them out of the regular steamer lines or the accustomed paths of surface going freighters.

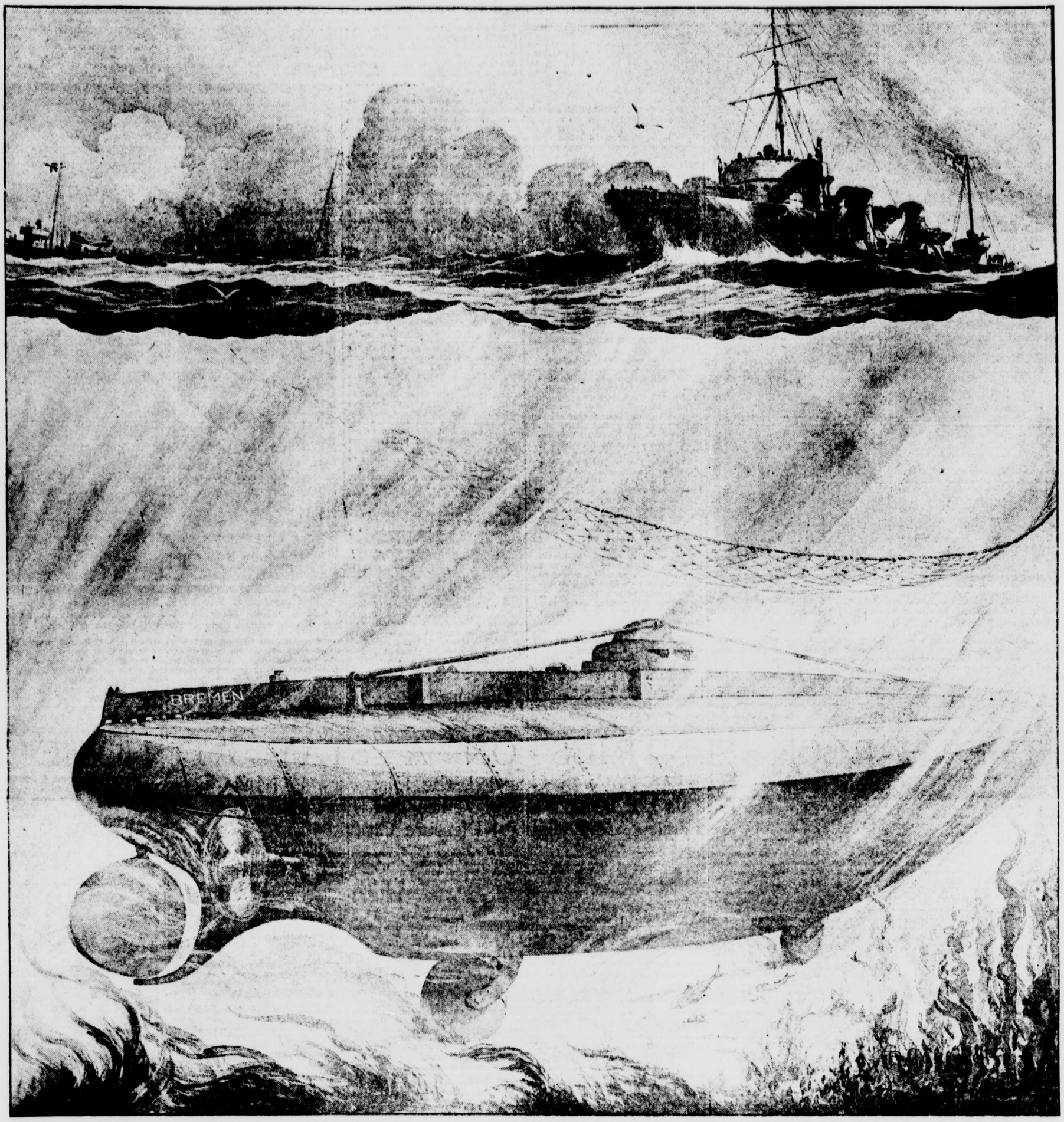
The sandy character of much of the Atlantic seaboard lends itself admirably to just this order of covert commerce which the Germans have initiated. A submarine freighter has two routes by which she might reach or leave the port of New York, one, via Long Island Sound, and the other by way of the lower bay and the Ambrose Channel.

The twenty fathom line of the sandy sea floor extends well oceanward off Newport, in fact is a matter of ten miles, and once within our territorial limits an approaching submarine would have no trouble in entering Long Island Sound. A departing boat would have the same advantages in getting clear of the coast and also in sidestepping enemy sea patrols. Again, a U boat of this sort coming from the east would find the twenty fathom contour running generally parallel with Long Island and extending outward from the southern shore for a good distance.

A submarine cargo carrier, either arriving or departing by way of Sandy Hook, would find an average depth of but fourteen fathoms within a radius of twenty miles off that point, and it could follow the Jersey coast submerged as far as it served the boat's purpose to do so before coming into or striking out from the land.

A submarine utilizing Philadelphia as a port of discharge or a point for departure has the benefit of the shallow waters lying outside of the capes of the Delaware. It is thirty miles from Cape Henlopen to the twenty fathom curve. But what must be kept in mind is that an ordinary submarine, that is one running between the bottom and the surface when travelling submerged, could not make use of the relatively shallow waters under consideration.

A boat of that sort would probably invite a disaster if she tried to dodge a sea patrol by quick submergence and sought to get within the three mile limit by a hurried run under cover of the water. These subaqueous freighters are not easy to handle submerged, and their great length—the Deutschland being about 300 feet long—adds to the difficulty. At the moderately acute angle of 10 degrees down by the head there would be a difference between the bow and stern vertically of quite sixty feet.



Travelling along on the sandy sea bed a submarine freighter need not fear destroyers searching for her with steel nets.

How the Old Argonaut, Father of Seagoing Underwater Craft, Proved the Practicability of Bottom Wheels and Surprised a Fort

Driving along at any speed at all the vessel would strike against the bottom and be doomed if she attempted to operate in water of twenty fathoms, or 120 feet.

But a submarine equipped with bottom wheels, on the other hand, would not be imperilled if she sought cover under the water and tried to continue on her course. She could operate safely and without fear of detection in water 50 or 60 feet deep. This would be enough to cover her by an ample margin.

All she would have to do would be to take in water ballast, a performance covering probably not more than a minute, sink to the sea bed after lowering her wheels from their recesses, and then go rolling along out of harm's way at a good clip upon the firm wide path of nature's making. She could do this even though a storm raged above, because the cushioning feature developed by Mr. Lake would take care of any vertical movement of the mass of the water and effectually prevent the boat from being pounded down upon the hard, underlying sand.

More than this, the vessel could go to the bottom in time of fog and travel along with more security than upon the surface. Her compass would give the course, and her pressure gauges would register depths without need of sounding by means of the lead line. The distinctive nature of the bottom, which is one of the ways a mariner feels his position when nearing land, could be determined from time to time through the bottom door of the diving compartment, and thus the commanding officer would have an additional check upon his exact position without rising to the surface.

Years back, when Mr. Lake first adopted this method of submarine navigation, he called the sea bed his guiding medium. Naval men at that time treated his proposition humorously, but even the official mind, like the sun, "do move," as the colored parson said. The ridiculed things of the past have become the very practical agencies of the present. The installation of the diving compartment is, in a measure, optional; but for blockade running the bottom wheels are indispensable if the greatest margin of safety and promise of fullest success are to be looked for. Bottom wheels are neither expensive nor difficult to add to a boat like the Deutschland or any of her class, and the associate operative apparatus would call for only a modest additional weight and space in which to function. What is more, the fitting could be done in a short while.

The installing of a diving compartment would be of the greatest service should the submarine freighters decide to make use of underwater supply bases, or, so far as that is concerned, for the transshipment of certain sorts of freight packed in small hermetically sealed metal containers. This idea has been elaborated upon before. There is nothing impracticable in such a performance.

The undersea cargo carriers could establish their base or bases upon the sandy bottom at some points along the coast where detection would be well nigh out of the question. Again, there are known to be a number of wrecks off the coast of large vessels that lie in relatively shallow water outside the three mile limit. What is to prevent submarine traders of this sort from using the sheltered side of any of these sunken craft as a point for the transfer of freight that can be handled in this fashion?

One or more U boats of commerce could ply between American ports and such a depot, while others would not seek to enter harbors, but make that submerged station their objective. Canned supplies of all sorts could be delivered to those from overseas, and thus they could be revictualled and reloaded with freight from our shores. Their cargoes in turn would be taken in by the local blockade runners, the diving door and the diving chamber making all of this feasible.

The public probably wonders why nickel and rubber should bulk so large in the homeward bound cargo of the Deutschland. Nickel gives added powers of resistance to armor plate and therefore is particularly desirable in increasing the defensive properties of steel. It is an invaluable alloy where lightness must be considered in the protective plating. Possible it is just this sort of steel that is needed to armor the newest aeroplanes, and the greatest of the super-Zeppelins.

Rubber plays no less a vital part in the successful conduct of modern war, and the Germans have been hard pressed for this material. In fact, the Imperial Government issued an order not so long ago confiscating all available supplies of rubber products within the Fatherland, including rubber waste, and remade rubber. Permission to sell certain rubber goods could be secured only by application to the War Ministry, and the names of the purchasers had to be made a matter of record as well as the quantity and the character of the articles sold them. The reason for this was that the prevailing price for crude rubber in Germany has reached anywhere from ten to twelve dollars a pound. In England, on the other hand, rubber can be bought today in abundance for three shillings a pound.

Report has it that the Germans are building eighty cargo carrying submarines, and even half that number would constitute a good sized problem for their enemies to keep track of. Some of them of course may fail to get through to this side of the Atlantic, or fall by the way on the homeward run, but certain it is that fewer of them will be sacrificed if they make the most of our shallow coastal waters, with their sandy sea bed, and elude the enemy patrols of whatever sort by rolling along as far as possible upon the Atlantic's floor.

It is known that the Deutschland has profited by an underwater microphone and it is just as likely that she has means of subaqueous communication. What then is to prevent an aeroplane from circling aloft above the capes of the Chesapeake and signalling either directly to the submarine or relaying the warning message by way of an innocent looking surface craft lying within our territorial waters?

Short Cut to Shoulder Straps

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This without any consideration of age. But the President may also appoint from the Officers Reserve Corps to a Second Lieutenancy in the regular army any of its members between the ages of 21 and 27 years. This organization must be drawn upon to keep the officers' lists filled.

It is the expectation that this officers' training corps will be the goal of many of the thousands of young men who are in the summer camps at Plattsburg, N. Y.; Salt Lake City, American Lake, Wash.; Indianapolis, Monterey, Cal., and San Antonio, Tex.

In Plattsburg alone about 11,000 men registered this year. How well these camps will prepare them is to be seen by comparison with the work in the National Guard.

"National Guardsmen," said an army officer recently, "may attend forty-eight drills of an hour and a half each in a year, making seventy-two hours in all. The annual guard camp gives all who attend ten days of work at ten hours a day, let us say for the sake of figures. Special occasions may furnish as a limit twenty hours more—total in one year, 172 hours. In four weeks at Plattsburg every man gets 240 solid hours of training.

"But you must not misunderstand me to mean that when a man has passed through the training camp at Plattsburg he is of necessity ready to be admitted to the Officers Reserve Corps. I venture to say, however, that any one of them who shall attend three camps and apply himself to the instruction there will be fully qualified for a temporary appointment to a commission. The officers in charge of the Plattsburg camp are on the keen lookout for men who show qualifications for the officers' training corps. Such men they will mention in reports to Washington and they will be invited to take the examinations for the Officers Reserve Corps.

"Men at the camps who have passed 27 years of age can, if they wish and will pass the examinations, be appointed up to and including the rank of Major in the Officers Reserve Corps, whence they may go into the volunteer army, if we have one, without loss of rank.

"England was pitifully lacking in this development. An American army officer who was in England through a part of the preparation for the great war told me upon his return recently that to see the raw recruits drill was pitiful at times. A squad of men who had had no military training, and in front of them a young man, earnest, patriotic, energetic and sincere.

"Every one of them was doing the best he knew how, and especially the young man, who was, alas, trying to teach them something he didn't know himself, working with his squad during the day and studying through the night to fit himself for a leadership, but hopelessly handicapped because he had never before tried to learn about it and all the trained officers who might have taught him were at the battle front.

"The United States will do better than this, given time for working out what has already been begun. Last year at Plattsburg we had about 2,500 men. Almost all of them are back this year, and they have brought other thousands with them. Any one of them is now equipped to lead a squad, and this year we shall turn out 10,000 and more just as able. They will drill others, and in a short time the country will be filled with men able to take charge of volunteer troops if we ever need their services."

Whether or not it is advisable from a purely financial standpoint for a young man to enter the army as an officer is for individual consideration. The base or initial pay of a Second Lieutenant is $1,700 a year; of a First Lieutenant, $2,000; of a Captain, $2,400; of a Major, $3,000; of a Lieutenant-Colonel, $3,500; of a Colonel, $4,000; of a Brigadier-General, $6,000, and of a Major-General, $8,000. The base pay is increased 10 per cent. for every five years of service. To this are added quarters, light and heat, and the advantages of the commissary department bring the cost of living far below that of a civilian's menage of the same size and style.