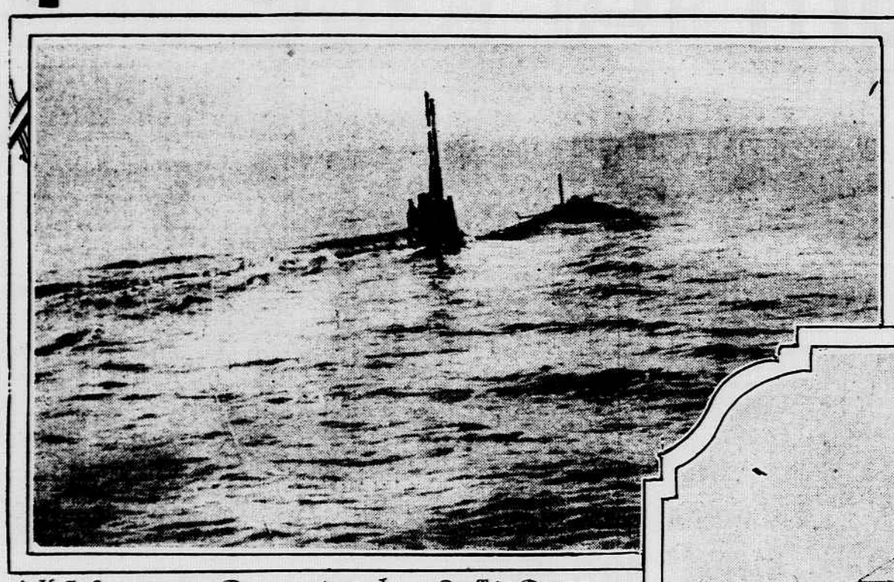
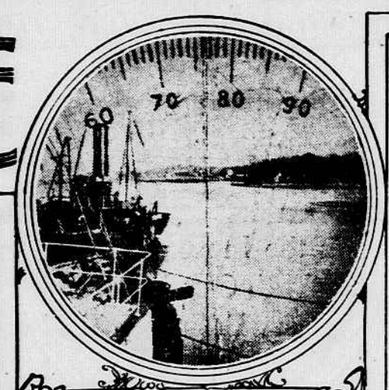
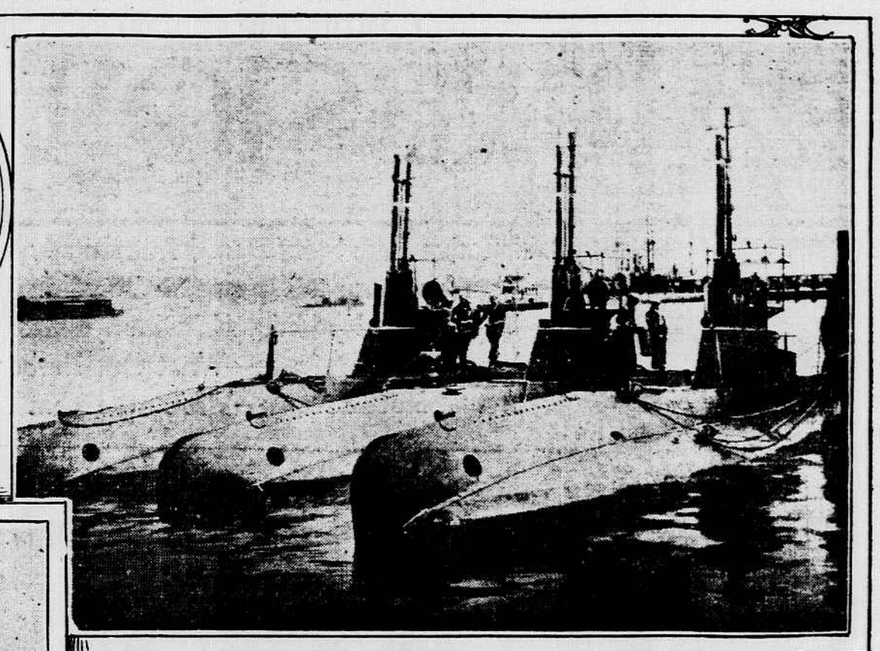
THE SUBMARINE



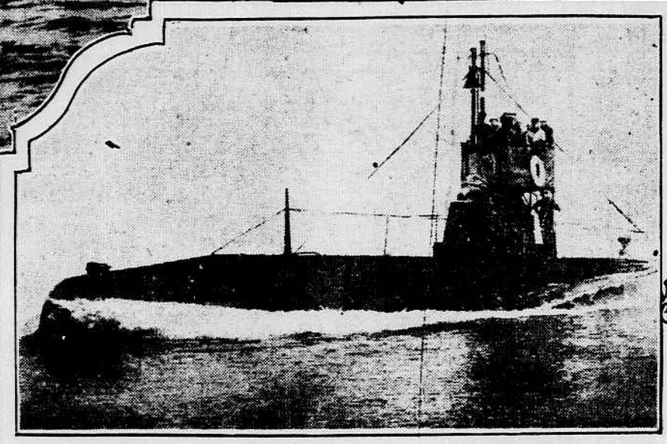
A U. S. SUBMARINE DIVING AND JUST ON THE POINT OF DISAPPEARING BENEATH THE SURFACE.



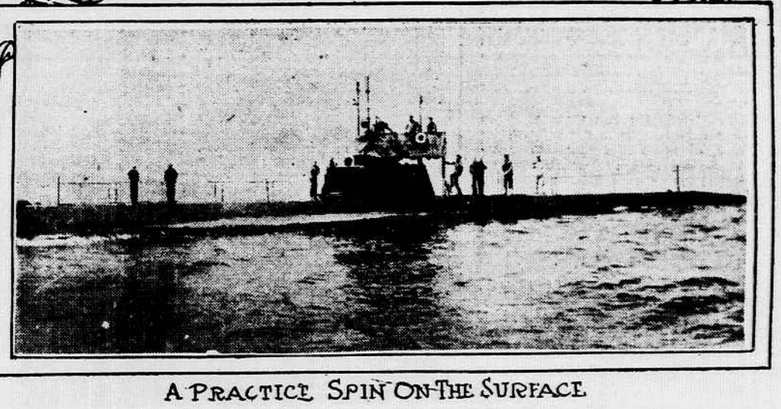
LOOKING THROUGH THE PERISCOPE OF A SUBMARINE.



A TRIO OF UNCLE SAM'S SUBMARINES



FULL SPEED AHEAD



A PRACTICE SPIN ON THE SURFACE

Its Theoretical Strength and Weakness as Compared to the Dreadnaught and Battle Cruiser — How the Submarine Operates. The Delicate Matter of "Balance"—Is Really a Practical Machine Which Has Startled the World—It Talks, Hears and Sees — Little Known Facts About These Under-Water Engines Which Are Playing Such Havoc in the European Naval War Game.

"I would not hesitate a moment to go out in a late type submarine to fight the Queen Elizabeth and her fifteen-inch guns," said a United States navy officer familiar with the little craft. "She could not hurt me and I might hurt her, if she came near enough."

And in these few words he had summed up the weakness, the power and the defense of the submarine, so much at present in the limelight.

Some persons think that the dreadnaught is condemned to junk; others insist that the submarine is blind and that its efficiency has been overestimated.

* * *

The results so far accomplished in the North sea and the English coast are a refutation of any claim that submarines are of little value, but the English line of dreadnaughts, cruisers and destroyers, in which the submarines have hardly made a dent, has by its strict blockade destroyed German commerce and now prevents the delivery to that country of greatly needed supplies of copper, cotton and food which it cannot obtain otherwise.

The attempted blockade by means of submarines of the zone about Great Britain raises many questions of law and makes one want to know whether a submarine can see well enough to distinguish neutral from hostile ships.

It is now very generally understood that there is little mystery about a submarine. The fundamental principle is merely that of gravitation. The hull is so constructed that the water, except where admitted through valves, cannot enter it. Normally she floats a little higher out of water than when awash and in that condition acts as any rather "tubby" boat would.

When ready to go under water is admitted through sea valves into tanks, and the added weight submerges the boat. So perfectly can she be balanced that when under the water the strength of a man will lift her and ten pounds added to her weight will cause her to sink. In this condition if she touches bottom she bounds from it like a great rubber ball.

This perfect balance is not necessary and in actual work is not usually observed, for the drive of the propeller gives her headway so that she can be steered under or up as well as to starboard or port by her double sets of rudders. By means of compressed air the water is blown out of the tank when it is desired to restore flotation.

She has two sets of motors—one of Diesel internal combustion type, burning heavy oil fuel, which when properly used gives off no smoke, to be used when she is on the surface, and the other, electric, to be used when under water.

* * *

Until the development of some motive power, which would become dead as soon as the power was shut off, yet drive the boat when on the surface; and of a motive power which could be operated within the boat when sealed for submergence—no submarine of practical value could be devised. The invention of the gasoline motor of the same general type as those used in automobiles, and later of the internal combustion motor using heavy oil, and of the electric motor, driven by storage batteries, supplied these needs and made this boat the practical creature that has startled the world.

These craft vary in size from that of our earliest boat, about 100 feet in length, to the sea-going type, including one now under construction, which will be over 250 feet in length and have a surface speed of at least twenty knots. The earlier types had one large ballast tank, which was quite enough to secure submergence, but the later have several tanks, an arrangement which tends to maintain the craft in better balance.

As one looks at the picture of a submarine in surface cruising trim he sees two rows of stanchions supporting a light cable railing off a small part of the deck. There is a conning tower fitted with heavy glass peep holes; a light bridge in front of it, and a steel pipe about five inches in diameter projecting about fifteen feet or so above the conning tower; the much-discussed periscope, a staff for a flag, the supports and antennae for a wireless outfit and up near the bow what looks like a small steel box.

Like every other ship, our submarine must talk, hear and see. If the other party to the talk has wireless, they carry on their conversation in what has grown to be the natural way; but if not so equipped the captain or his signalman, standing on the bridge, uses flags, balls, cones and squares with which to give the signals that are easily read by all navy ships close enough to see them. When under water another system intimately connected with that small steel box is adopted.

* * *

A few years ago, when submarines were young, they found it difficult to communicate with one another when either was submerged. They fell back on the principle that water is a good conductor of sound, which passes through water with four times the velocity that it does through air. Most boys know that the sound of two stones struck sharply together under water is plainly heard by another fellow at a long distance if he has his ear under the water.

So when a man in one submarine wanted to hail a friend in another, he hit the steel side of his boat sharply with a hammer. The vibration was carried to the steel side, also a good conductor, of the other boat, and his friend heard the tap. The receiver could accentuate the sound by putting one end of a metal tube against the steel side and the other between his teeth or against his forehead. The number of taps conveyed the message.

Of course, the navy did not remain satisfied with so crude a method, and the hammer has long since given place to a peculiar bell forming the steel box on deck, which the bell hammer, driven by compressed air, strikes a sharp blow, projecting vibrant, clear tones.

The bar against the forehead, too, has been superseded by a metal box filled with salt water and fastened to the boat's side. From it microphones convey signals that can be heard for a number of miles. These, in turn, may soon be displaced by electrical devices that will enable two boats to have a friendly conversation at a considerable distance.

With the boat in cruising trim, when the order "Prepare to dive" comes, everything on the deck, except the periscope and the steel box, is taken through the conning tower hatch and stowed away below. Each man knows his position and exactly what to do and how to do it, and so skillful do they become that, if it takes more than two and a half minutes before everything is below, the last man inside and all ready for the order, the work has been so slow that the crew does not want to face the humiliated and indignant commander.

* * *

A few years ago a submarine met a big steamer coming up Chesapeake bay, and as the submarine was out for practice the captain gave the order to dive just as the two boats approached. It was obeyed with great alacrity, and, from the steamer, with seeming confusion as the submarine sank from view. The next morning inquiries from the department reached her, asking whether she was still afloat. For a steamer had come in with a report that it had met a submarine in a sinking condition, that the crew had been seen running about the deck in great dismay and they had all gone down not as prominent in the public mind vessel for their tomb.

An old lady on the steamer had fainted, and as no one had seen the submarine come up, she was given up for lost. Diving submarines then were not as prominent in the public mind as they are today.

When the deck is cleared, and all movable parts and the crew are below, the captain, who has been standing on the conning tower, after assuring himself that the oil engines are shut off, passes into the conning tower, letting fall the hatch cover, which locks itself automatically and seals the boat. As he enters he takes his position in the conning tower and gives the order to start the electric motors. The boat settles, the horizontal rudders are turned and she goes under.

Outside is darkness. The under water voyage has begun. If it is not necessary to submerge completely the captain keeps a lookout through the periscope. This instrument resembles a piece of five-inch stovepipe with a short elbow at each end, but on opposite sides of the pipe. It projects vertically about fifteen feet above the conning tower and runs down into the boat, a lens covering the open end of the upper elbow receives a picture of whatever lies in front of it, and reflectors carry the image below through the tube.

* * *

They all are made on the same principle, though the method of using them varies. Some throw a magnified but distorted picture upon a white table; but the most popular has an eyepiece for the steersman in the end of the lower elbow. This style is called a "walk around," because the long pipe may be revolved in the socket that holds it and the upper elbow is swung so that it takes into its view any part of the whole circle. But the lower elbow swings in a corresponding manner, making it necessary for the observer to follow it around.

In order to keep the lens in the upper elbow clean the steersman occasionally washes it by sending the boat down a little. Of course, he knows that as long as light comes down the periscope the boat is not more than fifteen feet below the surface, but a dial near him at all times shows her depth. When submerged her navigator keeps his course by means of a compass, usually a gyroscopic compass, which is not influenced by the magnetism of the steel lying about it.

This periscope, so indispensable to the submarine, creates a wake as she passes along which may betray her presence. As the periscope and its wake are much more plainly visible to an overhead observer, and as the form of the boat to a depth of one hundred feet is quite discernible to any one a few hundred yards overhead, some claim that every ship should have at least two hydroaeroplanes hovering about it, like fishhawks watching for prey, to detect the presence of the submarines.

But the experts claim that if the submarine were on the surface—which it usually is—the crew would see the aeroplane first; and be prepared to beat it off if the aeroplane came near enough to attack, and that, if the submarine were submerged, it would make no difference if the observer in the plane should discover her presence, although the submarine's attack is usually made either at night or in the early morning, when the aeroplane could not see the boat under any circumstances.

* * *

No especial pains are taken to select the men for submarine crews, although no one whose record is not good is taken. But after acceptance each man in those small crews comes under the direct observation of the captain, who promptly requests the transfer of all who show themselves unfit for the service. Thus by a process of elimination the fittest for the work remain.

No liquor is allowed aboard. If a man, after shore leave, comes aboard with a stomach that refuses food, and with a dull brain, he is cared for kindly and not allowed to do any work that he is unfit for, but the quiet talk that a day or two later the captain has with him convinces him that he will never touch liquor again—or at most but once more—while he remains a member of that boat's company.

Officers and crew know that their work, like that of the aviators, is dangerous; for if a small explosion causes a leak which cannot be controlled, she sinks. If a rudder fails to work, and she heads down and cannot be stopped, the water pressure will crush her in like an egg shell. Yet they believe that most accidents can be avoided by carefulness, and that they will be safe as long as all do their work perfectly; but it must be done quickly.

* * *

It has been thought that the number of unfortunate accidents aboard in the earlier days of submarines would shake the nerves of the crew, and that the officers would minimize the reports. Not so; they took pains to let the public know all the circumstances, with the result that each man felt that if he had been on the lost boat he might have saved it or have seen a way to avoid the accident. Many good suggestions have come for improvements in details about the boats from the crews, and they are encouraged to make them.

The men become so interested sometimes in their work that they think their boat can do anything. One gunner's mate became certain that his craft could loop-the-loop, and when his captain explained that it could not, because among other reasons the electric batteries would drop upon the crew and crush them when the boat was on her back, the veteran would not be convinced.

Soon after he actually proposed to the commander that some day they two should try the stunt, the officer locking himself safe in the conning tower while the sailor alone took the chance below. Some time after the captain looked up the man's enlistment record and read: "Names and addresses of your nearest relatives? None." "Who are to be notified in event of your death? No one." "What shall be done with any pay that may be due to you? Give it to any local charity." His ship was his home and his shipmates were his friends.

* * *

When the Audacious was sunk people cried that she must have struck a mine, as the scene of the disaster was 450 miles from the nearest hostile port, and no submarine unattended could go so far from its base. In 1910 the Salmon (now D-3), sailed alone from Quincy to Bermuda, 750 miles. She fell into some severe weather, but made the voyage safely, and after a short stay, and without repairs, made the return trip. The object of this trip was to demonstrate the seagoing qualities of this boat, and it proved that more than four years ago one of our submarines could have made the trip attributed to the German.

In actual service the boats are uncomfortable. When sailing on the surface they can be perfectly ventilated; but at best the room is very circumscribed, and the deck is too small for free exercise. When the boat is submerged the air, if not foul, is not fresh, and there is not room in the hull for comfort. Ample provision for heating and cooking by electricity are made in the later boats. But in the earlier classes this was not perfected, and at times the condition was very hard.

The defense of the submarine is simple. She slips away from danger, either by diving or sinking out of sight to safety. A shot hitting her periscope—a very small target—temporarily puts her out of submerged service, but does not sink her. She need be but a few yards below the surface to be safe from gunfire. It is doubtful whether any bomb that could be carried by an aeroplane would be any damage to a submarine submerged so that only the periscope elbow projects above the surface. She can pass under and around the greatest superdreadnaught with impunity, for it has no way of harming her.

The submarine's offensive is made with a torpedo. Just how this is operated and what its range from this class of ship is, "the good of the service" will not permit to be discussed, and an inquirer might as well ask the Sphinx as ask a naval man. But these facts are known—a torpedo, driven by compressed air and carrying an explosive which discharged below the water line against the side or bottom, will sink any ship hat ever floated; it has an effective range of at least 4,000 yards—over two and a half miles—with such accuracy that practice scores of eight consecutive hits have been made against a battleship target.

In actual work this accuracy cannot be maintained, because the flight of a torpedo is relatively slow, and the hostile ship, particularly in the present European war, is usually in motion. It takes a projectile from a gun about four seconds to travel 4,000 yards, and about five minutes for a torpedo to go the same distance. In that time a ship will move a mile.

* * *

Every sportsman knows the difference between shooting at a duck on the water and at the same bird flying through the air. Nevertheless, since one of these boats, with the periscope splotched with white and gray and green paints, can hardly be made out at half a mile, it seems that in a place as favorable for submarines as the North sea—with its soft bottom, shallow waters, frequent fogs and convenient bases—unforeseen difficulties in the use of the torpedoes must have been encountered, or that the ships of the blockading fleet have introduced an unexpected defense; or else that the number of submarines available has been exaggerated. A ship of this class has not a large steaming radius, but, especially for defensive purposes, this is not necessary if there is an efficient mother-ship base or shore bases adequate in number and protection.

Nearly every one would like to know something about the fleet or squadron tactics of the submerged navy—how they cruise in groups, at what depths, how they support one another, how they deliver a combined attack. But there, again, the veil has fallen, for on this subject the service is silent.

One can probably never be constructed with surface speed enough to pursue and overtake a hostile ship. But as a duck hunter conceals himself at a place where the birds come for food or rest, so the submarine can, unknown to the enemy's fleet, proceed to a position which the fleet wishes to occupy, and can drive the whole fleet away, or destroy it, if it does not go.

* * *

Thus, had any government in Mexico been possessed of some efficient submarines and the desire to be rid of the American fleet last summer at Vera Cruz, our ships could not have remained where they did, with the city at the mercy of their guns. The fleet's only way to stay in the vicinity would have been to put to sea and keep moving.

Assuming that this country were at war with a hostile power, the attack, whether upon our isthmian or insular possessions or on the main coast, would come from the ocean. Assuming further that the power were able to overcome our primary coast defense, the navy, it is quite improbable that any hostile fleet would venture, even with guns of greater range, to open a direct attack upon the defenses of our most important cities and along our great waterways.

Unless its offensive force should be overwhelming it would never use its cannon against the attack of protected land batteries; but it would undoubtedly seek the most weakly defended place available, and made a landing, which it would endeavor to hold by the strength of its gun fire.

Our coast artillery not being a mobile force, our army could make slight resistance at this point. But, assuming that this country possessed a fleet of submarines which are mobile and concentrated them upon the enemy at its chosen point of attack, that hostile fleet could no more remain where it could control the shore with its gunfire than our fleet could have stayed at Vera Cruz if that harbor had been filled with submarines. A liberal supply of these vessels, many maintain, would be the most economical coast defense this country could provide.

Submarines cannot and are not intended to take the place of ships of the line, which have their own functions. But they are most efficient adjuncts to their own battleships and under some conditions the greatest source of annoyance and danger to hostile vessels.

"MOTHER A BELGIAN BABY," IS THE LATEST SLOGAN IN RELIEF WORK

Mrs. Ellis Logan of the Woman's Section of Commission for Relief in Belgium Tells of the Work—She Shows How Active Women Have Been All Over the Country in Sending Aid to the Stricken Nation—Helping the Destitute Mothers by Adopting Babies—Two Dollars a Month Keeps an Infant in Its Own Mother's Care.

"MOTHER a Belgian baby" is the latest slogan in relief workers' circles. Washington women and others throughout the country who are interested in helping the destitute mothers in devastated Belgium are being asked to adopt a baby. But the adoption is by proxy only. Two dollars a month keeps an infant in its own mother's care. The public is invited to adopt a whole baby or a fraction thereof.

Mrs. Ellis Logan of 1253 Irving street northwest, who is on the executive committee of the woman's section of the commission for relief in Belgium, believes this novel idea will meet with the instant approval of American mothers.

* * *

"Our organization has been sending clothing, food and milk to the needy Belgians, besides carrying out all sorts of unique schemes to raise funds, such as our 'mile of pennies' campaign, and now, when public interest is inclined to wane regarding further assistance, this baby adoption plan is very timely," she said.

"After an American woman has adopted a little Belgian baby by the absent method she will wear a small insignia, bearing our flag and the Belgian flag crossed, which announces her motherhood. I think it is a very beautiful idea.

"We must continue to do all in our power to help the suffering ones abroad. We realize the tenseness of the situation, and whenever we can give more than we have given in the past we can be assured of its acceptability. There is just as much need for relief work now as when the war commenced. After the cold weather is over perhaps the need will be lessened."

Asked if the women engaged in relief work ever encountered the "charity begins at home" maxim, Mrs. Logan confessed that they had.

"We have met with the criticism that we have depleted the wealth of our own country in sending provisions and money to another," she said. "I cannot agree with this charge, for whatever we give to the needy should not be looked upon as loss by us. We are not stinted because of this action. Our harvest will be just as ample, and our prosperity just as great as ever. We will have better heart and mind to enjoy our future benefits because we have extended the hand across the sea.

* * *

"It is not true that we have neglected our own needy because of our foreign relief work. We have given a great deal of aid to our own countrymen also. We did a large amount of Red Cross work in October; later we started the "mile of pennies" campaign for the Belgians; and then we directed our work toward home again, and concentrated all our attention here during the District donation week. It has simply been a case of combining our 'at home' and our 'abroad' relief work.

"Our sympathies couldn't help but include Belgium, for she has been so brave and true. It is the first time she ever had to depend on outsiders for help. We cannot but feel it is a privilege and not a necessity to help.

"We have met with hearty co-operation wherever we appealed for contributions. Our anxiety to help in whatever way we could brought about rather a laughable situation regarding food boxes for the babies in the war zone. It was suggested that we pack 'baby boxes' with the ingredients for baby food which would properly nourish young infants. We had almost completed plans for creating these when a noted Belgian woman, fresh from the war zone, came to speak at one of our meetings. Learning of our newest plan, she immediately stamped it as impractical, declaring that the Belgian mothers neither had the time to concoct the rather complicated food, nor would they understand how to do it; and incidentally, she suggested that Belgian babies were not necessarily bottle babies.

* * *

"We receive many odd donations in the way of handmade articles. Just yesterday one little girl sent me a pair of wristlets, which she had knitted herself, with the plea that they be sent off at once so that 'some, poor soldier can wear them before the cold weather is over.' She said that she had been working on them almost since the war commenced. The knitting was far from perfect, the stitches being wobbly and uneven, but the offering was accepted in the spirit it was given by the child."

Explaining how she came to be interested in relief work, Mrs. Logan said that on November 1, 1914, a cable letter was received in New York city by Mrs. Lindon Bates, wife of the vice chairman of the commission for relief in Belgium, which read in part:

"The American Commission for Relief in Belgium, which has been set up officially by the American ambassadors to execute their international agreements for the provisioning of Belgium, and which embraces American ambassadors as honorary chairmen, the American consuls and American residents of England and Belgium as members, would like to have you undertake the formation of a great group of American women who would support us in securing food or money for the Belgian people.

"It is certain that the entire population of seven millions are on the verge of famine, and that eighty thousand tons of cereals per month is the absolute minimum upon which body and soul can be kept together, and this provides a ration of but ten ounces per day for each inhabitant. The situation is one of gravest gravity."

"The organization was formed at once," continued Mrs. Logan. "The leaders of great organizations of women, international and national, were asked upon an executive co-operating committee. I, as president of the District of Columbia Federation of Women's Clubs, was put on the committee. In our collective name an appeal was issued for the rescue of the famine-menaced Belgians.

"Nothing that has ever been attempted in America gives such a testimonial to the power of and future of the woman movement as this rally. In the month between November 10 and December 10 there had been drawn, and were standing together, the presidents of international and national organizations, representing collectively over 5,500,000 women.

"No group asked was more responsive than the Women's Trade Union League. They did not wish to stand in name when they could not materially contribute; and in this year of great unemployment their funds were drained. The Colorado strike had also thrown upon them the provision for many burdens. Their women were all of the laboring class—heavy laden in the war's reaction here. Their officers did not feel that they could ask these toilers to lift also the tragedy of Belgium. The woman's section agreed and thanked them for their beautiful comradeship. When the roll is called of our nationals there is one of which we say: 'Absent, but not missing.'

"The two most important movements of the century are the organizing of labor and the organizing of women—both are at root allied. Counting the Federation of Clubs, and not including separately the Council of Jewish Women, one suffrage and the anti group, the organizations co-operating with the woman's section, December 30, 1914, represented more than 6,000,000.

"To the winning of the largest goal the women's section will have helped a great deal. It has gathered to its bosom the greatest number of international and national organizations ever standing together in any cause. They have felt the warmth of the community spirit. Later, we hope, they will unite in the 'council of national organizations of women.'

* * *

"The spirit in which these women came forward to help should win them a place in grateful memory. The president of the council of women, the largest of the nationals, was traveling and speaking in the west, when she read of the appalling condition of the starving Belgians. She also read of the woman's section, and knowing that hers would probably be the first national asked, she wired the chairman to 'use us for Belgium.' Another leader sent a message which has thrilled along our whole movement like a bugle call—'300,000 white ribboners will stand with the woman's section.' They have been as good as their word. The contributions have been everywhere large from the W. C. T. U.

"Other smaller groups have come forward in the same willing way. From Georgia came the message: 'Count on our 25,000 Georgia club-women for your work.' And from Texas: 'Fifteen thousand Texas club-women will co-operate with the nation-wide efforts to save famine-stricken Belgium.'

According to Mrs. Logan, both suffrage presidents came to the front in gracious, helpful sympathy. The antis also joined the effort for Belgium. The Daughters of the American Revolution passed unanimously a vote to sustain the movement. The Council of Jewish Women and the Collegiate Nationals were approached next and enlisted their services.

"A needlework guild was established in Lyons, through the efforts of the section, where, the material being supplied, unemployed girls were given temporary work making women's and children's garments. The Belgian refugees in their districts are numerous. The Belgian mothers and babies are given wholesome meals and are clad in these warm garments, thus tiding over the awful winter. Two additional workships are now being opened.

"In January the Conference of Catholic Charities came to stand as the twenty-first national organization upon the executive co-operation committee of the woman's section.

* * *

"The system of seeking contributions has been virtually the same everywhere—a direct appeal. Clubs have been asked to give collectively or to donate through individuals separately, as they prefer. In some states groups have been asked to pledge certain fixed sums until the famine is over. In one county in New York clubs of women have been asked to contribute $1 a month, each member, for six months.

"The president of a small national organization has asked each member to contribute a can of food—beans or milk preferably. In one state all the clubs have been asked to contribute a certain number of barrels of flour; in another, 'pounds' of food.

"In a southern town a Belgian day was named. At a certain hour whistles blew, the church bells rang and women went forth to collect money and food for the Belgians. In four states there has been a tag day; in several, flag days.

"The lunchroom boxes have been successful, especially in restaurants. A motto, 'You are about to eat, and the Belgians are without food,' seemed to impress the horrors of starvation upon the patrons.

"The chain-letter system, which was supposed to be extinct, was extremely successful in another state, one group collecting about $2,300 in eleven days.

"Sewing circles have contributed thousands of garments. From a woman in Colorado Springs, who started a 'thank offering,' the woman's section received, for milk for the babies, within four weeks, $4,690.93.

"The food boxes have proved one of the most popular features of the movement. The basis of their possibilities lies in the transportation fund available to the commission. Arrangements have been made with express companies and with the parcel post whereby packages of sizes to be handled by them can be sent under commission payments. Circles of mercy have been successfully employed in Kingston, N. Y.

* * *

"The woman's section in Minneapolis organized a great municipal ball, with 'Belgian Sunday' following. They wired to headquarters for 1,000 mite boxes. The 'penny a day, or 5 cents a week' contributions from school children is a feature of the New York state campaign.

"Concerts, dances, silver teas, raffles and many other varieties of social affairs have been given. Artists have contributed pictures, authors books, to be sold for the Belgians.

"Two large lifelike dolls were installed in the window of a prominent shop in Pasadena. One—warmed only by its nether garment—held in its extended hand a placard—'I am freezing and starving.' The other reached to it food and clothes. These two dolls drew large contributions in behalf of the children of Belgium. Bambino cards and calendaars have been circulated.

* * *

"An exclusive feature of the commission is the bread-line ticket. They are the food cards which are stamped or punched for each contribution. They give the name of the recipient and the number registered in the family. Several have blanks representing days when the commission could not supply food and the people—men, women and children—went foodless.

"The spirit of humanity and generosity has been so universally shown that one cannot mention one state without recalling that each other state calls for just as hearty mention. A national movement carries something of value which local activity cannot inspire. Its sweep of sentiment, its comradeship, its communal effort are real elements."

The woman's section of the commission for relief in Belgium is under the august patronage of her majesty, the Queen of the Belgians, and H. R. H. the Duchess of Vendome.

A letter was recently received by the section from the queen which read in part: "I wish to extend to the women of America in deep gratitude of the women of Belgium for the work which they are doing for my people. The food which your country is daily providing to our women and children cobes like a ray of sunshine in the darkest hour of Belgium's history."

MRS. ELLIS LOGAN.
President of District of Columbia Federation of Women's Clubs.

Making Potato Alcohol.

THE potato is a prolific producer of alcohol when treated with the intent to develop and to take from it that spirit. Potato whisky is well known in Ireland and Russia, and potato alcohol is known all through Europe. There have been published recently certain communications from Europe which have given it out that Germany has overcome her shortage of gasoline by the use of alcohol for producing force in internal combustion engines. It is estimated that from one ton of average white potatoes twenty-five gallons of pure alcohol may be obtained.

A number of years ago there was published a description of the processes through which potatoes were put in order to produce alcohol. In the first place, the potatoes were washed by machinery. Then they were steamed and pulped and driven through a strainer into the mash-tub, where they were mixed with a small percentage of malt. The result of this, which was the wort, was then passed into fermenting vats. The mash would be left to ferment for thirty hours, and would then be conveyed to the still. On issuing from the condenser the spirit would pass through a domed glass case in which is a cup. In this cup, into which the spirit flows and from which it overflows, float a thermometer and hydrometer to indicate the strength of the passing spirit. From the cup the spirit flows into a meter, and from that register of quantity it passes on to the receiver or container, in which it is sent on its way as an article of trade.

His Accomplishments.

JOHN MITCHELL, the miners' leader, said at a recent dinner in New York:

"I want to see child labor products forbidden in interstate commerce. Put little children to work and harm is sure to come of it.

"A slum visitor said to a 'little mother' of six, who was taking care of a baby boy of three:

"'And has the baby learned anything yet? Can he talk, can he walk, can he——'

"The little mother turned to her charge and said:

"'Hi, Tommy, smoke a cigaroot fur de loidy and swaller de butt.'"