

advice: 'Never give reasons. Your judgment may be fine and your reasons feeble.' Who also does not remember cases of the mining engineer who is superb in his advice to clients and unsuccessful when he goes into mining ventures on his own account?"

GERMANY'S SUBMARINE EFFORT

IF GERMANY CONCENTRATES her whole manufacturing energy on submarines, how many can she turn out in a year? It is the editorial opinion of *The Scientific American* (New York, April 7) that the number is in excess of one thousand, and it bases its belief on the existence of German yards having a capacity of over 500 submarines at once and on an estimate of six months as the average time of construction. In this possibility the editor sees "the immediate danger-point" of the great conflict into which we have just entered. It is obviously our business to see that Germany's submarines are destroyed faster than she can build them, or at the rate of, say, three a day. It is impossible to say how many have been already destroyed, but *The Scientific American* is inclined to think that the mortality among them is by no means as great as had been represented. Says the editor:

"It is only recently that this journal has been able to obtain a conservative estimate, in quarters where reliable statistics are available; and we are informed that a total loss of one hundred would be, if anything, an overstatement of the truth. This figure includes many boats which were supposed to be lost because they were believed to have been heavily hit by shell-fire.

"For some months we have had a growing conviction, based upon a very close study of the campaign, that the submarine losses were not nearly so large as represented and that with the growth in size, speed, and sea-keeping qualities of the submarine, the problem of meeting and breaking up the so-called blockade is becoming increasingly difficult. . . .

"Of course, the only plan by which Germany could build a thousand submarines in a year would be by what has come to be known as the manufacturing method, of which a notable example is found in the great Ford plant at Detroit. It is pretty safe to say that she has adopted a standard type of craft, the details of which are based upon the experience of the past two and a half years, and that she has enlisted the whole of her ship-building plants, public and private, and a corresponding number of her engine-building firms, in this work.

"We have made investigation of the capacity of the German yards as regards building ways, and it discloses the interesting fact that, without laying down any additional ways, she could have under construction at any given time about 530 submarines of the size of the *U-53* which came to Newport last year. The 800-ton submarine requires about 30 feet of clear width in order to allow a working space around the hull, and its length is something under 250 feet. Each of the three 625-foot dry-docks at Wilhelmshaven, for instance, would permit of the construction of six submarines on its floor, and eight boats could be constructed in each of the larger docks, 822 feet in length. Also the floating docks, of which the Germans have so many, would form excellent building ways. The smaller dry-docks, 500 feet or less in length, and the floating docks would take two, three, or four submarines, as the case might be. Moreover, ways suitable for submarine construction can be built rapidly on foreshore or river-bank, and the actual shipping and dock-yard capacity, so far as building ways is concerned, could quickly

be doubled. If the Germans thought fit, they could have a thousand submarines under construction at the same time. . . .

"The Central Powers may have two hundred submarines afloat (and we think it is possible that they have many more than that), and if, as is more than likely, they have some five hundred on the ways at the present time, this would mean that in six months they would have seven hundred *U-boats* available, and twelve hundred by next spring.

"But the crews? The German naval personnel numbers over 150,000 men. Her idle battle-ships can supply all the men required to man the submarines as they are successively set afloat.

"Here, as we see it, is the immediate danger-point in this great conflict into which we have now entered. It is here that we should apply, and should at once apply our whole effort. If we refuse to do this, and elect to fight a purely defensive war, and the Allies should have to make a peace favorable to Germany, we may ultimately find ourselves face to face with the High-Seas Fleet of Germany, and the veteran armies, ten millions strong, of the four nations of the Central Powers."

VENISON FOR ALL OF US

THAT VENISON, instead of being familiar to only about one per cent. of our citizens, may in the near future become as common and cheap as mutton, is the prospect held out to us by Charles A. Sidman, who advocates, in a letter to the *New York Sun*, the wider use of deer-meat for food and the breeding of these animals for the purpose. If we can raise foxes for their fur, says Mr. Sidman, then we can raise deer and elk for their meat. This, of course, does not necessarily mean that these animals must be domesticated like cattle. That would probably be impossible. It has already been tried unsuccessfully many times with the common deer. It does mean, however, that they would be bred and kept in herds. Writes Mr. Sidman:

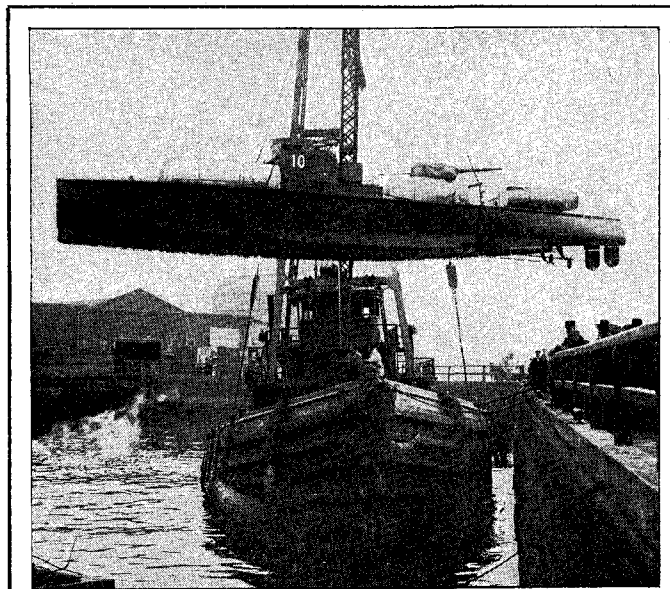
"The production of venison for the market is as legitimate a business as the production of beef and mutton. The State laws, when prohibitory, should be so modified as to encourage the industry. Elk and deer may be raised to advantage in forests and on rough, brushy ground unfitted for either agriculture or stock-raising, thus utilizing for profit much land

that is now waste. One of the added advantages is that the business is well adapted to landowners of small means.

"The members of the deer family rank next to the cattle and sheep family in general utility, and are the most important of the big-game animals of America. The meat of the deer has always been a staple article of food, whenever it could be obtained in any quantity, being a favorite with the epicures and also having a wide use as a substitute for beef and mutton. It resembles these meats in texture, color, and general characteristics. The flavor is also distinctive and suggests mutton rather than beef.

"The general popularity of venison is so great and the demand for it so wide-spread that overproduction is most improbable. The other products of the deer, skin and horns, are of considerable importance, and in countries where deer are abundant and especially where large herds are kept in semidomestication, the commerce in both is very extensive.

"The raising of deer for profit does not necessarily imply that they should be domesticated. They may be kept in large preserves with surroundings as nearly natural as possible and their domestication entirely ignored. In this manner the breeder may reap nearly all the profit that could be expected from a domestic herd, while the animals escape most of the



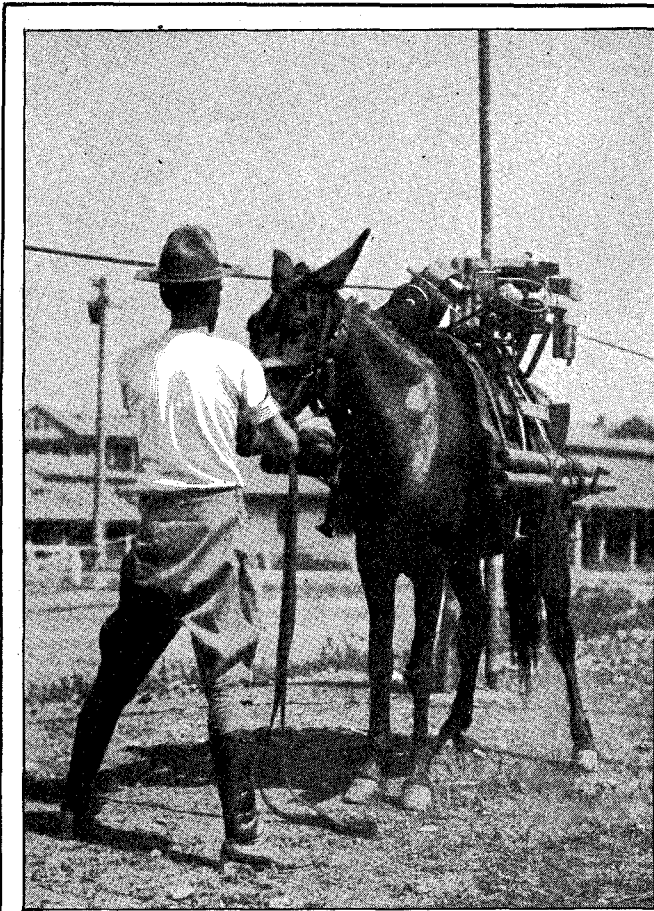
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OUR ANSWER TO THE SUBMARINE.

One of the new submarine-chasers for the American Navy on its way to the place of launching. Note the details of its construction and observe how easily it can be transported.

dangers incident to close captivity. The ultimate domestication of a herd will in the end, however, be the most successful one."

One of the best of the deer family for this purpose, Mr. Sidman tells us, is the Virginia or whitetail deer. The wapiti, or Rocky Mountain elk, also offers a promising field. Both the elk and deer, says Mr. Sidman, are browsing and grazing animals. The elk seems to prefer a mixture of grass and browse, while the deer eats nearly every kind of vegetation. They are also fond of nuts, and will eat lily-pads, leaves, lichens, and mosses.



THE PORTABLE WIRELESS OF THE BORDER.

Generator and frame of the "pack-set" apparatus on a pack-mule.

Under these conditions, with plenty of range there need be no apprehension concerning the food-supply. He goes on:

"The flesh of the elk, altho somewhat coarse, is superior in flavor to most venison. That of the bulls is in its best condition about the time the velvet is shed, while it is poorest in October. The meat is best when it has been left hanging for four or five days before it is used.

"The increase of elk under domestication is equal to that of beef. Fully 90 per cent. of the females produce healthy young. An adult male elk weighs from 700 to 1,000 pounds; a female from 600 to 800 pounds. The percentage of dressed meat is greater than with cattle, and can be produced in many sections of this country at less cost a pound than beef, mutton, or pork.

"There are in several sections of the United States herds of both deer and elk. Individual owners, as well as associations, have also established large private preserves in many parts of the country and stocked them with deer and other big game. The objects have been to preserve the animals and to provide sport for the owners. In the free life under the protected conditions generally provided deer have done remarkably well, the increase being even more rapid than in small parks. There can be no doubt of the success of ventures in propagating the Virginia deer under natural conditions as wild game, as has been proved by the experience of a large number of hunting clubs and private owners.

"The production of venison and the rearing of deer and elk for stocking parks offer an interesting field for experiment, as well as remunerative returns for the investment of capital.

It is believed that with favorable legislation much otherwise waste land in the United States may be utilized so as to yield profitable returns, and also that this nutritious meat, instead of being denied to 99 per cent. of the people of the country, may become as common and as cheap as mutton."

DONKEY-BACK WIRELESS FOR WAR

THE USES OF A "PACK-SET" of apparatus for wireless telegraphy in border operations by the militia are described from actual experience by George T. Droste, a signal electrician of the New York National Guard, in *The Wireless Age* (New York, April). The experience of the Guard with this type of telegraph on the Mexican border ought to be of the greatest value in the operations of our new Army. Mr. Droste's account, which he calls "On the Texas Border with a Pack-Set," includes a number of suggestions for bettering the service, and contains a somewhat comprehensive analysis of the workings of pack-sets now in use. He writes:

"In my earliest experience during July, when we did nothing but listen in for whatever went through the air and without any definite policies, using different operators, experienced and inexperienced, in the art of radio propagation, nothing of any glory was accomplished. By sending out different sections on detached service to surrounding districts and conducting a main business of about three to four messages a day, consisting of reporting 'present' in the morning and 'good-night' in the evening, we finally were put on details that carried on a more substantial business.

"Our distances between stations, being about eighteen to twenty-five miles, were a larger stretch when the poor detectors and the enormous amount of man-power expended are considered. However, we triumphed by covering the work, if not by radio completely, then partly by radio and buzzer—it being our duty to get the work through. So by using private telephone-lines as buzzer-wires without any special orders, we succeeded in establishing records for the 1/2-kilowatt sets under continuous service conditions that were never known to the New York Signal Corps before, being heard continuously by regular Army stations at Hidalgo, Fort Ringgold, and Brownsville—distances of about twenty-eight, forty, and sixty-eight miles, respectively.

"My final detail was to conduct the station at McAllen. This started a new era for pack-set work, as we were called upon to work with the main Army stations which were established for some years and carrying on a daily business that required experience to keep up with. To do this, I was provided with an experimental engine and generator never before tried out with any continuous success.

"Numerous heartbreaking attempts to make various belts stand the strain of transmitting the energy from the engine to the generator, and preventing the engine from getting hot, took up our time, and we still carried on the entire official business for the Sixth Division, which passed between Fort Sam Houston at San Antonio, 250 miles away, and Brownsville, Texas, by intercepting it and acknowledging receipt of it. This demanded undenyng attention and sacrifices from all the operators in the station, as repetitions were not forthcoming. For us they came only once, and we showed that we were able to cope with the situation and seldom lost a message. Our record consisted in not having lost a message by interception for a continuous stretch of a month with an average of ten to twenty-five messages a day, each consisting of fifty words or more.

"This service finally established us in the eyes of the regular Army stations at Fort Sam Houston and Brownsville. Altho militia stations were established at Fort Ringgold, Harlingen, Hidalgo, Lanogrande, Del Rio, and other points on the border.

"On the night of December 11, 1916, we were forced to close the station, owing to the fact that we were about to be sent to our homes in the North, and, much to our regret, had to sever our aerial connections with the men of the regular Army . . . with whom for two months we had been in continuous radio communication. We felt that we had gained their confidence because of being fully able to handle their work direct, notwithstanding the handicaps of experimental apparatus.

"Summing up the entire experience, we feel that so far as radio work goes for the Signal Corps, we established ourselves in the eyes of the regular Army, and that our successes will go down in the archives of their experiences of working with the militia."