AMERICA MAKES BIG DISKS NOW

Lens Manufacturers Solve Difficult Problem With the Aid of Scientists.

CATCHING UP WITH GERMANY

All Mechanical Difficulties in Making of Large Telescopic Disks Have Been Overcome—Process Is Delicate One.

New York.—Large telescope disks are being made in the United States. All mechanical difficulties have been overcome, according to an announcement made by Dr. George W. Morey, a member of the American Chemical society.

This remarkable achievement is due to preparation and handling of the ingredients required for pure and flawless glass and is the result of experiments begun at the outbreak of the world war, under the auspices of the geophysical laboratory of the Carnegie Institution in Washington.

Catching Up With Germany.

Before 1914 practically all the optical glass in the United States was imported from Germany. When the United States entered the war the field glasses, range finders, telescopes and other instruments of precision used by her army and navy were equipped with lenses fashioned beyond the Rhine. Private citizens even loaned or contributed opera glasses and binoculars to the fighting forces.

Optical glass of fine quality, however, is now to be had on this side of the water. The climax of this achievement of industrial chemistry has been reached by American makers in the manufacture of lenses for telescopes. At first disks which strengthened our view were made three or four inches in diameter. Recently a special four and three-quarter inch lens was ground for Lowell observatory at Flagstaff, Ariz.

The first nine and one-half inch disk was turned out last December. Six others have since been made and delivered. As their diameters increase disks are made with greater difficulty. Finally, on February 15, 1920, the first perfect 12-inch disk was furnished, and a large optical glass corporation now lists this size for short-time delivery.

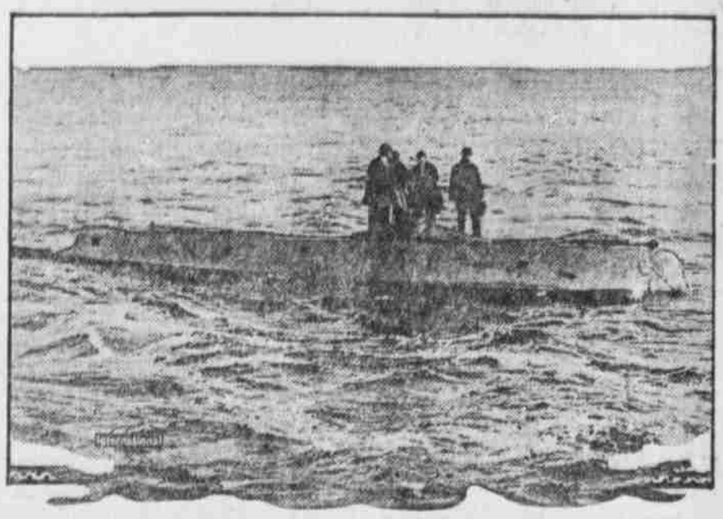
Making Larger Disks.

The next size attempted was a 20-inch disk, in the manufacture of which the problem was still more complex. Several flawless ones were produced, but they cracked in the annealing process. American ingenuity was brought into play to devise a means of slowly cooling these immense plates of glass, so that they might be free from the strain so likely to destroy them. Experiments by scientists of the geophysical laboratory showed exactly how slowly their temperatures must be lowered, and the cooling schedule outlined was closely followed. Owing, however, to the extreme cold weather of last March and the shortage of gas, this schedule could not be followed. One splendid disk strained and broke just when nearly ready to be taken from the oven.

Equipment hitherto used was then scrapped and an electric furnace was specially designed to meet the needs of the problem by experts of an electric company. This device is thoroughly insulated and provided with an automatic appliance which will hold the temperature absolutely constant to a fraction of a degree while the glass is being treated to remove strain. The temperature can be dropped a few degrees a week.

With the aid of this furnace now in process of construction it is believed that the last difficulty in the way of the American manufacture of the largest disks will be overcome. Orders have already been accepted for the production of several large guaranteed disks, including one pair of the 18-inch size for refracting telescopes, and a 36-inch disk for a reflecting telescope. The furnace will receive the 40-inch size. When that goal has been reached, the company will continue the development, so that eventually the largest and finest disks in the world will be American made.

One of the First Submarines



One of the first submarines ever built by John P. Holland, their inventor, of whom it is said that he conceived the idea of submarines as a means of destroying the British navy. Holland was an ardent Fenian and associate of many Irish patriots who have gone down into history. Leaders of the Revolutionary party in Ireland became interested in Holland's idea and commissioned him to build a trial submarine. He built it well enough, but on its trial spin on Long Island Sound it was struck by a coal barge and quickly sunk. The discouraged Irish leaders gave up the idea. Later Holland built his first successful submarine, "The Holland," which was accepted by the United States government in 1897. "The Holland" is here shown on her trial spin.

Marks New Era In U. S. Flying

All Metal Plane Will Revolutionize Aircraft Design and Construction.

BIG ADVANCE IN SCIENCE

Frail Spruce and Linen Ship That Did Its Bit in War and Has Been Used in Commerce Will Be Displaced by All Metal Type.

New York.—The presence in America of John M. Larsen's JL-6 all metal monoplane will completely revolutionize aircraft design and construction, according to statements made here by leading airplane manufacturers.

The frail spruce and linen ship that did its bit in the war and that has been used successfully, though precariously, in commerce will soon be displaced by the sturdy all metal type brought out after the war by the Germans, almost every aeronautical expert who has witnessed the performance of the JL-6 agrees. One American manufacturing company has already announced its intention of discontinuing operations.

The War Plane Passes.

There is little comparison between the JL-6 and the old type plane.

The only type of airplane that was successful prior to the JL-6's appearance was the wood and linen biplane. The wing beams, the long fuselage, the engine bearers, the struts, the under-carriage were made of either spruce or ash and the wings were covered with Irish linen. The fuselage between the wings gave support to the panels. It was a strong ship; only a cyclone or a crash could warp the wings around the fuselage.

But it appears as fragile and delicate as a china vase beside the JL-6. There is an all metal fuselage. One metal wing spreads from each side of the body, a wing that measures eight or ten inches in thickness at the leading edge, and has a trailing edge as thick as the blade of your knife. There are no interwing struts to offer wind resistance, no control horns on the ailerons, no flying or landing wires, no control wires free to the wind. It has been said that the flying, landing and control wires of the old type ship cut down its speed by as much as twenty-five miles an hour.

Wings Survive Side Slip.

The wings of the JL-6 are so rigid that only a head on crash will injure them. One plane that side slipped to the earth was immediately righted and flown away after a new propeller had been put on. Not even the fuselage to which the metal panels are attached was injured. Eighty-five men have stood upon the forty-seven foot spread without causing any ill effects.

The body of the plane contains a luxuriously furnished compartment that will seat in upholstered chairs six people. Two pilots may be seated in the control compartment. The motive power is furnished by a 160 horsepower Mercedes engine. It requires five gallons of gasoline to fly 100 miles. Present aeronautical motors require from ten to fifteen gallons for that distance. The motor is almost silent, compared to the deafening roar of the Liberty. A conversation can be carried on in the cabin with the motor wide open.

According to Mr. Larsen, the JL-6 represents the greatest step forward in flying in all time. He has purchased all American rights, from the Junker company of Germany, which first perfected the all metal plane. It was from an all metal battle plane that the boche shot down Maj. Raoul Lufberry in the most heroic air battle of the war. Dr. Hugo Junker, German engineer, is the original designer of the all metal ship.

NEED WEAPONS FOR SAFETY

German Farmers Reluctant to Surrender Their Firearms, Says Cabinet Minister.

Berlin.—There is a reluctance on the part of some German farmers to surrender their firearms, due to "the legitimate desire to protect their homes against marauders," Minister of Agriculture Braun said to a Tageblatt representative.

He added, however, that a number of farmers have been "storing arms deliberately for subversive purposes," but he said that these were not as numerous as generally believed.

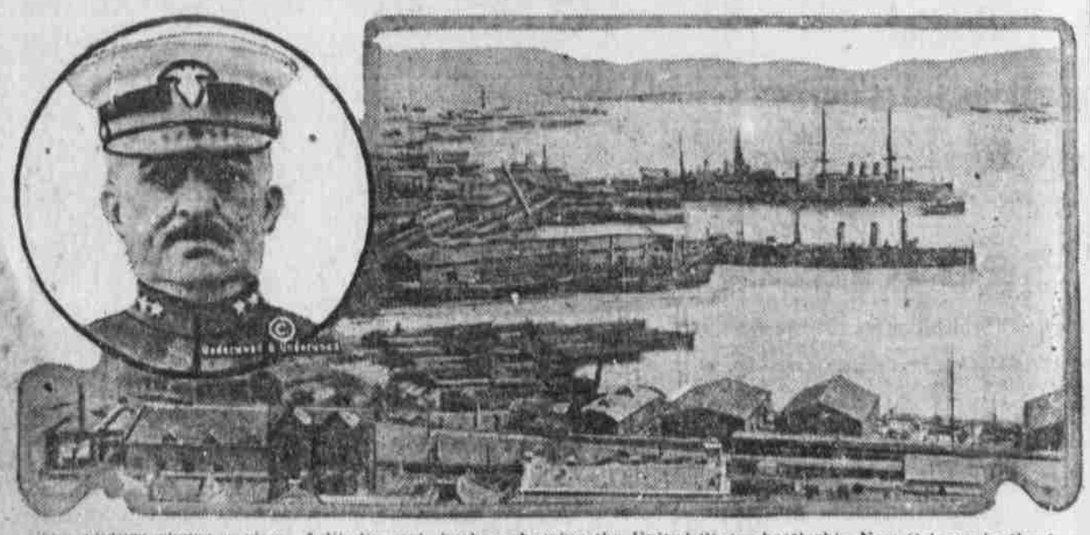
"If the people only will keep their heads," Herr Braun said, "I do not believe there will be any organized outbreak in the near future. The rural situation at this time inspires confidence."

Vets Receive Money Due Half Century

Lansing.—Two Civil war veterans, each more than 80, received aid from the state, which was due more than half a century ago, when the board of state auditors granted them their unpaid bounty and interest.

They were the oldest ten who were similarly treated at the same session.

With the U. S. Navy at Vladivostok



The picture shows a view of Vladivostok harbor showing the United States battleship New Orleans in the foreground, a Japanese battleship next, and a Chinese battleship in the rear. The insert shows Admiral A. S. Gleaves, commanding the American naval force.

DAIRY POINTS

RETAIN PUREBRED BULL CALF

Good Dairyman Knows Value of Young Animal in Way of Improving Grade Herd.

Nature has her own percentage rules which are as infallible, in the long run, as the dealer's margin at a Monte Carlo gambling resort. According to this inflexible law of averages, there are about as many bull calves born each year as there are heifer calves.

Every good dairyman knows the value of a purebred sire of good record, and what such an animal may accomplish in the way of improving a grade or scrub herd. Despite their acknowledged value, it appears that 73,000 purebred bull calves of dairy breeds were killed for veal or were fattened for beef in 1918.

A chart has been prepared by the dairy division, United States department of agriculture, which furnishes a graphic illustration of what happened to the purebred bull calves in 1918.

The line representing purebred Holstein-Friesian cows registered in 1918

Farmers Are Urged to Conserve Their Purebred Bull Calves Wherever Practical Instead of Butchering Them.

runs out to 80,000. The line for the bulls of this breed registered during the same year extends only to 30,000. The difference, 50,000, represents the approximate number of bull calves not registered. Presumably most of them were either veaied or fattened as steers.

The Jersey breed in 1918 registered 30,000 cows and about 12,000 bulls—a loss of 18,000 purebred sires, many of which might be more profitably employed in the work of improving scrub herds.

Guernsey and Ayrshire totals are less, but the percentage of loss is heavy there also.

In the face of this waste it is estimated that five grades or scrub bulls are in use for every purebred bull. According to experts of the United States department of agriculture the replacement of scrub and grade bulls with good purebreds would quickly and materially raise the average production of dairy herds. One of the reasons for the surprising situation outlined is probably an underdeveloped system of distribution.

THUNDERSTORMS SOUR MILK

Theory Held by Many People, but Authorities Attribute Trouble to Other Causes.

The season for thunderstorms is at hand and a good many farmers' wives will be concerned about the souring of the milk. The theory is held by a good many that thunder will sour the milk, but authorities say the souring should be attributed to other causes. They say that the souring is caused normally by the acidity which results from bacterial growth and sterilized milk will not sour during a thunderstorm. Neither will milk that is kept on ice. The probable explanation lies in the fact that during the storms of this kind the temperature is raised sufficiently to favor the multiplication of the milk-souring bacteria where the temperature is not regulated by the use of ice.

BENEFITS OF SILAGE ACIDS

Fermentation of Feed Has an Important Dietetic Value—Keeps Bowels Regulated.

The acidity of silage caused largely by the formation of lactic acid by the fermentation of the feed has an important dietetic value, regulating the bowels and checking undesirable putrefactive processes in the intestines. The favorable influence of silage on the health of animals has been commonly noted, and is probably due to the silage acids.

DAIRY NOTES

Wash the separator thoroughly after each separating.

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A normal calf should have all the good roughage it will eat.

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Roughage to the calf gives bulk to the feed and satisfies the normal appetite.

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Neatness in your own appearance and that of your barn never impresses your visitors unfavorably.

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People of the dairy countries in Europe always feed some straw in the ration and they get good results.

FORESHADOWING AUTUMN STYLES

NO ONE turns away from the beautiful and too-brief summer of the North, even to consider its glowing autumn, except from necessity. But those who must think ahead in the matter of the styles, have already given time and attention to frocks for early fall, because they must be ready for the young woman whose school work is resumed in September. They are fore-handed and blaze the trail that mothers from one ocean to the other will follow, in outfitting their daughters who are still in school.

Even when materials have gravitated to something like normal in price, only those of substantial quality and plain texture are chosen for school girls. Reliable fabrics and simple designing are for them. Many schools prescribe a uniform for everyday wear, and this makes easy sailing for those who must outfit the student. But there are other things besides the uniform to consider, among them frocks to be worn on the street and on occasions when the student is not in school.

Two new models that are pretty and practical ought to please their youthful owners, for they are becoming to lithe young figures. Brown is a favorite color and the frock at the left is successfully made in this color of any of the plain wool fabrics that can be depended on for service. It is a one-piece affair having a blouse ornamented with braid in the same color, that has the effect of embroidery. There are flaring sleeves with handsome braiding and a plain skirt set onto the blouse about six inches below the normal waistline. Covered buttons are set on in a loop at each side of the skirt. The plain round neck which youth may venture to wear, is slashed at the front with a tiny vestee inserted made of lace, and there is a heavy silk cord finished with a knot, about the easy waist.

The vogue for accordion plaiting is to hold over into the fall, according to the pretty dress shown at the right. This is also a one-piece model with plaited skirt set onto a plain bodice having a short jacket with long sleeves over it. A very wide girdle, finished with pointed ends falling from short loops, fastens at the left side. The jacket is outlined with two rows of narrow braid in white and the frock, in this instance, dark blue. There is a small sailor collar at the back. These are pretty frocks that will serve without a wrap for fall, and with a warm coat will last out the winter.

Caps for Morning Wear

THE woman who meets the acid test of the breakfast table and the bathing beach and succeeds in looking attractive at these places, is the envied of her sisters. It is no small undertaking, yet there are many who succeed—and there are many who fail in it. Almost everyone can manage the garb for early morning successfully—but the bathing suit is more difficult and takes considerable study. It is of less importance than the dress for the beginning of the day.

Morning dress must be suited to the morning's occupation. In these servantless days most women must engage themselves with the business of getting breakfast ready or helping to get it. It is not the hearty meal our forbears indulged in, for most modern households have learned the wisdom of a light breakfast, but it requires very practical dressing. Besides the one-piece, simple cotton frocks that come from the weekly laundering looking crisp and sprightly, there are popular breakfast sets that include a skirt and a jacket, or blouse, made of the same washable materials. These are the only wear for early morning working hours.

The woman who need not concern herself with housework may indulge in silk breakfast jackets or those of georgette or chiffon. Pretty as they are they are not more pleasing than those crisp cotton frocks worn by her busier sisters.

Whatever the sort of dress, a pretty breakfast cap worn with it is the strongest ally of fair woman at the breakfast table. These little affairs of ribbons and laces and all other gay and frivolous fabrics are made in unending variety so that there is a cap for every face. One has only to experiment to find it, and this experimenting is more worth while than we are likely to imagine.

The breakfast cap is the least expensive of luxuries and the easiest bit of finery to make, as may be gathered by looking at the samples shown in the picture. One of them is made of wide satin ribbon fitted to the head by rows of shirrings. It has two bands of shirred lace across the front bordered with narrow flutings of ribbon and a rosette of this narrow ribbon at each side. A frill of lace all around the cap finishes it. Satin ribbon about two and a half inches wide, and lace cut in triangles form the crown of the other cap. The ribbon is placed in a band extending from back to front and from side to side with the spaces between filled in with lace. Ribbon is shirred in a band about the head, finished with bow and ends at the back.

Julia Bottomley