

OPERATIONS
OF THE
QUARTERMASTER CORPS, U. S. ARMY
DURING
THE WORLD WAR



MONOGRAPH NO. 10

NOTES ON COLD STORAGE PLANTS,
A.E.F., FRANCE

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THE QUARTERMASTER CORPS SCHOOL
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THE ORGANIZATION AND ACTIVITIES
OF THE
COLD STORAGE BRANCH, SUPPLIES DIVISION,
QUARTERMASTER CORPS
WITH THE
AMERICAN EXPEDITIONARY FORCES
IN
FRANCE

MONOGRAPH NO. 10 -- NOTES ON COLD STORAGE PLANTS, A.E.F., FRANCE

6-27-29.
QMCS-I-14-cf.

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FOREWORD

This monograph is one of a series being prepared by the faculty of The Quartermaster Corps School, Philadelphia, Pennsylvania, dealing with the operations of the Quartermaster Corps during the World War.

These monographs are being compiled so far as practicable from original material now under the jurisdiction of The Quartermaster General. It is hoped that their publication may make available to the military student, in condensed form, some of the lessons of the World War on the subject of supply, with special reference to the operations of the Quartermaster Corps.



B. F. CHEATHAM,
Major General, U.S. Army,
The Quartermaster General.



6-27-29.
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WASTINGS

HISTORY OF THE ORGANIZATION AND ACTIVITIES OF THE
COLD STORAGE BRANCH, SUPPLIES DIVISION

The Cold Storage Branch, Supplies Division, was charged by the Chief Quartermaster at the time of its organization with the supervision of all matters so far as the Quartermaster Corps, A.E.F., was concerned, involved in the supply of fresh meat to the personnel of the A.E.F. and organizations attached thereto. In general, this duty consisted in the procurement and distribution of the fresh beef required by the forces in France.

Beef was procured from three sources: viz., local French merchants, the French Government, and from the United States. Discussion of the policies pursued and results obtained in the procurement of the necessary quantities of fresh meat will follow in subsequent paragraphs.

For effecting distribution, it is evident that the most important consideration involved is that of the utilities available for such distribution. The foundation for the subsequent activities of the Cold Storage Branch, Supplies Division, was laid by following cablegram sent from Paris to the Adjutant General, Washington, on June 22, 1918:

No. 13

Paragraph 5. Following personnel and supplies needed by the Chief Quartermaster: *****

Plans and specifications for ice plant of 500 tons capacity per day, plans and specifications for refrigerating plant capacity 5,000 tons of beef, necessary superintendent and personnel for construction of these plants should be sent over, also the necessary materials excepting lumber and concrete materials.

Pershing

A subsequent cablegram to the Adjutant General (Paragraph 13, No. 102, August 15, 1917) requested that lumber be sent in addition to the other materials, since it had been found that lumber for this construction could not be obtained in France in such time as would permit prosecution of the work without delay.

EDITORIAL NOTE

Upon receipt, in Washington, of the cablegram calling for the Ice and Cold Storage Plant, it was decided (the Chief of Engineers concurring), that all work in the United States connected with design of the plant, specifications, purchase, inspection, and shipment of equipment and material, as well as procurement of personnel, would be done by the Quartermaster Corps, but that erection of the plant in France would be done by the Corps of Engineers in accordance with the ruling that the Engineers would handle all construction for the A.E.F., France.

Specifications and preliminary drawings were prepared and furnished the principal refrigerating companies in the United States and general contact was executed on 7 July 1917, providing for all materials and equipment required, the contract price being \$1,001,707.00.

It was the original intention that this plant be located near Vierzon (Cher) and the cablegram of August 15, 1917, gave Vierzon as the proposed site. It was later decided, however, to locate a large storage depot at Gievres (Loire et Cher) and to include the Ice and Cold Storage Plant in that project. Information in regard to the location, particularly with reference to water supply available was contained in a cablegram addressed for the attention of The Quartermaster General and dated October 2, 1917 (Paragraph 7, cablegram No. 197). The location chosen in the Gievres project was approximately 3,000 feet from the Sauldre River from which an ample supply of cool water for ammonia and steam condensing purposes could at all times be obtained.

EDITORIAL NOTE:

In response to the request for construction personnel, there were employed a civilian superintendent of construction, six (6) civilian assistants, and two hundred fifty-three (253) other civilians, the latter being principally carpenters, bricklayers, and mechanical erectors. The superintendent of construction and his six assistants arrived in Paris September 23, 1917. The other civilians arrived in France during November and the first part of December, 1917. In the meantime considerable quantities of material for the plant had arrived and these men were at first largely employed in unloading this material at the plant site.

On December 6, 1917, the first ground for this plant was actually broken. From that date until February 1, 1918, the construction work was carried on by the civilian employees of the Quartermaster Corps as above mentioned together with detachments of Engineer troops. In the meantime the Adjutant General of the Army had authorized, on September 16, 1917, The Quartermaster General "to raise and maintain a special technical organization for operation of the Ice and Cold Storage Plant in France," this organization to be designated Ice Plant Company No. 301, and including the following personnel:

1 Major
2 Captains
6 1st Lieutenants
6 2nd Lieutenants
335 Enlisted Men

On account of the scarcity in France at that time of available labor, either civilian or military, for construction purposes and as it was deemed undesirable to import civilian labor from the United States, it was agreed in accordance with paragraph 12, cable No. 239 sent from The Quartermaster General, War Department, on October 2, 1917, that the military unit primarily intended for the operation of the plant would be forwarded as promptly as possible to furnish workmen required for erection in addition to the civilians. On January 24th, this Company arrived at Brest and reported on February 1, 1918, at Gievres to the Engineer Officer in Charge of Construction. On account of the increased amount of labor thus furnished, progress on the construction of this plant proceeded from that date at a rapid rate, one cold storage room of the plant being actually under refrigeration on May 2, 1918, and the other four rooms finished within a short time thereafter.

In the meantime letters had been received from The Quartermaster General, dated 22 August, 1917, and 26 August, 1917, inviting attention to the probability that cold storage plants in addition to the one above referred to would be required by the A.E.F. As a result, approval was obtained under date of January 8, 1918, for the construction of three additional plants each to have a capacity for storage of 2,000 tons frozen beef with possibility of increase to 4,000 tons and to be provided with proper ice-making facilities. It was designated that one of these plants was to be constructed at St. Nazaire, one at Bordeaux, and the other at some point in the Advance Section, probably Is-sur-Tille.

In accordance with this approval, there was dispatched to the United States for attention of The Quartermaster General, a cablegram, prepared in the Office of the Chief Engineer, Lines of Communication (Par. 1, cable 636-S, January 25, 1918), requesting that The Quartermaster General "design and provide all machinery, equipment and materials for three cold storage plants, each with meat storage capacity of 2,000 tons and each with ice making capacity of 125 tons *** all three plants to be designed so their capacity can be increased to 4,000 tons of meat," also that the Quartermaster General "provide complete operating personnel for each plant."

Subsequent to the dispatch of this cablegram, a French company presented proposal for erection by their concern of a cold storage plant at St. Nazaire, such plant to be leased by the American Army. After receipt of this proposal, recommendation was forwarded by the C.G., L.C., to the C. in C. under date of February 12, recommending that cablegram be sent requesting that one of the three plants under call from the United States be held in abeyance. This cablegram was dispatched to the United States under date of February 17th (Par. 1, Cable 612-S.).

In the meantime another French society had called attention to the fact that they had at La Pallice a partially completed cold storage plant which would have an ultimate capacity of 4,000 tons frozen meat. Under date of 4 March, 1918, by 9th Indorsement, the C.E.O., S.O.R. recommended lease of 2,400 tons capacity in this plant at La Pallice. This was approved by the C. in C. under date of March 16, 1918, this plant at La Pallice being in addition to the cold storage facilities originally contemplated and as approved under date of January 8, 1918.

It had been decided that the large ice making capacity provided at Gievres would not all be required, in view of which a cablegram prepared by the C.E., S.O.R. was dispatched under date of March 31, 1918, (Par. 2-C, Cable 822-S), advising that it would not be necessary to send any ice making equipment for one of the two plants then under order, also requesting the elimination of a greater part of the refrigerating machinery necessary for that plant, the intention being to remove from Gievres the necessary machinery for that purpose. This left only one complete plant under call from the United States.

This complete plant to be shipped from the United States was designated "Refrigerating Plant No. 1", site for same being chosen in the railroad departure yard at Bassens. The cold storage plant for which the equipment was to be largely obtained

from the excess at Gievres was designated "Refrigerating Plant No. 2." This plant was originally intended for installation at Is-sur-Tille but approval for such installation was withdrawn before work was commenced. The cold storage plant to be constructed by the French concern at St. Nazaire was designated "Refrigerating Plant No. 3."

Until the Gievres plant was placed in operation on May 2, 1918, the only cold storage facilities available for use of the A.E.F. consisted of the S.S. McClelland at St. Nazaire and certain space in the French Government cold storage plant at Dijon (Cote d'Or). The old transport McClelland had arrived at the port of St. Nazaire on July 2, 1917, with cargo of frozen meat. It was found that the vessel was in bad condition and after inspection was condemned as unfit for ocean-going service. It was accordingly decided to retain this vessel in the basin at St. Nazaire as a permanent cold storage plant. The capacity of this ship was originally about 1,250 tons. Authority for increase of about 250 tons capacity was obtained under date of 11 October, 1917, but due to delay in carrying out the construction work, this additional space was not available until 23 April, 1918.

The arrangement with the French for use of their plant at Dijon was made after arrival of the S.S. McClelland with the first cargo of frozen beef for the A.E.F. The space available at Dijon varied, but in general the A.E.F. was given the use of one room, this being designated "Room No. 4," and having capacity for 300 tons frozen beef. The records show American beef received at Dijon from 1 September, 1917, to 1 July, 1918, as follows:

September, 1917	890	tons
October	739	"
November	374	"
December	215	"
January, 1918	1,391	"
February	1,555	"
March	1,491	"
April	2,232	"
May	1,970	"
June	707	"

During the winter of 1917 - 18 and the following spring, organizations in the vicinity of ports were supplied from vessels in port when possible, otherwise by local purchase from French merchants. Organizations in advance of Dijon and as far west as Gievres were supplied from Dijon. Meat was shipped

from the ports to Dijon in box cars and distributed from Dijon either by motor truck, by "Grand Vitesse," or by carload shipment in French box cars.

During the three months from February 1, 1918, to May 1, 1918, the amount of frozen beef received from the United States was as follows:

February	655	tons
March	2,362	"
April	2,828	"
	<u>6,845</u>	"

With the approach of warmer weather, it was apparent that it would be necessary to secure refrigerator cars for the transportation of beef. Order had been placed in the U.S. for 450 standard American refrigerator cars equipped with ice bunkers but these cars were not as yet available. Accordingly, under date of February 20, 1918, a letter prepared in the Supplies Division was forwarded by the C.G., S.O.R. to the D.S.T. instructing him to take "necessary steps **** to obtain 50 refrigerator or insulated box cars from the French Government" and also inviting attention to Par. 5, Cable 519-S to the effect that frozen meat was to be shipped to France to full capacity of all boats destined from the United States to France, except the ones destined for Brest, and stating that considerable difficulties had been already experienced in transporting from base ports to Dijon the small cargoes received to that date.

Difficulty was experienced in securing use of these insulated cars, particularly since, on account of there being no adequate system of car records at that time, the French often diverted these cars to their own use when the occasion for so doing arose. The means used to cope with this lack of insulated cars is outlined in following wire prepared in the Supplies Division and sent under date of 28 March, 1918, over signature of the Adjutant General, S.O.S., to the C.G., St. Nazaire:

"Q-519. In addition to frozen beef now in port of St. Nazaire 900 tons is due to arrive within 4 or 5 days and an additional cargo of unknown quantity in about 10 days. It is therefore necessary to forward meat now on hand to Dijon as fast as possible. As refrigerated or ventilated cars are not available you will use ordinary box cars lining them with hay or

straw and paulins, packing beef closely and covering it over with hay or straw and paulins. It is believed that frozen beef shipped in this manner can be delivered at Dijon in good condition provided there is no delay in loading and in transporting it from the base to destination. Report by wire the approximate rate at which beef can be forwarded in this manner. Signed
'BASH'.

The above paragraphs outline in general the situation existing at the time of the organization of the Cold Storage Branch, Supplies Division. The Commanding Officer, Ice Plant Company No. 301, had been placed by the Director of Construction and Forestry in general charge of cold storage plants so far as construction work was concerned. In order to effect close liaison between the activities of construction and operation at these plants, the Chief Quartermaster advised in conference on 5 May, 1918, that it was his intention to turn over to an organization under his office the supervision of the general problem of meat handling for the A.E.F., including operation of the cold storage plant at Gievres and that he would charge the Commanding Officer, Ice Plant No. 301, with that work provided that, in view of his connection with the Engineers, the D. of C. and F. would not offer objection to such course. Under date of 9 May, 1918, the Director of Construction and Forestry advised that he would have no objection to this arrangement provided it would not interfere with the erection of the new refrigerating plants.

In accordance with the above, the Cold Storage Branch was opened on 20 May, 1918, with a personnel of two officers and two enlisted men. The representation of the Branch on May 25, 1918, consisted of an officer and ten enlisted men of Ice Plant Company No. 301 at Base Section No. 1, and Butchery Company No. 301 at Is-sur-Tille.

Butchery Company No. 301 had been sent to Is-sur-Tille from Dijon as the first measure taken by the Cold Storage Branch to improve distribution of beef. As above stated, it had been the practice until that time to ship all meat for the Advance Section to Dijon, making distribution from that point. Several considerations resulted in making this arrangement unsatisfactory. In the first place, Dijon is located some 25 kilometers behind the regulating station at Is-sur-Tille, which prevented shipments of meat with the other supplies from the regulating station; further, on account of limited refrigerating facilities, the French were not able to maintain temperatures in the cold storage plant sufficiently low to re-freeze any incoming soft meat; also, on account of

its location, the transportation facilities at the plant were very poor, which resulted in many delays in the delivery of shipments to the plant. These delays were particularly serious due to its being necessary to make shipments in ordinary box cars and to the warm weather, together with the impossibility of re-freezing any soft meat put in storage.

It was accordingly decided to supply the Advance Section direct from Gievres, via Is-sur-Tille. So far as possible, French insulated cars were used for shipments to Is-sur-Tille, the meat being there transferred by Butchery Company No. 301 to French box cars for forwarding to railheads. In general it required about 72 hours from time of leaving Is-sur-Tille until the beef was actually serviced from advanced company kitchens. A typical illustration of the movement of beef from Is-sur-Tille is given by the following paragraph taken from the report on June 25th on trip made by the officer in charge of the Cold Storage Branch throughout the Advanced areas:

"A car of beef, which left Is-sur-Tille 7:00 PM on June 17th, arrived at Toul 2:00 AM on the 18th, was transferred there during the day and shipped at 5 o'clock the morning of the 19th, arriving at Menil-la-Tour at 7:00 AM that day. A portion of this beef was again transferred and sent by narrow gauge railroad to the regimental dump at Corneville, arrived there in time for issue that same afternoon, the last quarter leaving for the mess halls at 3:00 PM. This quarter was found to be almost defrosted but in the best of condition. The bulk of the balance of the shipment to Menil-la-Tour was taken from the cars in wagons to the division dump, not far from the railroad yards, where it was loaded into ration wagons during the day. Two quarters sent from there to a mess hall near the front lines, where they arrived during the night, and were cut and used for supper the following day. This beef was entirely defrosted on arrival at the mess hall, but in perfect condition!"

The beef shipped from Gievres to Is-sur-Tille in insulated cars arrived in good condition at the advanced points, but considerable difficulty was experienced with shipments made in box cars. A cablegram had been received under date of 17 April, 1918 (Cablegram 1118-R, Subparagraph E) advising that 100 refrigerator cars were being floated. However, these cars were not as yet available and the number of insulated cars obtained from the French were inadequate for the requirements. At the urgent request of Cold Storage Branch, the Transportation Department agreed to turn over ten American box cars at Gievres and under date of 24 May, 1918, arrangement was made with the D. of C. and F. to insulate them and provide cold storage doors. These ten cars, heavily insulated with cork,

insulating paper and matched lumber, were put in service during the last few days in May, their use greatly relieving the situation existing at that time.

It was not until 22 June, 1918, that the first of the American refrigerator cars was put in service. These cars were released from the erection shops at La Rochelle and Saintes as follows:

Date	Number Cars	Date	Number Cars	Date	Number Cars	
June 22	1	July 15	18	Aug. 21	32	
27	4	16	26	22	30	
28	5	17	28	23	25	
29	8	18	27	24	27	
July 1	27	19	29	26	21	
2	15	20	25	27	7	
3	14	22	22	Sept. 21	19	
5	22	23	21	23	23	
6	17	24	14	24	32	
7	3	25	5	25	32	
8	23	26	3	26	27	
9	25	27	2	27	24	
10	25	29	4	Nov. 8	12	
11	26	Aug. 16	9	9	22	
12	26	17	25	11	15	
13	28	18	23	23	1	
		19	24			
		20	27			
					TOTAL	950

Of these 950 cars the first 500 were provided with ice bunkers, but, at the request of the Cold Storage Branch, bunkers were not installed in the remaining 450 cars. This action was taken on account of the very good results obtained by making shipments in the refrigerator cars without their being iced.

Instead of maintaining a temperature of about 15° F. in the Gievres Plant, as is the common practice in the United States for freezer storage plants, it was found that particularly good results were secured by maintaining the temperature in the Gievres Plant at 0° F. Beef at this low temperature.

introduced into insulated cars served effectively to cool the car to a point below freezing without the defrosting of any of the meat. The results obtained by this method are well shown by certain tests made on shipments from Gievres to Is-sur-Tille, for example, two cars were en route 57 hours from Gievres to Is-sur-Tille, car temperature at loading being 73° F. and 68° F. and car temperatures when opened 36° F. and 30° F. respectively, the average outside temperature during the time of shipment being 66 degrees F. and the meat being loaded from a storage room at Gievres of which the temperature was 2 degrees F. It is estimated that during the summer, the maintenance of this low temperature in the Gievres Plant does not increase the coal consumption for the operation of the plant more than about 15% whereas to have manufactured sufficient ice for the icing of outgoing carload shipments would have at least doubled the coal consumption. It has been calculated on a theoretical basis that the sensible heat represented by a difference of 15 degrees F. in the temperature of a carload of beef is equal to the sensible heat which must be abstracted to reduce the car temperature 40 degrees and overcome heat conduction for a period of three days with a temperature difference of 40 degrees F.

Another condition which has contributed to render it satisfactory to make shipments in refrigerator cars without ice is the comparatively low mean temperatures in France. As an illustration, there is tabulated below certain mean temperatures in degrees Fahrenheit taken from records of the French Government.

	ANGERS	AUXERRE	BORDEAUX	CHAUMONT
January	39	36	41	33
February	41	39	43	36
March	45	43	47	41
April	51	51	52	49
May	57	55	58	55
June	63	64	63	61
July	66	67	68	65
August	66	66	68	64
September	60	60	63	58
October	52	51	55	49
November	45	43	47	41
December	41	36	41	34
Year	52	51	54	49

During the early part of the summer, before it was realized how thoroughly satisfactory frozen beef could be transported in the manner above described, consideration was at one time given to the proposition of using refrigerated motor trucks for distribution from railheads. Certain information in regard to such trucks was forwarded by the Acting Quartermaster General under date of 18 May, 1918. However, investigation during June, 1918, of the condition in which frozen beef was being received by organizations occupying advanced positions developed that the use of these refrigerated motor trucks was unnecessary and the Acting Quartermaster General was so advised.

Before an adequate number of refrigerator cars became available, thus making it necessary to ship a considerable amount of beef in box cars, the hazards incurred in making such shipments were great. To reduce this hazard, one of the first steps taken by the Cold Storage Branch was to arrange for the convoy of every beef shipment. It is believed that this convoy system prevented many losses. As it was, the losses suffered were entirely negligible. Great stress was laid by the Cold Storage Branch on this convoy system. In general, the convoyers were obtained from Ice Plant Company No. 301 or from some of the Butchery companies, these latter organizations having been placed at the disposal of the Cold Storage Branch. It was the intention to pick the best men from these organizations for convoy duty and in general the same men were continued on that duty. It was endeavored to educate these men as to the importance of their work. As an illustration of this effort, the following is quoted from "Instructions to Convoyers of Meat Shipments":

"Delivering beef to the troops in good condition depends largely upon prompt and proper handling in transit.

The convoy is responsible for every part of the movement of a car of beef; from the loading dock to the spotting of the car for discharge; for the prompt return of the empty refrigerator cars to original points unless otherwise specially instructed; for the prompt rendition of all required reports.

Initiative and attention are the factors which contribute to the value of the convoys. Such habits and conduct as will make for alertness must be cultivated.

Acquire enough French to be able to ask for necessary information from train crews and Chefs de Gare.

Telephonic and telegraphic accommodations will be secured through the Cold Storage Branch representative or, if there be no such representative, through the R.T.O., in the absence of both, convoy will utilize such other means of securing this accommodation as may be available.

To wire the Cold Storage Branch address "C.Q.M., Tours." To telephone the Cold Storage Branch call "341, Tours."

The following reports are required to be made to the Cold Storage Branch by wire or telephone:

1. Report of whereabouts at end of each twelve-hour period after leaving loading track.
2. Report of anticipated or encountered delay.
3. Report of arrival at unloading point, giving destination, time of arrival, car initials and numbers.
4. Report of departure on return trip with empty refrigerator cars, giving station, time, car initials and numbers.
5. Report of arrival at reloading point with empty refrigerator cars, giving station, time, car initials and numbers.

Immediately on return from the trip, convoy will submit in duplicate to his Commanding Officer the prescribed form report giving precise answers to all questions.

If possible, convoy will report his shipping point, destination, car initials and numbers to the R.T.O's at passing point when his cars are not a part of a solid American train.

When side-tracked in railroad yards, convoy will report to the R.T.O., giving his car initials, car numbers, destination and the number of the track on which his cars are set, and will ask for such movement as is desired. This report to the R.T.O. does not relieve the necessity for wiring the reports required by the Cold Storage Branch.

Immediately after having so reported to the R.T.O. convoy will return to his cars and will stay close enough to them as to prevent their being lost track of by switching, etc.

Upon arrival at a destination at which there is a Cold Storage Branch representative, report immediately to him. At other destinations report to the consignee.

Before starting on a trip, ascertain if there is a Cold Storage Branch representative at your destination and if not be sure that you know the name of the consignee, that you may find him promptly.

A convoy will stay with his cars from the loading dock to the point at which they are spotted for unloading. The nearest freight yard is not considered a destination. Securing prompt switching service is a part of the convoy's duty before starting on return trip, convoy will remove all posters from his cars.

If delays are encountered en route: first, report to the Cold Storage Branch as outlined in these instructions; second, try to get action through the R.T.O., train crew, or the Chef de Gare.

If car trouble is encountered, making it necessary to transfer meat from one car to another, inspect all cars to make sure that:

1. The cars are tight.
2. The running gears are well oiled.
3. There is no accumulation of materials which will stick to the beef and put it in bad condition at destination.

Report numbers of seals removed from original car and numbers of seals attached to resultant car.

Before opening the original car have the details so arranged that the transfer can be made as quickly as possible.

The convoy must know the number of his train and its approximate schedule so that where it is necessary for him to delay to take care of a disabled car he will be able to report the whereabouts of the balance of his convoy and be able to look it up and ascertain its delivery readily."

As a further means of controlling and expediting beef shipments, the Cold Storage Branch made considerable use of the long distance telephone and telegraph. On account of the perishable nature of the product, letter-writing in regard to shipment was in general entirely out of the question. Numerous instances occurred when on account of "hot boxes" or for other causes railroad cars loaded with beef became unserviceable in transit. Report of such condition being received by telephone from the convoyer, it was possible in numerous instances to arrange for quick disposition of the product before loss occurred.

Orders for beef requirements were also placed by telegraph and telephone and report of shipments and receipts forwarded to the Cold Storage Branch by the same means. It was in this manner possible to keep close touch upon the entire beef situation and to detect and take steps to expedite any delay in movements. In addition to the essential reports by telephone and telegraph, certain reports by letter were also required. The following is taken from the general letters of instructions and lists in detail these several reports:

1. "Depot Quartermasters will render daily reports as outlined in paragraph 4. These instructions do not apply to depots which have no cold storage space and which use beef receipts for immediate issue.

2. Reports will cover the preceding day, from midnight to midnight, and should be telephoned each morning, or, if telegraphed, as soon as data are available. If the reports are telegraphed, written reports should be forwarded by courier or first mail as soon as possible.

3. Mail reports should be addressed: Chief Quartermaster, Supplies Division, Cold Storage Branch. Telegrams should be addressed: Chief Quartermaster, A.E.F., Tours, Telephone number is: 341 Tours.

4. Reports will be rendered as follows:

A. - TELEPHONE REPORT OF BEEF RECEIPTS.

1. Divide the report into parts according to the shipping points or sources of receipts for each part giving:

- (a) Shipping point, Car Initials and Numbers.
- (b) Total fores, hinds and weight.
- (c) Condition.

2. Total receipts, showing fores, hinds, and weights

B. - TELEPHONE REPORT OF BEEF SHIPMENTS.

1. Divide the report of beef shipments into parts according to destination, grouping shipments to each Cold Storage Plant, to each Regulating Officer and to Consumption in each Section. For each part of the report give:

- (a) Destination, Car Initials and Numbers.
- (b) Total fores, hinds and weight.
- (c) Condition.

2. Total of all shipments, showing fores, hinds and weight.

C. - TELEPHONE REPORT OF COLD STORAGE PLANTS AND INCOMING BEEF SHIPS.

1. Highest temperature in any room.
2. Lowest temperature in any room.
3. Total receipts, showing fores, hinds and weight.
4. Total shipments, showing fores, hinds and weight.
5. Stock, showing fores, hinds and weight.

NOTE: Where telephone communication is not feasible, the "C" report may be sent by telegraph with Items 1 and 2 omitted and the "A" and "B" reports can be dispensed with.

D. - WRITTEN REPORT OF BEEF RECEIPTS.

1. Shipping point.
2. Car Initials and Numbers.
3. Number of fores.
4. Number of hinds.
5. Weight.
6. Sub-totals to conform with "A" report.
7. Condition to conform with "A" report.
8. Total received.

E. - WRITTEN REPORT OF BEEF SHIPMENTS.

1. Destination.
2. Car Initials and Number.
3. Number of fores.
4. Number of hinds.
5. Weight.
6. Sub-totals to conform with "B" report.
7. Condition to conform with "B" report.
8. Total shipped.

F. - WRITTEN REPORT OF STOCK AT EACH COLD STORAGE PLANT OR ON EACH INCOMING BEEF SHIP OR, SO FAR AS APPLICABLE, FROM EACH RE-LOADING POINT.

1. Highest temperature in any room.
2. Lowest temperature in any room.
3. Total receipts, showing fores, hinds and weight.
4. Total shipments, showing fores, hinds and weight.
5. Stock, showing fores, hinds and weight.

As above mentioned, during winter and spring, largely on account of transportation difficulties as well as lack of cold storage facilities, considerable amounts of frozen beef were purchased locally by various organizations throughout the A.E.F. This practice was objectionable in that the French Government complained that it was depriving the civilian population of this meat and further as the French Government expected the return of an equal amount of meat from the United States.

In view of this condition, there was adopted as a policy of the Cold Storage Branch as stated in the report for the week ending June 1st, the following:

"(a) Issue of frozen beef on a 70% basis to all troops to whom it is possible to make shipments, eliminating the local purchase of fresh beef.

"(b) Deliver frozen beef to the French Military establishment for use of their garrisons. Credits thus accruing in our favor to be exchanged for fresh beef next winter if our need demands.

"(c) Increase the frozen beef issue insofar as compatible with a good ration balance, placing in reserve stock the canned goods so saved."

In accordance with this policy, every effort was made to supply all organizations however small. To accomplish this the use of "peddlar" cars was introduced. These cars made it possible to supply small detachments located in towns where it would have been necessary to have purchased their requirements locally and to which it was impossible to make full carload shipments. One of these "peddlar" cars was placed in operation out of La Rochelle on the 22d of July. This car left La Rochelle under convoy every other day and moved on the following schedule:

Lv. La Rochelle	7.57 AM	
Ar. Niort	11.20 AM	
Lv. Niort	6.00 PM	
Ar. Thouars	8.20 PM	
Lv. Thouars	9.07 PM	
Ar. Saumur	10.06 PM	
Lv. Saumur	9.16 AM	Following day
Ar. Angers	11.00 AM	

This schedule being definitely established, the car was met at each point by a detachment of men from the organization for whom the beef was intended. Another peddlar car was established from Bordeaux, travelling daily via Libourne, Montpont, Perigueux, Limoges, Montmorillon, arriving at Poitiers the second morning, beef being delivered to each of these places with entirely satisfactory results. Also the practice of making shipments via Grande Vitesse was extended, thus supplying numerous organizations who could not handle full carload shipments and whom it was impossible to supply by peddlar car.

As a further step toward reducing the purchase of beef locally, arrangements were made for the rental of a 120 ton cold storage plant at Le Havre. Previous to the leasing of this plant, which was concluded on June 7, the troops in Base Section No. 4 had been obtaining beef by local purchase. After this plant became available, shipments to same were made from St. Nazaire.

Another point which it was found difficult to supply was Hq. S.O.S. Under date of 24 April, 1918, approval had been given for necessary construction work to place in operative condition an old plant located in a brewery on the Place des Halles, Tours. On 11 June, this plant, having a capacity for approximately 200 tons beef was placed in operation. In general, this plant has been supplied by shipments from St. Nazaire, although at times when, due to general shortage of beef, it was not desired to carry a large stock at Tours, it was necessary to make some shipments to the Tours plant from Gievres.

To take care of this work successfully the Cold Storage Branch had found it a distinct value to deal with certain specified officers at the different ports and cold storage plants. Further, as the personnel at these points was in most cases already so taxed as to make a burden the numerous reports and other matters which it was deemed advisable to send to the several port officers who, reporting to the several Quartermasters, would deal directly with the Cold Storage Branch at Tours. In accordance with this policy, the following assignments were made:

Butchery Company No. 307 to St. Nazaire on June 3, 1918.

Butchery Company No. 303 to Bordeaux on June 30, 1918.

Butchery Company No. 308 to La Pallice on July 1, 1918.

Butchery Company No. 309 to Brest on July 30, 1918.

After the American refrigerator cars became available, and in view of the method as outlined above for making shipments from a low temperature at Gievres, distribution difficulties were to a great extent eliminated. However, the total cold storage capacity available was still so limited that it was difficult to dispose of cargoes in the case of a number of vessels arriving at approximately the same time.

Such a condition occurred in the first part of July, 1918. The total beef stocks in France on July 7, 1918, amounted to 11,629 tons, of which 6,200 tons was in storage at Gievres, 1,641 tons on board the "Sagua" at St. Nazaire, and 1,604 tons on board the "Tanamo" at Nantes, three other vessels in port having on board a total of 1,368 tons.

An inspection had previously been made of cold storage plants under control of the French Government at Toul, Epinal and at Belfort, and, in view of the cold storage situation existing during the first part of July, and also in order to make it possible to maintain stocks of fresh beef in the Advance Section, request was made to the Sous-Secretaire d'Etat du Ravitaillement that these three plants be turned over for the use of the American Army. The capacities of these plants expressed in tons frozen beef is as follows:

Epinal	1,800 tons
Toul	400 "
Belfort	400 "

Permission for the use of 1,000 tons storage in the Epinal Plant and for the use of the entire capacity at Toul was obtained from the French under date of July 9th, and under date of July 18th further permission was obtained for the use of the entire capacity of the Belfort Plant. Occupancy of the Toul Plant was commenced on July 22nd, the Epinal Plant on July 24th and the Belfort Plant on July 30th.

It was agreed that the French would operate these plants so far as the machinery was concerned and that American personnel would handle the beef into and out of the plants, it further being agreed that the French would be paid for the use of the plants at the rate of Fr. 1.10 per ton per day.

Personnel sent to operate these three plants was as follows:

EPINAL - One officer and 36 men of Butchery Co. No. 310.
TOUL - One officer and 20 men of Butchery Co. No. 310.
BELFORT- One officer and 25 men of Butchery Co. No. 304.

In addition to these French plants, the available cold storage facilities were further increased about August 15th by the addition of a 400-ton cold storage plant on the Quai de la Ouest, Brest. This plant was particularly needed due to the fact that many of the large vessels docking at Brest were provided with refrigerated capacity in excess of that required for the storage of supplies for the ship. On account of the difficulty of handling beef at Brest before this plant became available, it had been necessary to request that no beef shipments be made to that port. This plant has been used entirely for the supply of troops in Base Section No. 5. As far as possible, it has been stocked from vessels docking at Brest, otherwise it has been supplied by rail shipments from St. Nazaire.

As a means of increasing the capacity of the available cold storage plants and also of decreasing the amount of ocean tonnage required for shipment of beef as well as the number of railroad cars needed for movement of the beef from ports, steps had been taken to determine the advisability of having all beef shipped deboned. A cablegram was sent to the United States under date of 15 May (Par. 4-A, Cable 116-S) as follows:

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"Take fifty steers of quality shipped to France. Cut edible beef in pieces as large as possible, pack in boxes not heavier than 80 lbs. freeze and ship as early as practicable for experimental purposes. Omit all suet, cod and brisket fat, and as far as possible all bones. Mark cases with quality of beef so each organization can get equal parts of best and poorer grades. Advise quantity of this beef which should be issued in lieu of equal quantity of carcass beef, what saving would be in ocean transportation and what increase in cost per pound."

While waiting for this shipment, it was decided to make tests over here on the boning and shipment of locally killed cattle. Accordingly, there was slaughtered at St. Aignan on June 7, 1918, ten cattle, these being delivered to the Cold Storage Plant at Gievres and there deboned and frozen in forms containing approximately 100 pounds each. After freezing, the forms were removed and beef burlapped. Ten of these packages, shipped from Gievres on June 15th, were distributed from Is-sur-Tille to seven railheads. The package sent to the railhead at Menil-la-Tour arrived there on June 20th, inspection at that point by representatives of the Cold Storage Branch developing that the beef was in perfect condition. After making these trial shipments the use of deboned meat was discussed with numerous Quartermasters and others in the Advance Section, it being the universal opinion that meat in such form was preferable to beef in quarters.

The records at Gievres show the following results as to the deboning of these ten carcasses.

Original Weight	6,197 lbs.	
Weight used in boning	6,190 "	
Boneless Meat	4,491 lbs.	72.55%
Kidney Knobs	79 "	1.28
Ox Tails	28 "	.45
Fat	197 "	3.18
Bones	1,397 "	22.25
Tankage	6 "	.09
Shrinkage or loss	12 "	.20
	<u>6,190 lbs.</u>	<u>100.00%</u>

In accordance with the cablegram of May 15th, above quoted, there arrived at St. Nazaire, July 13th, on board the S.S. Sagua, 288 cases deboned beef with gross weight of 23,910 pounds and net weight of 21,030 pounds. This shipment was forwarded to Gievres and placed in storage there, later

being shipped direct to the cold storage plant at Toul. This shipment was inspected upon its arrival at Toul by the officer in charge of the Cold Storage Branch, who, in his wire under date of 23 July, reported as follows:

"Received at Toul today 263 boxes beef cuts. Stored in plant 78 hours after loaded at Gievres. Opened seven boxes at random and found most of meat solidly frozen but some cuts partially defrosted. Measurements showed average of 32.5 lbs. net weight per cubic foot space occupied by box. Due to packing considerations there is considerable unused space in boxes. Meat is packed in one-quarter inch iron bound wood boxes. Tare averages 20 per cent of meat. Each box contains only one variety of cut. Total of eleven different cuts. This will make proper issue difficult. Have arranged for issue of this meat from railhead, and to have order issued directing reports be made from organizations on condition of meat, these reports to be forwarded to you. Based on observation here I consider it safe and advisable to order cargo deboned beef. If this is done recommend cuts be not separated but that all portions of each quarter be packed together marked whether fore or hind. Also that packing consist of cheese cloth, paper and burlap. Consider boxing a mistake as it prevents proper inspection to detect defrosting."

In view of the results obtained with this experiment, it was decided to make shipments of boned beef on a larger scale. To this end shipment of three lots of 250 tons each was requested from the United States in accordance with cablegram of July 29, 1918. (Par. 1, Cable 1534-S) as follows:

"For Quartermaster General: With reference to paragraph 9 B your cablegram 1712. Shipment described paragraph 4-A our cablegram 116 just received and put in consumption through regular channels. Packing permits not only waste space in box but hastens defrosting which started to show at end of 72 hours in refrigerator car shipment to advance section points. Tare weight 20 per cent. Grouping of similar cuts in each box makes satisfactory issue difficult. Experiment made here on 10 French steers boned meat from each quarter frozen solid in 100 pound block, covered with cheese cloth and paper sewed in burlap shipped through regular channels to same advance point still in excellent condition and frozen solid after 84 hours due to elimination of air space in packages. Desire new shipment extensive enough to be conclusive as follows: Surplus fat and tallow to be removed, trimmings cut, balance of meat from each quarter being packed together making minor adjustments with smaller

cuts to give exactly 100 pounds net weight in each package, which would be stenciled showing whether contents be from fore or hind quarters. Ship as soon as possible three lots of 250 tons each; one with blocks of beef wrapped in cheese cloth; then paper sewed in burlap; second wrapped in cheese cloth and paper and packed in veneer wire bound boxes; third wrapped same and packed in boxes same weight as shipment received. Competent inspectors should supervise packing. Bulk of each lot to be divided between two full ship steerage chambers and with package separated with wooden slats to provide through air circulation throughout, the other in solid pile with racks only on bottom and side walls giving circulation around but not through pile. Considered essential that no defrosting be permitted between freezing point and ship cold storage room. Apply on beef delivery schedule. Advise date floated and arrange to have ship deliver temperature records on arrival. Advise which method in packing considered most economical."

In accordance with this cablegram there was received on the S.S. Sixaola docking at Bordeaux on 14 October, 4,974 packages deboned beef. An officer had been sent from Washington as a convoy of this shipment with instructions to report on the condition in which this beef was received by the troops. He reported on the five different kinds of packages, referred to as Tests 1 to 5.

"Test 1: Frozen Boneless Beef, this beef trimmed from the entire carcasses of army beef and frozen in molds solid as near 100-pounds as possible.

Test 2: Frozen Boneless Beef, same as Test 1, except that this shipment was put up and frozen in veneer cases with wire binding.

Test 3: Frozen Boneless Beef, same as Test 1 and 2, except that shipment was made in sawed lumber boxes with iron strapping.

Test 4: In addition to the tests above recommended, it was thought advisable to make a trial shipment of beef in quarters with the shanks cut off. The cut on hind quarters to be just above the knee joint and the cut on the front quarter to be made at the shoulder. This test was termed Test 4.

Test 5: In addition to the above tests it was thought advisable to try out another shipment of same beef cuts with the bone in order to again compare same with the other tests. Care was also taken to pack and freeze these cuts as compact as possible in the boxes with iron strapping packed similar to Test 3 in order to save space. This shipment is termed Test 5."

This shipment was forwarded to the 1st Army through the regulating station at St. Dizier. On November 6th, the following telegram was received from the Regulating Officer at St. Dizier:

"R-5500. First shipment of experimental boneless beef extremely satisfactory both as to condition and ease with which boxes can be handled over 60 centimeter roads and in truck trains. Beef in fine condition after delivery from railheads."

Letter was also received under date of 15 November from Quartermaster, 1st Army, advising that "reports from organizations show that boned beef is easy to handle and is better suited for field service than is the beef in carcass." In view of the experience of this shipment, cablegram was forwarded under date of 16 November, 1918 (Par. 8, Cable 464) as follows:

"For Purchase. Experimental boneless beef shipment arrived in very good condition at final destination. Recommend you include as much boneless beef as possible in future beef shipments consisting of Tests 1 and 2."

Inspection made of deboned beef packed in accordance with Test 3 received on the "Calamares" 22 November, showed following data in regard to packing:

Volume per package	2.35 cu. ft.
Gross weight per package	120 lbs.
Tare	20 lbs.
Net Weight	100 lbs.
Net Weight per cu. ft. pkg.	42.5 lbs.

On the basis of 20% weight of bones, this was equivalent to 53 pounds carcass beef per cubic foot. This compares with 21 pounds per cubic foot obtained with careful piling of frozen beef in quarters. In other words, in the case of the shipment referred to, the actual beef per cubic foot storage space required was just two and one-half times as much as beef in quarters.

However, to eliminate the considerable tare in the case of this Test 3 package, letter was sent by courier under date 4 December, 1918, requesting that in the future the package referred to as Test No. 1 be used in making future shipments of boned beef. In addition to much smaller tare, this package has the distinct advantage of rendering it possible to determine condition of beef with respect to defrosting without opening the package.

The full advantage of the better packing in the case of deboned meat cannot be ordinarily realized in overseas shipment due to the fact that to do so would increase too greatly the dead weight. However, it is estimated that on an average there is a saving of 30% in ocean tonnage in addition to which there is a saving of 50% in the number of refrigerator cars which must be moved, and an increase of at least 150% in the capacity of cold storage plants.

As stated above, ice making equipment for 500 tons had been provided in connection with the Gievres cold storage plant. However, it had been determined that the issue of ice to troops was not necessary under conditions in France except for hospitals and, further, as outlined above, it had been found unnecessary to ice beef shipments. Due to these conditions, the Gievres Ice Plant, although the construction work on same had been completed, had never been placed in operation. Approximately 75% of the boiler room and engine room capacity provided for the Gievres Plant had been installed to furnish refrigerating facilities for ice manufacture. When instructions were received to make plans on the basis of supplying an army of 4,000,000 men, it was decided that it would be advisable to utilize a portion of this excess refrigerating capacity at Gievres for the cooling of an additional cold storage plant to be located in the vicinity of the plant already provided. Further, as above stated, the original request for equipment for Refrigerating Plants Nos. 1 and 2 specified that these plants were to be so designed that their capacity could be readily increased from 2,000 to 4,000 tons. As ample boiler room and engine room capacity had been provided for this increase, it was decided that at the time of asking for the Gievres addition, it would be advisable also to request the comparatively small amount of additional equipment required for doubling the capacity of Refrigerating Plants Nos. 1 and 2. It was estimated that the total tonnage of building materials and mechanical equipment required from the United States for the additional 5,200 ton cold storage plant at Gievres and for the increase of 2,000 tons capacity in each of Refrigerating Plants Nos. 1 and 2 amounted to only 900 tons. Approval for this construction

having been received, cablegram as prepared by the Director of Construction and Forestry was dispatched under date of June 28th as follows: (Par. 3-D, Cable 1269-S):

"With reference to paragraph 2 A your cablegram 1221 and paragraph 3 your cablegram 1298, certain refrigerating capacity provided for making ice will be used for refrigerating meat storage space to be added as follows: 5,200 tons to Intermediate plant, 2,000 tons each to plants 1 and 2. Ship for these ammonia piping, valves, fittings, headers and connections, pipe hangers, insulating paper, asbestos paper, cold storage doors and hardware, nails, hydrolene or similar product for laying cork insulation of floor and ceiling, conductor spouts, thermometers, fire hose and nozzle with standard pipe threads, ammonia for initial charge and one year's operation: also 40 trucks similar to Fairbanks Western pattern for each of plants Number 1 and Number 2 and 100 for Intermediate plant. So far as possible, do not make shipment of ice freezing apparatus ordered for plant Number 1. This refers particularly to ice tanks, ice cans, accumulators and woodwork for ice tanks. Have leased 2,400 tons capacity at La Pallice ready in August and will provide with materials obtained locally 400 tons capacity at Brest ready in August. The steamship McClellan is now at Saint Nazaire and has a refrigerating space of 1,500 tons; she is unseaworthy and cannot be placed in Trans-Atlantic or cross-channel service without repairs and cannot be rebuilt in any reasonable time. She will be retained in use as a storage plant, which with the above and certain small leased plants and 2,000 tons leased plant Number 3 at Saint Nazaire, will result in seacoast capacity of 10,550 tons, Interior 14,600. Allot priority our cablegram 1168."

For the construction of Refrigerating Plant No. 1, Bassens, there were sent from Gievres to Bassens during June, 1918, 110 of the civilians originally employed by The Quartermaster General for the construction of the Gievres Plant. In addition there arrived from the United States, during the same month, 30 additional civilians employed by The Quartermaster General for construction work on the Bassens Plant. Work on that plant was commenced about 10 June, 1918.

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In response to the request sent to The Quartermaster General that he should furnish operating personnel for the additional refrigerating plants, there arrived in Le Havre on 18 September, 1918, Refrigerating Plant Company No. 301, consisting of nine officers and 219 enlisted men. The company was sent at once to Bassens, arriving there 19 September, 1918, and in accordance with the request of the Cold Storage Branch, being assigned to the Commanding General, Base Section No. 2, for duty under the Section Engineer in connection with the construction of the Cold Storage Plant. After arrival of this company at Bassens and on account of the increased labor thus furnished, construction work progressed at a rapid rate, one room being placed in operation on 3 November, 1918, and the other three rooms following within a short time thereafter.

Additional cold storage plant personnel arrived at Brest on October 1st, as follows:

Refrigerating Plant Co. No. 302,
9 officers and 215 enlisted men.

Meat Handling Section, Refrigerating Plant Company No. 301,
2 officers and 113 enlisted men.

Refrigerating Plant Co. No. 302 was originally intended for operation of the Cold Storage Plant contemplated for Is-sur-Tille. However, although a number of points had been discussed as the proper location for this plant, including Is-sur-Tille, Chatillon-sur-Seine, Troyes and Liffol-le-Grand, final approval for its location had never been obtained, so that it had been impossible to commence construction work. It was, therefore, decided to send Refrigerating Plant Company No. 302 to Gievres, this company arriving there on 6 October, 1918, and reporting to the Commanding Officer for assignment to duty under the Section Engineer in connection with the erection of the additional Gievres Cold Storage Plant.

Meat Handling Section, Refrigerating Plant Company No. 301 was sent to Bassens to furnish additional labor required for the construction and operation of the Cold Storage Plant at that point.

In order to avoid confusion and in accordance with approval from Washington, the names of these several organizations were later changed to:

Refrigerating Plant Company No. 501
Refrigerating Plant Company No. 502
Meat Handling Section, Refrigerating Plant Co.#503

During the first part of 1918, the Chief Purchasing Officer, Q.M.C., had purchased twelve small refrigerating machines from the French concern, Etablissements Singruen, Golby near Epinal (Voages) France. Ten of them had a rated capacity of 6,000 frigories per hour each (2 tons refrigeration). Purchase price of these ten machines was 26,200 francs each. The other two machines had a rated capacity of 3,000 frigories per hour each (1 ton refrigeration), these machines costing 13,100 francs each. One of the small capacity machines was sent to Base Hospital No. 6 at Talence (near Bordeaux). The other small capacity machine was sent to Is-sur-Tille with the intention of using it for refrigeration of a plant for storage of yeast for the mechanical bakery at that point. This machine, however, was never installed. Under date of June 29, 1918, approval was obtained from the Assistant Chief of Staff, G-4, S.O.S., for the installation of the ten larger capacity machines, together with small cold storage plants at ten hospital centers as follows:

Mars	(Nievre)
Mesves	(Nievre)
Beaune	(Cote d'Or)
Allerey	(Cote d'Or)
Rimaucourt	(Haute Marne)
Bazoilles	(Vosges)
Savenay	(Loire Inferieure)
Grand Blottereau	(Loire Inferieure)
Beau Desert	(Gironde)
Perigueux	(Dordogne)

The cold storage plants to be installed with these machines had capacity for storage of 25 tons frozen beef. In addition to cooling such storage rooms to a temperature of about 25 degrees F., these refrigerating machines had ice making capacity of approximately one ton of ice per day.

Additional cold storage facilities consisted of certain plants leased from French concerns as follows:

<u>Name</u>	<u>Capacity</u>	<u>Date Acquired</u>
Arcachon (Gironde)	150 tons	May 1, 1918
Angers (Maine et Loire)	12 "	May 1, 1918
Blois (Loire et Cher)	100 "	May 15, 1918
Vittel (Vosges)	28 "	July 1, 1918
Orleans (Loiret)	2 $\frac{1}{2}$ "	July 4, 1918
La Rochelle (Charente Inf.)	30 "	July 10, 1918
Vichy (Allier)	32 "	July 13, 1918
Bordeaux (Gironde)	100 "	August 7, 1918

During the time the S.S. McClellan had been used as a cold storage plant at St. Nazaire, its operation had been under the direction of the Army Transport Service, but, in accordance with request formulated by the Cold Storage Branch, it was agreed that the operation of this vessel be turned over to the Quartermaster Corps. The operation of this ship was formally taken over by the Q.M.C. the first part of September, 1918.

Due to failure of shipments from the United States, the available supply of beef during the first part of September became so low that it was necessary to reduce the fresh beef issue, in accordance with which wire was sent to the C. in C. under date of 2 September, 1918, as follows:

"Q-7. Because of nonarrival of frozen beef from United States it is necessary to issue the meat component of the ration for each seven days as follows: one day salmon; two days canned meats including corned beef, corned beef hash and fresh roast beef; two days bacon; two days fresh beef. Request that orders be issued immediately covering this change so that Is-sur-Tille and St. Dizier can issue on that basis tomorrow if possible."

Wire was also sent under the same date to the Commanding Generals of the several sections of the S.O.S. requesting issue of the meat component of the ration on the same basis.

On account of improvement in the meat situation, wire was sent to the C. in C. under date of 7 September as follows:

"Q. 42. Meat stocks will permit the issue of the meat component of the ration for each ten days as follows: four days frozen beef; three days bacon; two days canned beef including corned beef, corned beef hash and fresh roast beef; one day salmon. Request that orders be issued covering these changes. Meat can be delivered to the Regulating Stations on that basis beginning Wednesday."

Similar telegrams were also sent under the same date to the Commanding General of the several S.O.S. Sections. Under date of 18 September, telegram was sent to the C. in C. as follows:

"101. Stocks of frozen beef now permit issue of the meat ration for each 10 day period 7 days frozen beef and three days bacon."

Similar telegram was sent under date of 19 September to the Commanding Generals of the several sections of the S.O.S.

Except for the period as above mentioned ample stocks were at all times available for the Cold Storage Branch to supply all requirements.

In order to furnish satisfactory service to the large number of separate messes at Hq. S.O.S. there was put into operation at the Tours Cold Storage Plant on 5 November, 1918, a butcher shop in which all meat was prepared for cooking before issue. The various cuts were segregated, one sort of cut only being supplied to any one enlisted man's mess on one day. A roster was kept of the different messes, it being determined from such roster the particular grade of cut to be supplied. In all, 43 enlisted men's messes were so supplied. In addition to issue from this butcher shop, arrangement was made for sale of cuts as might be desired through the Post Commissary. In this manner a total of 39 messes were supplied, these including officers' messes and messes of the Y.M.C.A., Y.W.C.A., etc. For such sale a price list was established, so adjusted that the total for which the different cuts were sold would equal the price of the entire carcass. This price list as adopted for sales through the Post Commissary at Tours was as follows:

PRICES ON BEEF CUTS
BASED ON PRICE OF BEEF, Fresh
at 25 cents per lb.

<u>Cuts</u>	<u>Weight</u>	<u>Price per lb.</u>	<u>Total</u>
Tenderloin	5	.40	\$2.00
"T" Bone	12	.35	4.20
Short Cut	15	.32	4.80
Loin Steak	18	.32	5.76
Round Steak	42	.30	12.60
Rump Roast	9	.28	2.52
Flank	12	.20	2.40
Shank	20	.15	3.00
Fat and Bones	<u>17</u>	<u>...</u>	<u>...</u>
	150		\$37.23

A similar butchery establishment was put into operation at Toul about the middle of November, 1918. Decision was also made to establish similar Butcher Shops at the ports of Brest, St. Nazaire and Bordeaux and also at St. Aignan, Le Mans and Blois.

Further means taken to improve the meat ration was the decision to obtain sufficient frozen pork from the United States to issue same to all organizations once each month, in accordance with which cablegram was sent under date of 19 September, 1918 (Par. 3-B, Cable S-151), requesting that there be shipped monthly in lieu of equal quantity frozen beef, 1,000 tons Boston Butts and Boneless Loins. A sufficient quantity of pork, received in response to this cablegram, was shipped to the 3d Army in time to enable same to be issued to the troops of that Army on Christmas Day.

The practice was also followed of buying excess ship's stores from incoming vessels, such purchases consisting of beef livers, poultry, pork loins, etc., such articles being in general sold to hospitals.

Previous to October 15th an arrangement for replacement in kind of frozen beef was in effect between the French Government and the Q.M.C. In addition to this replacement in kind, it had further been agreed that the Q.M.C. would sell to the French Government an amount of beef equal to that purchased locally from French merchants by various organizations of the A.E.F. In accordance with agreement effected by the Chief of Supplies, all beef transactions subsequent to October 15, 1918, were handled as direct sales without any reference whatever to subsequent replacement.

In order to obtain beef for replacement to the French negotiations were entered into to secure 50,000 head of cattle from Switzerland. Under date of November 8, 1918 cablegram (Par. 1 Cable S-425) was sent to the United States requesting that Export License for these cattle be secured. However, before such license was obtained the armistice was concluded and it was decided not to proceed further with this matter, and under date of November 25, 1918, cablegram (Par. 1-A, Cable 3-502) was sent to the United States requesting that no further action be taken to secure Export License for the Swiss cattle.

The possibility of obtaining mutton from Algeria had also been investigated, it having been reported that it would be possible to secure 300,000 to 400,000 mutton in that

country during the months of May, June and July. However, in view of conditions created by the armistice, this proposition was also dropped.

There is attached hereto certain statistical data. This includes a tabulation (Marked Report A), showing all beef cargoes arriving during the ten months from February 1, 1918 to December 1, 1918, and the disposition of cargoes arriving subsequent to May 20, 1918. Another tabulation (Marked Report B), shows cargoes arriving each month from February 1, 1918, to December 1, 1918, the totals shown by this tabulation being as follows:

MONTH	TOTAL POUNDS BEEF ARRIVING AT PORTS
February	1,311,108
March	4,724,181
April	7,657,165
May	8,171,694
June	20,208,132
July	20,368,191
August	12,212,759
September	25,070,610
October	42,447,309
November	<u>52,769,556</u>
TOTAL	194,940,705

There is also attached one of the daily beef reports for each week from 1 July, 1918, to 1 December, 1918. (Marked Report C.). These latter reports, it will be noted, give detailed information as to the distribution of beef existing on the date for which they are prepared.

These reports were of great value in the conduct of the business of the Cold Storage Branch. The information for them was obtained by long distance telephone, or in certain cases by telegraph, and compiled by noon each day as of the situation existing the preceding midnight. It was on the basis of this report that, after receipt of information as to the sailing from the United States of a beef carrying vessel, the Cold Storage Branch designated the port to which such vessel should be sent. This report also furnished the information required to enable the Cold Storage Branch to issue intelligently the necessary telephonic orders for each day's beef movements.

Three blue printed curve sheets are attached showing the following information weekly from the second week in June, 1918, to 1 December, 1918: (Marked Report D).

Total pounds American frozen beef on hand.
Average total pounds daily consumption American frozen beef.
Average pounds daily consumption American frozen beef per man.

The information shown by these curve sheets is also presented in tabular form, (Marked Report E), such tabulation showing average total daily consumption during the week ending June 15, 1918 to have been 224,000 pounds, and the average daily consumption per man during the same period .34 pounds. The figures for the week ending November 30, 1918, were respectively 1,462,000 pounds total average daily consumption and .73 pounds consumption per man per day. After the first of December, the consumption of frozen beef had a further substantial increase, the report for the 10 day period ending 19 December showing average daily consumption amounting to 1,663,412 pounds which, based on the approximate total A.E.F. personnel in France, figured average daily consumption of .831 pounds per man. In other words, in the middle of December, 1918, the average consumption of frozen beef was 7.5 times the consumption six months previous, and the average daily consumption per man was 2.5 times the consumption per man six months previous.

Shortly before the conclusion of the armistice, instructions had been received to vacate the French plants at Epinal and Belfort, in accordance with which these two plants were vacated on November 6, 1918. Eight hundred tons in the French Cold Storage Plant at La Pallice had become available on 25 September, 1918, in view of which lease of the 30 tons space in the cold storage plant at La Rochelle was cancelled. Also, after the cold storage plant at Bassens was put into operation, steps were taken to cancel lease of 100 tons space in the French Cold Storage Plant at Bordeaux.

After the conclusion of the armistice, G.O. 54, Hq. S.O.S., 14 November, 1918, was issued. It contained the following paragraph in regard to refrigerating plant construction:

"REFRIGERATING PLANTS: The contract for the refrigerating plant at St. Nazaire will be cancelled. Construction work on refrigerating plants will be terminated except on such plants as have been so

nearly completed that completion would increase their salable value considerably beyond the actual cost of completion. This will eliminate the increase at Gievres."

In view of this order, the following cold storage projects were cancelled:

Construction of 5,200 ton increase in the Gievres Plant.
Advance Section Plant - capacity, 4,000 tons
Contract for occupancy of 2,000 tons space in French Cold Storage Plant at St. Nazaire.
Contract for occupancy of 1,600 tons space in French Cold Storage Plant at La Pallice.
Arrangements with French Government for use of space in plant at Dijon.
Cold Storage Plant for yeast for Is-sur-Tille Bakery.
Hospital ice-making and cold storage plants as follows:

Mars	(Nievre)
Mesves	(Nievre)
Beau Desert	(Gironde)
Perigueux	(Dordogne)

Tabulations are included (Marked Report F), showing status of cold storage projects as of 1 November, 1918, and also as of 15 December, 1918. The first shows the work at its highest and the latter the conditions existing after the armistice.

In addition to the statistical data referred to above, there is attached hereto typical reports required by the Cold Storage Branch for the conduct of its business: These include the following:

- Report No. 1. - "Report of Beef Shipments."
This report was submitted daily by Cold Storage Plants at Gievres and Bassens.
- Report No. 2. - "Recapitulation."
This report was submitted daily by Cold Storage Plants at Gievres and Bassens.
- Report No. 3. - "Beef Report."
This report was submitted daily by all Cold Storage Plants and beef transfer points with the exception of the Cold Storage Plants at Gievres and Bassens.
- Report No. 4. - "Report of Shipments." (Printed Form)
This report prepared daily in office of Cold Storage Branch on the basis of preceding two reports. (Editorial Note: Not available).

Report No. 5. - "Report of Shipments."

This report prepared in office of Cold Storage Branch on the unloading of every steamship, containing information showing destination to which each car was shipped and number of fores and hinds, total weight and date on which received at destination. (Editorial Note: Not available).

Report No. 6. - "Shipments to Consumption."

This report was prepared each ten-day period in office of Cold Storage Branch on basis of reports received during such period.

Report No. 7. - "Report of Convoyers of Meat Shipments."

This report was submitted by convoyers for every beef shipment made.

Report No. 8. - "Power House Daily Record for Refrigerating Plants of A.E.F."

This report shows detailed data as to pressures, temperatures and other information showing efficiency and results obtained in the operation of the several cold storage plants. (Editorial Note: Not available.)

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BEEF ARRIVALS FOR A.E.F. FROM FEBRUARY 1, 1918 to
DECEMBER 1, 1918

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Montanan	2/1	La Pallice		823,816	823,816
Tenadores	2/5	Brest		232,707	232,707
Henderson	2/8	St. Nazaire		12,869	12,869
Calamares	2/15	Brest		227,806	227,806
Finland	2/28	St. Nazaire		13,910	13,910
G. Washington	3/4	Brest		378,052	378,052
Pres. Grant	3/4	Brest		290,910	290,910
Covington	3/4	Brest		112,266	112,266
Pres. Lincoln	3/4	St. Nazaire		12,378	12,378
Ticonderogo	3/11	Bordeaux		3,522	3,522
Tenadores	3/21	Bordeaux		469,510	469,510
Croonland	3/22	St. Nazaire		7,804	7,804
Madawaska	3/23	St. Nazaire		13,854	13,854
Mercury	3/23	Bordeaux		93,952	93,952
Nav. Air Sta.	3/23	Paulliac		297,406	297,406
Pocahontas	3/28	St. Nazaire		29,432	29,432
Tivives	3/25	Tivives	(Transferred to French Gov't)	3,015,095	3,015,095
Dochra	4/10	Bordeaux	do	1,839,765	1,839,765
Moccasin	4/12	Bordeaux	do	1,603,912	1,603,912
G. Washington	4/12	Brest		382,669	382,669
Ohioan	4/14	La Pallice		1,044,150	1,044,150

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Gr.Northern	4/15	Brest		17,728	17,728
Pastores	4/14	St. Nazaire		107,426	107,426
Panaman	4/18	Nantes		959,330	959,330
Montanan	4/21	Bordeaux	Transferred to French Govt. 4/28	1,101,923	1,101,923
Pres.Grant	4/22	Brest	"	312,969	312,969
Calamares	4/29	St. Nazaire		283,349	283,349
Madawaska	4/29	St. Nazaire		3,944	3,944
Mercury	5/7	Brest	Transferred to	208,795	208,795
Tenadores	5/11	Bordeaux		294,173	294,173
Sagua	5/11	St. Nazaire		2,973,351	2,973,351
Tanamo	5/11	St. Nazaire		22,753	22,753
Mattsonia	5/12	Bordeaux		108,907	108,907
Wachusetts	5/12	Brest		4,157	4,157
Tivives	5/20	Nantes	French-Paris DQM Gievres	1,686,632 1,598,144	3,284,746
Pastores	5/23	Brest	Navy-Brest DQM Gievres	300,000 148,894	448,894
Calamares	5/30	St. Nazaire	DQM Gievres	502,803	502,803
Pres.Grant	5/30	Brest	DQM Gievres	323,115	323,115

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Mocassin	6/1	Nantes	DQM Gievres Local issue	1,175,586 101,750	1,277,366
Hercules	6/3	Brest	Navy-Brest	110,202	110,202
Ulua	6/9	Bordeaux	DQM Gievres	3,711,097	3,711,097
Huron	6/8	Brest	DQM Gievres	229,915	229,915
Muscatine	6/14	St.Nazaire	DQM Gievres Local Issue French-Paris	3,979,451 518,637 32,700	4,530,788
Ohioan	6/19	St.Nazaire	DQM Gievres Local Issue McClelland	493,207 563,333 331,319	1,387,859
Aeolus	6/18	Brest	Navy-Brest	148,873	148,873
Montanan	6/24	Bordeaux	DQM Gievres	1,167,048	1,167,048
Vauban	6/29	St.Nazaire	DQM Gievres French-Paris Local Issue McClelland	5,390,838 649,006 767,740 278,333	7,085,917
Pastores	6/28	Brest	Navy-Brest	559,097	559,097
Panaman	7/1	La Pallice	DQM Gievres Local Issue La Rochelle Tours	924,287 46,773 18,537 102,924	1,092,521
Iowan	7/5	La Pallice	French-Bordeaux Le Havre French-Paris Local Issue La Rochelle	200,680 240,321 401,430 8,036 14,628	865,095

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Sagua	7/13	St.Nazaire	DQM Gievres Local Issue McClelland	1,967,634 484,304 588,083	3,040,021
Tanamo	7/12	Nantes	DQM Gievres French-Dijon Local Issue Is-sur-Tille	2,413,091 59,528 62,767 203,679	2,739,065
Tenadores	7/12	Brest	DQM Gievres Navy-Brest	142,086 69,702	211,788
Pres.Grant	7/12	Brest	DQM Gievres	249,813	249,813
Dochra	7/21	Bordeaux	Bordeaux Bastide DQM Gievres La Pallice Local Issue	482,503 582,597 998,647 24,375 110,102	2,198,224
Aeolus	7/21	Brest	Navy-Brest	85,788	85,788
Pennsylvania	7/21	La Pallice	French-Bordeaux	982,658	982,658
Tolca	7/24	St.Nazaire	DQM Gievres Tours La Rochelle Local Issue	2,898,682c 109,176 123,137 472,679	3,503,675
Tivives	7/30	St. Nazaire	DQM Gievres La Rochelle Local Issue	2,930,652 58,077 404,441	3,399,750
Pastores	7/30	St. Nazaire	DQM Gievres	385,228 95,556	480,784

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Moccassin	7/30	Bordeaux	DQM Bordeaux DQM Gievres	204,970 1,314,039	1,519,009
Passaic	8/6	Bordeaux	DQM Gievres DQM Bordeaux DQM Arcachon	3,964,550 714,545 261,275	4,940,370
Pennsylvania	8/13	La Pallice	DQM Gievres St. Nazaire La Rochelle Local Issue	579,015 156,668 56,455 141,887	934,025
Tenadores	8/12	Brest	Navy-Brest	351,690	351,690
Hercules	8/20	St. Nazaire	La Rochelle Local Issue	33,177 135,004 5,198	173,379
Muscatine	8/26	St. Nazaire	DQM Gievres La Pallice Local Issue French	4,031,851 113,835 512,712 11,632	4,670,030
Aeolus	8/26	Brest	Navy-Brest	94,651	94,651
Ohioan	8/26	St. Nazaire	McClelland DQM Gievres Local Issue La Rochelle	510,886 386,578 98,376 52,774	1,048,614
Pastores	9/7	Brest	Cold Storage- Brest	433,969	433,969
Tenadores	9/12	Brest	"	284,967	284,967

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Sagua	9/7	St. Nazaire	La Rochelle	129,866	
			DQM Gievres	2,502,183	
			McClelland	358,480	
			Local Issue	238,907	
			French	7,006	
					3,236,444
Panaman	9/8	St. Nazaire	DQM Gievres	210,296	
			Is-sur-Tille	704,425	
			La Rochelle	57,311	
			Bordeaux	27,930	
					999,962
Toloa	9/10	Le Havre	DQM Gievres	3,653,396	
			C,S. Le Havre	117,218	
			Spoiled	3,349	
					3,773,963
Dochra	9/19	Bordeaux	DQM Bordeaux	1,122,304	
			RO Is-sur-		
			Tille	854,341	
			DQM Gievres	66,910	
					2,043,555
Aeolus	9/29	Brest	Brest Cold Stor.	91,718	91,718
Moccasin	9/22	Nantes	DQM Gievres	731,954	
				958,398	
					1,717,352
Iowan	9/17	St. Nazaire	McClelland	620,264	
			Local Issue	476,855	
			DQM Gievres	38,375	
			French local	6,112	
					1,141,606
Tivives	9/22	St. Nazaire	DQM Gievres	3,201,302	
			Local Issues	194,169	
			French-Local	13,955	
					3,409,426

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Desna	9/27	St. Nazaire	DQM Gievres	7,542,843	
			French	18,328	
			Local Issue	320,006	
			McClelland	23,625	
			La Roche Sur Yon	32,846	
					7,937,648
Ulua	10/2	St. Nazaire	Is-sur-Tille	1,649,115	
			DQM Gievres	1,142,697	
			Brest	310,820	
			Dijon	264,648	
			Tours	64,345	
			Local Issue	408,388	
			French Local	1,242	
					3,841,255
Ascania	10/7	St. Nazaire	Local	161,915	
			French	4,295	
			DQM Gievres	1,042,017	
			Tours	51,930	
			Dijon	60,038	
					1,320,196
Ice King	10/7	St. Nazaire	DQM Gievres	2,575,506	
			Local	676,030	
			McClelland	90,541	
			French	22,048	
			RO Is-sur-Tille	1,216,048	
			DQM Dijon	152,132	
			DQM Paris	156,173	
					4,888,514
Carrillo	10/10	Bordeaux	DQM Bordeaux	1,401,884	
			DQM Gievres	1,874,544	
					3,276,428
Sexola	10/14	Bordeaux	DQM Bordeaux	2,090,800	
			DQM Gievres	1,783,511	
					3,874,311
Corona	10/14	Brest	DQM Gievres	578,753	
			C, S, Brest	121,819	
					700,572

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
Ulysses	10/6	St.Nazaire	McClelland	1,424,661	
			DQM Gievres	122,556	
			Local	32,480	
					1,579,697
Armagh	10/7	St.Nazaire	DQM Gievres	8,261,151	
			Local	947,849	
			Tours	105,841	
			C.S.Brest	117,388	
			Le Havre	109,551	
			French	41,443	
			Nantes	21,208	
					9,604,391
Appeles	10/19	St.Nazaire	Tours	60,218	
			Local	139,631	
			DQM Gievres	275,429	
			C.S.Brest	37,098	
				512,376	
Tenadores	10/21	Brest	C.S.Brest	270,505	270,505
Euripides	10/24	St.Nazaire	DQM Gievres	4,784,759	
			C.S.Brest	223,535	
			Local	601,205	
			French	62,067	
				5,671,566	
Sagua	10/26	St.Nazaire	DQM Paris	127,318	
			DQM Gievres	2,860,403	
			Local	157,177	
				3,144,898	
Pennsylvania	10/26	La Pallice	Local	1,080,605	1,080,605
Tanamao	10/26	Bordeaux	DQM Bordeaux	1,067,919	
			DQM Gievres	782,803	
			RO Is-sur-Tille	831,273	
				2,681,995	
Montclair	11/6	St.Nazaire	DQM Gievres	3,942,105	
			DQM Brest	213,825	
			Local	316,744	
				4,472,674	

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
U.S.S. Surinan	11/10	St.Nazaire	DQM Brest Tours DQM Paris DQM Gievres Local	41,506 104,146 250,020 1,263,707 232,316	 1,911,695
Ohioan	11/14	La Pallice	DQM La Pallice	 1,064,030	 1,064,030
Atenas	11/14	Brest	DQM Brest DQM Gievres DQM Dijon DQM Paris RO Is-sur- Tille Local	153,569 1,989,662 37,648 221,377 68,817 710,997	 3,182,070
Rappahannock	11/16	St.Nazaire	Local McClelland DQM Gievres	272,381 1,511,328 222,326	 2,006,035
Muscatine	11/16	St. Nazaire	DQM Gievres DQM Brest Tours Local DQM Paris	2,188,870 291,861 212,861 1,788,510 149,140	 4,631,242
Santa Marta	11/16	St.Nazaire	Local DQM Gievres DQM Brest McClelland	320,471 3,219,160 115,267 9,037	 3,663,935
Panaman	11/18	Bassens	Bassens-Plant	1,084,948	1,084,948

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
U.S.S. Tivives	11/18	Bassens	Bassens Plant Bastide DQM Gievres RO Is-sur-Tille	2,293,576 549,904 32,873 297,181	3,173,534
Matapan	11/22	Bordeaux	C.S.Bassens RO Is-sur-Tille	2,528,870 968,123	3,497,093
Calamares	11/22	Bordeaux	C.S.Bassens RO Is-sur-Tille DQM Gievres	1,239,870 552,629 1,658,222	3,450,721
Polar Sea	11/24	St.Nazaire	DQM Gievres Boneless Beef Le Havre Tours Nantes Local	2,624,620 54,454 146,434 158,681 34,695 539,929	3,558,813
Ulua	11/25	St.Nazaire	DQM Gievres DQM Brest Local	2,568,683 145,949 507,803	3,222,435
Iowan	11/27	La Pallice	DQM Gievres C.S.La Pallice	687,154 403,665	1,090,819
Turilla	11/27	St.Nazaire	DQM Gievres DQM Paris Tours Local Boneless Beef Frozen Pork	2,086,859 166,156 166,883 402,878 338,769 207,641	2,822,776 338,769 207,641

(REPORT A CONTINUED)

<u>NAME</u>	<u>DATE</u>	<u>PORT</u>	<u>CONSIGNEE</u>	<u>WEIGHT</u>	<u>TOTAL</u>
U.S.S. Dochra	11/28	Bassens	RO Is-sur-Tille	780,495	
			Bassens Plant	25,909	
			DQM Gievres	1,035,969	
					1,842,373
Tacapa	11/30	St.Nazaire	DQM Gievres	3,614,265	
			Local	912,741	
					4,527,006

(REPORT B)

REPORT OF FROZEN BEEF RECEIVED DURING MONTH OF
FEBRUARY, 1918

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
February 1st	MONTANAN	LA PALLICE	823,816	
February 5th	TENADORES	BREST	232,707	
February 8th	HENDERSON	ST. NAZAIRE	12,869	
February 15th	CALAMARES	BREST	227,806	
February 28th	FINLAND	ST. NAZAIRE	13,910	1,311,108
	TOTALS	.....	1,311,108	1,311,108

'MONTH OF MARCH

March 4th	GEO. WASHINGTON	BREST	378,052	
March 4th	PRES. GRANT	BREST	290,910	
March 4th	COVINGTON	BREST	112,266	
March 4th	PRES. LINCOLN	ST. NAZAIRE	12,378	
March 11th	TICONDEROGA	BORDEAUX	3,522	
March 21st	TENADORES	BORDEAUX	469,510	
March 22d	CROONLAND	ST. NAZAIRE	7,804	
March 23d	MADAWSKA	ST. NAZAIRE	13,854	
March 23d	MERCURY	BORDEAUX	93,952	
March 23d	NAV. AIR STA.	PAUILLAC	297,406	
March 28th	POCAHONTAS	ST. NAZAIRE	29,432	
March 25th	TIVIVES	TIVIVES	3,015,095	4,724,181
	TOTALS	.....	4,724,181	4,724,181

REPORT OF FROZEN BEEF RECEIVED DURING MONTHS OF APRIL
AND MAY, 1918

(REPORT B CONTINUED)

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
April 10th	DOCHRA	BORDEAUX	1,839,765	
April 12th	MOCCASIN	BORDEAUX	1,603,912	
April 13th	GEO. WASHINGTON	BREST	382,669	
April 14th	OHIOAN	LA PALLICE	1,004,150	
April 15th	GR. NORTHERN	BREST	17,728	
April 14th	PASTORES	ST. NAZAIRE	107,426	
April 18th	PANAMAN	NANTES	959,330	
April 21st	MONTANAN	BORDEAUX	1,101,923	
April 22d	PRESIDENT GRANT	BREST	312,969	
April 29th	CALAMARES	ST. NAZAIRE	283,349	
April 29th	MADAWSKA	ST. NAZAIRE	<u>3,944</u>	
	TOTALS ...		7,657,165	7,657,165
May 7th	MERCURY	BREST	208,795	
May 11th	TENADORES	BORDEAUX	294,173	
May 11th	SAGUA	ST. NAZAIRE	2,973,351	
May 11th	TANAMAO	ST. NAZAIRE	22,753	
May 12th	MATTSONIA	BORDEAUX	108,907	
May 12th	WACHUSSETTS	BREST	4,157	
May 20th	TIVIVES	NANTES	3,284,748	
May 23d	PASTORES	BREST	448,894	
May 30th	CALAMARES	ST. NAZAIRE	502,803	
May 30th	PRES. GRANT	BREST	<u>323,115</u>	
	TOTALS ...		8,171,694	8,171,694

REPORT OF FROZEN BEEF RECEIVED DURING MONTHS OF
JUNE AND JULY, 1918

(REPORT B CONTINUED)

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
June 1st	MOCCASSIN	NANTES	1,277,336	
June 3d	HERCULES	BREST	110,202	
June 9th	ULUA	BORDEAUX	3,711,097	
June 8th	HURON	BREST	229,915	
June 14th	MUSCATINE	ST. NAZAIRE	4,530,788	
June 19th	OHIOAN	ST. NAZAIRE	1,387,859	
June 18th	AEOLUS	BREST	148,873	
June 24th	MONTANAN	BORDEAUX	1,167,048	
June 29th	VAUBAN	ST. NAZAIRE	7,085,917	
June 28th	PASTORES	NAVY-BREST	<u>559,097</u>	<u>20,208,132</u>
		TOTALS.....	20,208,132	20,208,132
July 1st	PANAMAN	LA PALLICE	1,092,521	
July 5th	IOWAN	LA PALLICE	865,095	
July 13th	SAGUA	ST. NAZAIRE	3,040,021	
July 12th	TANAMAO	NANTES	2,739,065	
July 12th	TENADORES	BREST	211,788	
July 12th	PRES. GRANT	BREST	249,813	
July 21st	DOCHRA	BORDEAUX	2,198,224	
July 21st	AEOLUS	BREST	85,788	
July 21st	PENNSYLVANIA	LA PALLICE	982,658	
July 24th	TOLOA	ST. NAZAIRE	3,503,675	
July 30th	TIVIVES	ST. NAZAIRE	3,399,750	
July 30th	PASTORES	ST. NAZAIRE	480,784	
July 30th	MACCASSIN	BORDEAUX	<u>1,519,009</u>	
		TOTALS	20,368,191	20,368,191

(REPORT B CONTINUED)

REPORT OF FROZEN BEEF RECEIVED DURING MONTHS OF
AUGUST & SEPTEMBER, 1918

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
August 6th	PASSAIC	BORDEAUX	4,940,370	
August 13th	PENNSYLVANIA	LA PALLICE	934,025	
August 12th	TENADORES	BREST	351,690	
August 20th	HERCULES	ST. NAZAIRE	173,379	
August 26th	MUSCATINE	ST. NAZAIRE	4,670,030	
August 26th	AEOLUS	BREST	94,651	
August 26th	OHIOAN	ST. NAZAIRE	<u>1,048,614</u>	<u>12,212,759</u>
	TOTALS	.....	12,212,759	12,212,759
September 7th	PASTORES	BREST	433,969	
September 12th	TENADORES	BREST	284,967	
September 7th	SAGUA	ST. NAZAIRE	3,236,444	
September 8th	PANAMAN	ST. NAZAIRE	999,962	
September 10th	TOLOA	LE HAVRE	3,773,963	
September 19th	DOCHRA	BORDEAUX	2,043,555	
September 29th	AEOLUS	BREST	91,718	
September 22d	MOCCASSIN	NANTES	1,717,352	
September 17th	IOWAN	ST. NAZAIRE	1,141,606	
September 22d	TIVIVES	ST. NAZAIRE	3,409,426	
September 27th	DESNA	ST. NAZAIRE	<u>7,937,648</u>	<u>25,070,610</u>
	TOTALS	.....	25,070,610	25,070,610

REPORT OF FROZEN BEEF RECEIVED DURING MONTH OFOCTOBER, 1918

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
October 2d	ULUA	ST. NAZAIRE	3,841,255	
October 7th	ASCANIA	ST. NAZAIRE	1,320,196	
October 7th	ICE KING	ST. NAZAIRE	4,888,514	
October 16th	CARRILLO	BORDEAUX	3,276,428	
October 14th	SEXAOLA	BORDEAUX	3,874,311	
October 14th	CORONA	BREST	700,572	
October 16th	ULYSSES	ST. NAZAIRE	1,579,697	
October 17th	ARMAGH	ST. NAZAIRE	9,604,391	
October 19th	APPELEO	ST. NAZAIRE	512,376	
October 21st	TENADORES	BREST	270,505	
October 24th	EURIPIDES	ST. NAZAIRE	5,671,566	
October 26th	SAGUA	ST. NAZAIRE	3,144,898	
October 26th	PENNSYLVANIA	LA PALLICE	1,080,605	
October 26th	TANAMAO	BORDEAUX	<u>2,681,995</u>	<u>42,447,309</u>
	TOTALS	.....	42,447,309	42,447,309

(REPORT B CONTINUED)

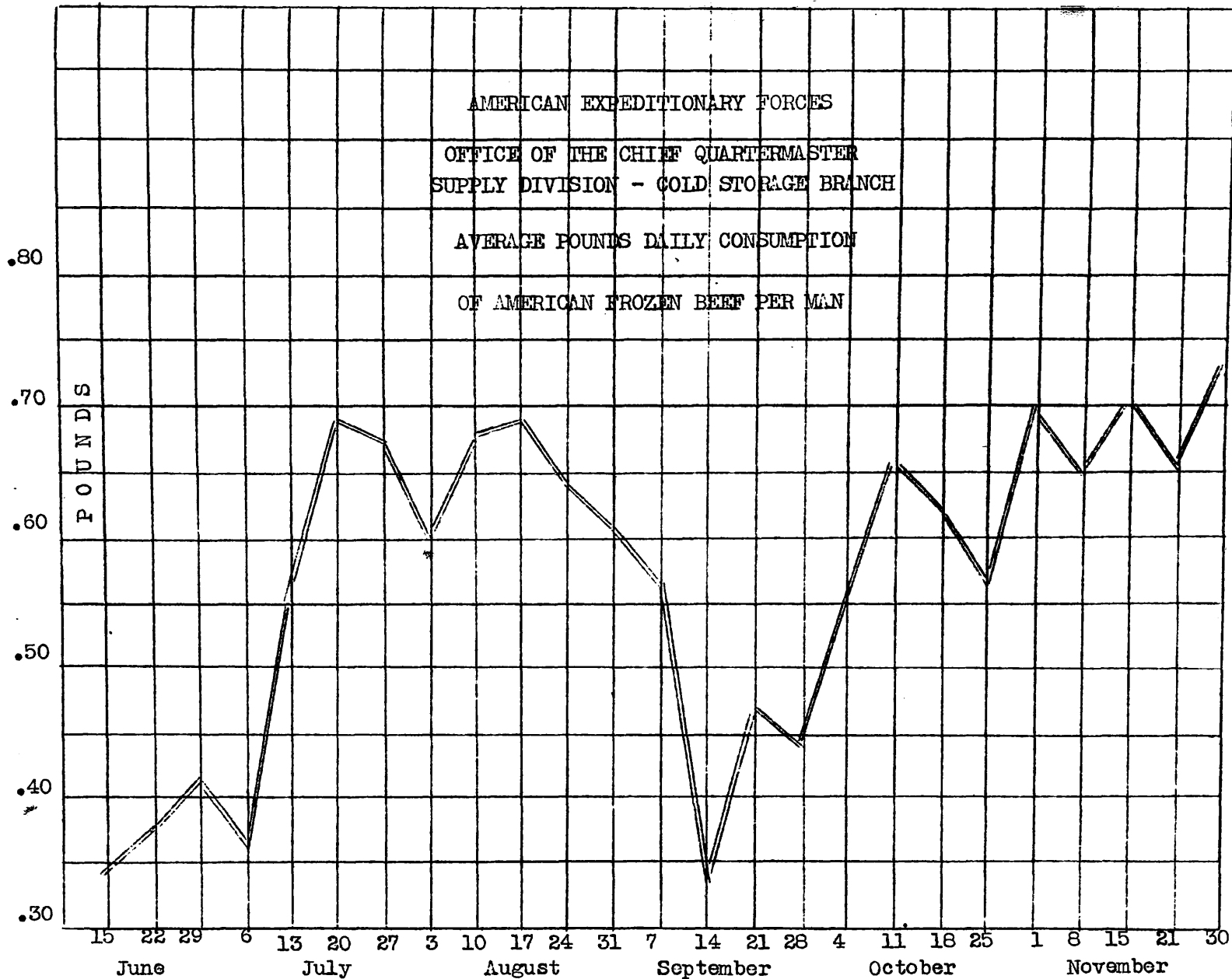
REPORT OF FROZEN BEEF RECEIVED DURING MONTH
OF NOVEMBER, 1918

<u>DATE</u>	<u>NAME OF SHIP</u>	<u>PORT</u>	<u>WEIGHT</u>	<u>TOTALS</u>
November 6th	MONTCLAIR	ST. NAZAIRE	4,472,674	
November 10th	SURINAN	ST. NAZAIRE	1,911,695	
November 14th	OHIOAN	LA PALLICE	1,064,030	
November 14th	ATENAS	BREST	3,182,070	
November 16th	RAPPAHANNOCK	ST. NAZAIRE	2,006,035	
November 16th	MUSCATINE	ST. NAZAIRE	4,631,242	
November 16th	SANTA MARTA	ST. NAZAIRE	3,663,935	
November 18th	PANAMAN	BASSENS	1,084,948	
November 18th	TIVIVES	BASSENS	3,173,534	
November 22d	MATAPAN	BORDEAUX	3,497,093	
November 22d	CALAMARES	BORDEAUX	3,450,721	
November 24th	POLAR SEA	ST. NAZAIRE	3,558,813	
November 25th	ULUA	ST. NAZAIRE	3,222,435	
November 27th	IOWAN	LA PALLICE	1,090,819	
November 27th	TURILLA	ST. NAZAIRE	2,822,776	
November 27th	TURILLA (Bone- less Beef)	ST. NAZAIRE	338,769	
November 27th	TURILLA (Frozen Pork)	ST. NAZAIRE	207,641	
November 28th	DOCHRA	BASSENS	1,842,373	
November 28th	TACAPA	BASSENS	3,020,947	
November 30th	LUELLA	ST. NAZAIRE	4,527,006	52,769,556
			<u>52,769,556</u>	<u>52,769,556</u>

(REPORT C)

FRESH BEEF STATEMENT—November 29, 1918

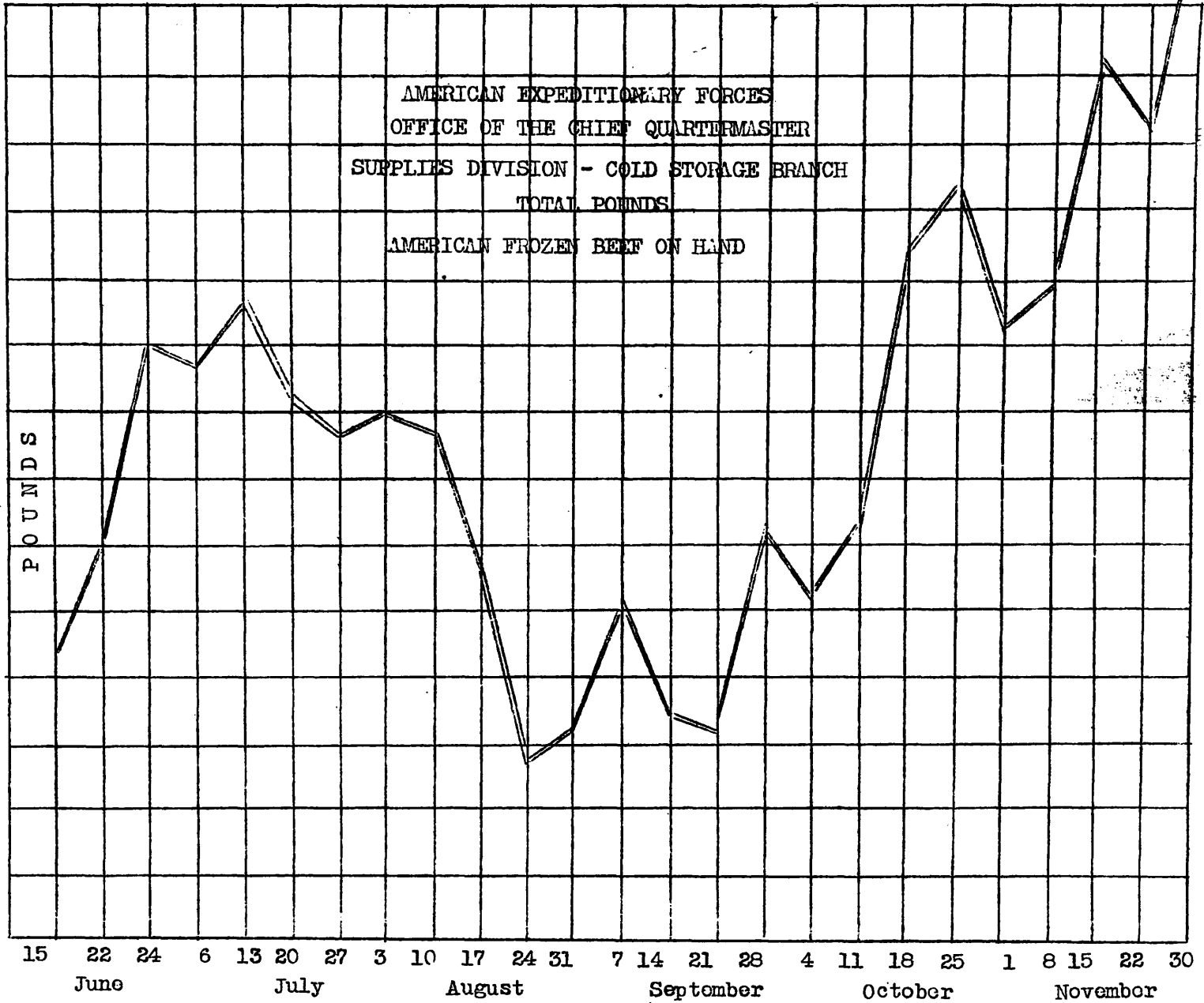
St. Nazaire:McClelland Cold Storage	1,663,490	
S. S. Ulua	4,119,872	
S. S. Polar Sea	533,410	
S. S. Turilba	2,600,000	
S. S. Luella	<u>4,600,000</u>	<u>13,516,772</u>
Paris: Cold Storage	<u>348,702</u>	<u>348,702</u>
Bordeaux: Bastide Cold Storage	4,133	
Arcahon Cold Storage	85,968	
Bassens Plant	3,063,204	
S.S. Carilla	2,800,000	
S.S. Matapan	<u>150,000</u>	<u>6,903,305</u>
Le Havre Cold Storage	78,445	
In transit	<u>146,434</u>	<u>224,879</u>
La Pallice Cold Storage	1,144,356	
S. S. Iowan	<u>619,755</u>	<u>1,764,111</u>
Brest: Cold Storage	<u>518,765</u>	<u>518,765</u>
Tours: Cold Storage	206,059	
In transit	<u>188,681</u>	<u>394,740</u>
Gievres: Cold Storage	5,562,484	
En route from:		
St. Nazaire	830,000	
Nantes	--	
Bordeaux	--	
La Pallice	--	
Brest	<u>--</u>	<u>6,392,484</u>
Toul: Cold Storage En route from		
" Is-sur-Tille	452,587	
Epinal: " " "		
Belfort: " " "		<u>452,587</u>
Dijon—En route from Gievres		563,141
Is-sur-Tille: En route from Gievres		<u>2,790,170</u>
TOTAL	---	<u>33,869,656</u>



6-27-29
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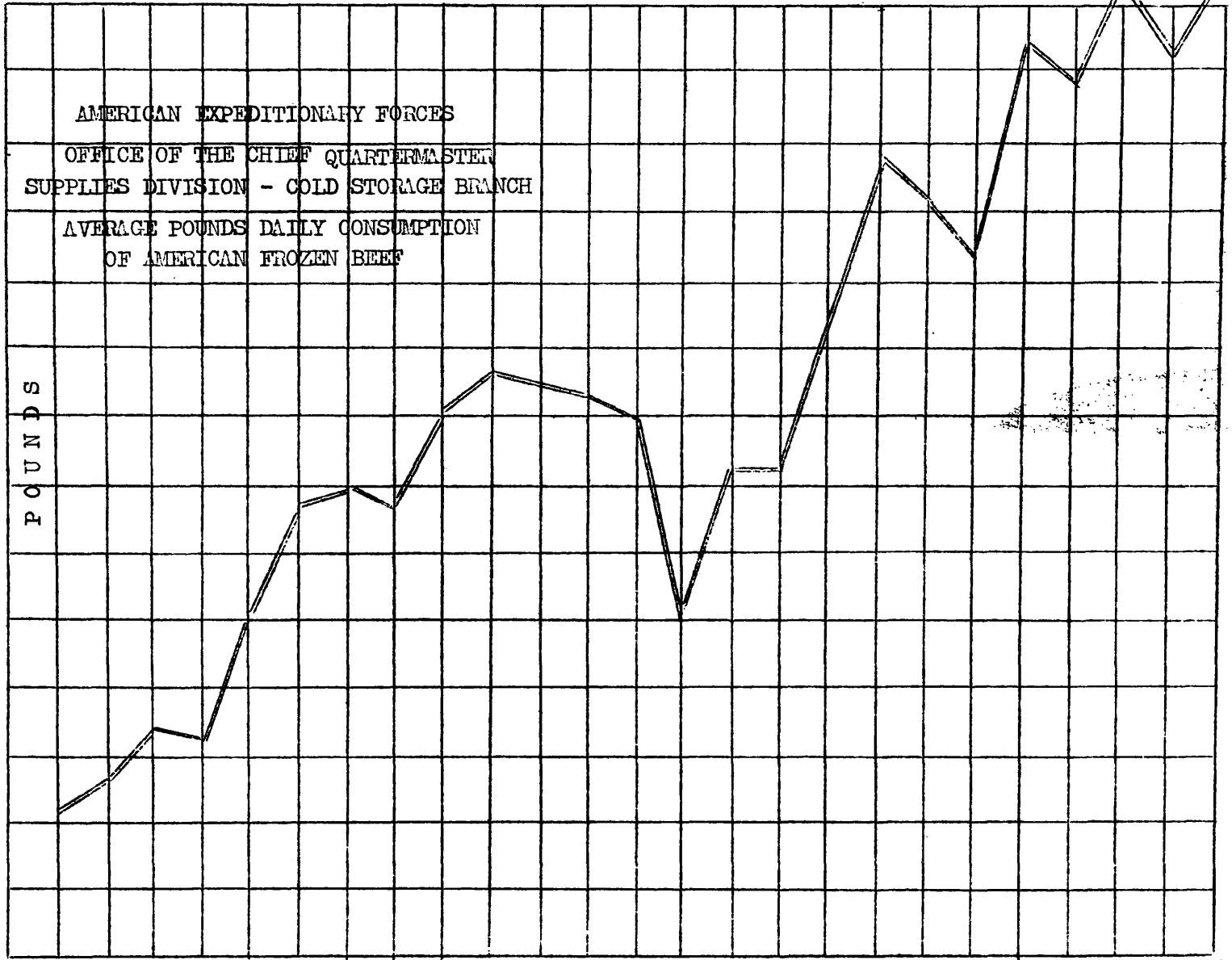
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15 22 29 6 13 20 27 3 10 17 24 31 7 14 21 26 4 11 16 25 1 8 15 24 30
June July August September October November

(REPORT E)

		: AVERAGE TOTAL	: TOTAL POUNDS	: AVERAGE POUNDS
: WEEK ENDING		: DAILY CONSUMP-	: BEEF AVAIL-	: DAILY CONSUMP-
		: TION - POUNDS	: ABLE	: TION - PER MAN:
<u>1918</u>				
June	15	224,000	8,285,000	.34
June	22	266,000	12,148,000	.37
June	29	351,000	18,034,000	.41
July	6	331,000	17,466,000	.36
July	13	516,000	19,491,000	.56
July	20	675,000	16,284,000	.69
July	27	700,000	15,257,000	.67
August	3	675,000	16,134,000	.60
August	10	813,000	15,324,000	.68
August	17	868,000	11,492,000	.69
August	24	850,000	5,560,000	.64
August	31	838,000	6,571,000	.61
September	7	801,000	1,399,000	.56
September	14	501,000	7,020,000	.33
September	21	732,000	6,464,000	.47
September	28	729,000	12,755,000	.44
October	4	950,000	10,231,000	.55
October	11	1,186,000	12,782,000	.66
October	18	1,126,000	21,126,000	.62
October	25	1,045,000	23,134,000	.56
November	1	1,344,000	18,229,000	.70
November	8	1,273,000	19,957,000	.65
November	15	1,429,000	26,295,000	.71
November	22	1,312,000	24,569,000	.65
November	30	1,462,000	33,870,000	.73

(REPORT F)

SEMI-MONTHLY REPORT OF COLD STORAGE AND ICE MAKING FACILITIES

Hq., SOS, Date 1 November, 1918.

LOCALITY	Tons-2000# Ultimate Capacity	Tons-2000# Present Usable Capacity	Percent. Completed	Probable date of completion
Gievres	10,400 : 250	5,200 : 250	60 : 100	2-1-19
Bassens	4,000 : ---	--- : ---	90 : ---	11-15-18
Chatillon- sur Seine	4,000 : ---	--- : ---	--- : ---	---
St. Nazaire	2,000 : 50	--- : ---	15 : ---	1-1-19
St. Nazaire S. S. Mc- Clellan	1,500 : ---	1,500 : ---	100 : ---	---
La Pallice	2,400 : ---	800 : ---	95 : ---	12-1-18
Brest	400 : ---	400 : ---	100 : ---	---
Arcachon	150 : ---	150 : ---	100 : ---	---
Le Havre	120 : ---	120 : ---	100 : ---	---
Bordeaux	100 : ---	100 : ---	100 : ---	---
Tours	200 : ---	200 : ---	100 : ---	---
Dijon	300 : ---	300 : ---	100 : ---	---
Blois	100 : ---	100 : ---	100 : ---	---
Vittel	28 : ---	28 : ---	100 : ---	---
La Rochelle	30 : ---	30 : ---	100 : ---	---
Orleans	2 $\frac{1}{2}$: ---	2 $\frac{1}{2}$: ---	100 : ---	---
Toul	400 : ---	400 : ---	100 : ---	---

(REPORT F CONTINUED)

SEMI-MONTHLY REPORT OF COLD STORAGE AND ICE MAKING FACILITIES

Hq., SOS, Date 1 November, 1918

LOCALITY	Tons-2000#		Tons-2000#		Percentage		: Probable : date of : comple- : tion
	Ultimate		Present Usable		Completed		
	Capacity		Capacity				
	: Cold	: Ice	: Cold	: Ice	: Cold	: Ice	
	: Storage	: Making	: Storage	: Making	: Storage	: Making	
Epinal	1,000	---	1,000	---	100	---	---
Belfort	400	---	400	---	100	---	---
Angers	12	---	12	---	100	---	---
Vichy	32	---	32	---	100	---	---
Bazoilles Hospital	25	1	--	---	85	---	12-1-18
Beau Desert: Hospital	25	1	--	---	0	---	1-1-19
Gd. Blottereau Hospital	25	1	--	---	50	---	1-1-19
Savenay Hospital	25	1	--	---	0	---	1-1-19
Allerey Hospital	25	1	--	---	0	---	1-1-19
Beaune Hospital	25	1	--	---	50	---	1-1-19
Mars Hospital	25	1	--	---	--	---	1-1-19
Mesves Hospital	25	1	--	---	--	---	1-1-19
Rimaucourt Hospital	25	1	--	---	80	---	1-1-19
Perigueux Hospital	25	1	--	---	--	---	1-1-19
Is-sur-Tille Bakery	40	--	--	---	--	---	1-1-19
TOTALS	27,864 $\frac{1}{2}$	310	10,774 $\frac{1}{2}$	250			

Number of refrigerator cars in service this date 910-capacity (beef) 17,190 tons. Probable number of refrigerator cars in service 15 days hence 910-capacity beef 17,190 tons.

SEMI-MONTHLY REPORT OF COLD STORAGE AND ICE MAKING FACILITIES

Hq., SOS, Date 15 December, 1918

LOCALITY	Tons-2000#		Tons-2000#		Percentage		Probable date completion
	Ultimate Capacity		Present Usable Capacity		Completed		
	Cold Storage	Ice Making	Cold Storage	Ice Making	Cold Storage	Ice Making	
Gievres	5,200	250	5,200	250	100	100	--
Tours	200	---	200	---	100	---	--
Blois	100	---	100	---	100	---	--
Orleans	2½	---	2½	---	100	---	--
Vichy	32	---	32	---	100	---	--
Beaune Hospital	25	1	25	1	100	100	--
Allerey Hospital	25	1	25	1	100	100	--
Rimaucourt Hospital	25	1	25	1	100	100	--
Bazoilles Hospital	25	1	25	1	100	100	--
Vittel	28	---	28	---	100	---	--
Toul	400	---	400	---	100	---	--
St. Nazaire S. S. McClellan	1500	---	1,500	---	100	---	--
Savenay Hospital	25	1	---	---	90	---	1-1-19
Gd. Blottereau Hospital	25	1	---	---	90	---	1-1-19
Angers	12	---	12	---	100	---	--
Bassens	4,000	---	4,000	---	100	---	--
Arcachon	150	---	150	---	100	---	--
Le Havre	120	---	120	---	100	---	--
Brest	400	---	400	---	100	---	--
La Pallice	800	---	800	---	100	---	--
TOTALS	13,094½	256	13,044½	---			

Sample of Daily Report received from Cold Storage Plants at Gievres and BordeauxREPORT OF BEEF SHIPMENT

DECEMBER 19, 1918

GIEVRES

		1	2	3	4	5	6	7	8	9	10			
										Time	Started	Finished		
Destination	Kind	Init.	Number	Fores	Hinds	Weight	Shipped	Loading	Loading	Cond.	Sundry			
DQM Issoudun			Truck	25	25	6,665			9:30AM	9:50AM	Good	Domestic		
DQM St.Aignan			"	26	26	7,394			9:20AM	9:40AM	"	Reported by 'Phone to CSB OCQM		
"			"	35	35	9,738			9:00AM	9:20AM	"	Tours, 7:30 AM 12-20-18		
"			"	30	30	8,497			8:30AM	8:45AM	"			
"			"	44	43	11,566			1:50PM	2:20PM	"			
"			"	30	30	8,298			2:15 "	2:30PM	"			
"			"	25	26	6,904			2:30 "	2:50PM	"	Shipped from Stg Temp.		
Post QM Gievres			"		14	1,873					"	Room "C" - 7 degrees above F.		
"			"		12	3,403			12:20AM	11:45AM	"	Room "A" - 15 degrees above F.		
"			"		18	4,830			11:00AM	11:15AM	"			
"			"		11	2,952			1:00PM	1:15PM	"			
A.S.P.C. #2			"		25	6,616			1:30PM	1:50PM	"			
St. Aignan			"		14	3,540			4:20PM	4:40PM	"			
SUBTOTAL				295	305	82,276								
ARO Liffel le Grand	Ref USA	60006		124	123	39,216	11 AM	11:30PM	9:00AM	"				
QM Allerey	" "	60123		113	113	30,330	2 PM	9:00PM	11:30AM	"				
"	" "	60176		116	113	30,555	" "	9:00PM	12:00AM	"				
ARO St Dizier	" "	60842		141	140	38,065	9 PM	9:30PM	2:00PM	"				
"	" "	60845		138	137	38,151	" "	11:40PM	2:15PM	"				
"	" "	60570		142	142	38,005	" "	10:15PM	2:10PM	"				
"	" "	60759		139	139	38,049	" "	2:30PM	5:00PM	"				
"	" "	60287		121	121	33,022	" "	1:00PM	4:30PM	"				
"	" "	60706		137	137	38,018	" "	1:15PM	4:30PM	"				
"	" "	60094		120	121	33,137	" "	1:15PM	4:35PM	"				
"	" "	60762		141	140	38,570	" "	2:15PM	6:00PM	"				
SUBTOTAL				1432	1426	389,118								
DQM Dijon	Ref USA	60189		96	96	26,948	Loaded	4:20PM	8:00PM	"				
"	" "	60609		30)	30)	8,029	for	4:45PM	8:30PM	"	SALVAGE BEEF			
				73)	73)	19,921	shipment							
				199	199	54,898	12-20-18							

7-3-29

QMCS-I-14-alc

REPORT OF BEEF SHIPMENT

DECEMBER 19, 1918

GIEVRES

Destination	Kind	Init.	Number	Fores	Hinds	Weight	Time Shipped	Started Loading	Finished Loading	Cond.	Sundry	
QM Verneuil	Ref	USA	60290	109	110	30,187	12-20-18	7.40PM	9.45 PM	Good		
RHO.Pacy sur Armoncon	"	"	60930	131	130	35,054	"	5.45 "	9.10 "	"	"	
QM Bourges	"	"	60763	87	86	23,989	"	5.20 "	9.40 "	"	"	
PQM Mehun	"	"	60720	108	109	30,074	"	8.35 "	10.45 "	"	"	
ARO Liffol le Grand	"	"	60621	125	127	35,060	"	4.40 "	8.20 "	"	"	
" " " "	"	"	60467	124	124	33,170	"	9.30 "	11.40 "	"	"	
" " " "	"	"	60020	125	127	33,408	"	10.00 "	11.50 "	"	"	
" " " "	"	"	60848	128	127	35,198	"	9.05 "	12.00 "	"	"	
" " " "	"	"	60345	122	120	33,085	"	10.15 "	12.50 "	"	"	
" " " "	"	"	60675	131	132	35,103	"	10.30 "	12.30 "	"	"	
Post QM Nevers	"	"	60902	147	146	39,872	"	10.00 "	12.10 "	"	"	
GRAND TOTAL				3263	3264	890,492						

GIEVRES

RECAPITULATION

DECEMBER 19, 1918

		<u>RECEIPTS</u>		WEIGHT	FORES	HINDS	WEIGHT
BONELESS MEAT	BOXED CUTS	BOXED CUTS	BOXED FORES	BOXED HINDS			
Receipts previously this month			3397	2941			653,916
FROZEN BEEF QUARTERS		FORES	HINDS				WEIGHT
Receipts this date		344	230				77,192
Receipts previously this month		46,195	47,033				13,840,245
Total receipts to date this month		46,539	47,263				14,571,353
Yearly receipts to Dec.1,1918		387,557	383,392				112,643,364
Yearly receipts to date							433,296 430,655 127,214,717
		<u>SHIPMENTS</u>					
Shipments this date		3,263	3,264				890,492
Shipments previously this month		41,084	41,242				12,063,759
Total shipments this month to date		44,347	44,506				12,954,251
Yearly shipments to Dec.1,1918		368,467	365,185				107,480,632
Yearly shipments to date							412,814 409,691 120,434,883
BALANCE IN STOCK THIS DATE							21,482 20,964 6,779,834
BALANCE BONELESS MEAT IN STOCK THIS DATE (Included in Grand Total)							632,718

Receipts previously this month	Boxes	Molds	Weight
BEEF LIVERS	1,366	9	80,964
BROILERS	454		15,868
PORK LOINS	439		30,533
OX LIVERS	282		16,603
KIDNEY KNOBS	546		23,329
PORK SHOULDERS	3,764		380,987
RIB SHOULDERS (DRY SALT)	55		13,843

From: C.O. Butchery Co. No.310,A.P.O. 784, A.E.F.
 To: Chief Quartermaster, A.E.F. Date December 18, 1918
 Subject: BEEF REPORT No 45

RECEIPTS

		CAR		NUMBER			
SHIPPED FROM:	KIND:	INITIAL:	NUMBER:	FORES:	HINDS:	WEIGHT:	CONDITION:
Is-sur-Tille:Ref.:U.S.A.			60557	121	130	32882	Frozen
Is-sur-Tille:Ref.:U.S.A.			60344	115	92	28888	Frozen
Is-sur-Tille:Ref.:U.S.A.			60283	113	119	31209	Frozen
Is-sur-Tille:Ref.:U.S.A.			60217	100	103	29743	Frozen
				449	444	122722	
RECEIPTS FROM FRENCH							
TOTALS							

SHIPMENTS

DESTINATION	VIA*	INITIAL	NUMBER	FORES	HINDS	WEIGHT	CONDITION
Railhead	Truck			69	72	18945	Frozen:459
Railhead	Truck			45	44	11525	Frozen:460
Sales Com.							
2d Army	Truck			4	10	1865	Frozen:443H
Justice Hosp	Truck			35	32	9051	Frozen:444H
Sales Com.							
1st Air Dcp.	Truck				1	122	Frozen:454C
				153	159	41508	
SHIPMENTS FROM FRENCH							
TOTALS							

	RECAPITULATION	FORES	HINDS	WEIGHT:
Stock on hand at close of previous day...		2355	2261	555597
Shipments		153	159	41508
Receipts		449	444	122722
Balance		2631	2546	736811
Total shipments to date		22756	23511	6266477
Total receipts to date		25407	26057	7003288

* Show whether by Box, Refrigerator, Peddler Car, Truck or Grand Vitesse.

2d Lieut., Q.M.C.

SHIPMENTS TO CONSUMPTION

TEN DAY PERIOD ENDING _____

<u>DATE</u>	<u>B.S.#1</u>	<u>B.S.#2</u>	<u>B.S.#4</u>	<u>B.S.#5</u>	<u>B.S.#7</u>	<u>INTER</u>	<u>PARIS</u>
Dec. 1	118,525	55,820	1,344	28,282		165,415	
Dec. 2	275,329	153,753	15,890	36,561	17,493	192,277	29,285
Dec. 3	195,533	130,244		54,566	11,066	229,700	31,872
Dec. 4	136,549	193,151	10,842	49,202	12,100	102,779	31,517
Dec. 5	329,039	114,982	642	52,071	11,602	208,878	11,465
Dec. 6	213,861	130,197	466	37,231	16,541	231,719	23,346
Dec. 7	238,434	162,689	16,018	40,877	16,081	396,403	42,716
Dec. 8	84,288	35,350	544	34,537		294,434	26,480
Dec. 9	46,545	136,535		31,720	11,716	329,115	27,718
Dec. 10	559,264	120,373	282	54,951	10,086	174,231	30,000

<u>ADVANCE</u>	<u>TOTALS</u>
894,785	1,264,171
979,230	1,699,819
479,785	1,132,766
1,161,084	1,697,224
584,646	1,313,325
912,103	1,565,454
642,545	1,555,763
970,232	1,445,865
840,540	1,423,889
1,416,931	2,366,118

REPORT OF CONVOYER OF MEAT SHIPMENT

Report No. 7

Left Loading Track at GIEVRES 7:30 P.M. Oct. 23, 1928
Station Hour Date

Arrived at Unloading Track at IS-SUR-TILLE 2:A.M. Oct. 26, 1928
Station Hour Date

Condition of Beef at Destination: Frozen

Started on return trip at 6.15 P.M. Oct. 27, 1918
Hour Date

Empty refrigerator cars delivered to loading track at:

GIEVRES 11.50 P.M. Oct. 31, 1918
Station Hour Date

<u>CAR</u>		<u>CAR</u>		
1 Initial		11 Initial		Number
2 USA	60235-60896	12 USA		
3	60517-60752	13 60534-60847		
4	60054-60832	14		Empties
5	60283-60414	15 USA		60253
6	60257-60681	16		60073
7	60349-60299	17		60793
8	60713-60620	18		60828
9	60833-60391	19		60800
10	60538-60034	20		

DELAYS IN TRANSIT -(Loaded & Empty Cars)

<u>Arrival</u>			<u>Departure</u>			<u>Cause</u>	<u>Action Taken</u>	<u>See Note</u>
<u>Station</u>	<u>Hour</u>	<u>Date</u>	<u>Hour</u>	<u>Date</u>				
Is-sur-Tille	5 PM	10/25	1 AM	10/26	Unloading and reconsign		(a)	
Perrigny	10 PM	10/27	11 AM	10/29	ing. Making up train		(b)	
Vierzon	12 AM	10/30	5 PM	10/31	R.T.O.		(c)	
							(d)	

Note (a) In Is-sur-Tille waited until cars were moved to unloading
 " (b) Had to wait for enough cars to make up train. track
 Yards blocked.
 " (c) Had to wait until train was made up.
 " (d)

Remark No. 1
Remark No. 2
Remark No. 3

Signed _____
Convoy

ORIGINAL COPY TO BE SENT
TO CHIEF QUARTERMASTER.

COMMENTS ON BEEF SUPPLY, A.E.F.

A Separate Refrigeration Section -

Considering in order the different phases of the beef supply for the A.E.F., attention is first turned to the steps taken in Washington to comply with the request from the Chief Quartermaster, A.E.F., for cold storage facilities. As stated in the accompanying notes, this project was referred to The Quartermaster General, and it is felt that at this point much was done to assure the ultimate success of the work by the establishment of a separate Refrigeration Section in the Cantonment Construction Office, the function of this section being to supervise preparation of detailed plans, fabrication and shipment of materials and equipment, and the employment or enlistment of qualified personnel for the construction and operation of the project.

Although covered by one general contract, materials and equipment were obtained from some twenty-five different points. An inspector was assigned to each plant from which the major items were being obtained. These inspectors sent daily telegrams to the Refrigeration Section, stating the exact progress made that date. This information was recorded on a large progress sheet on one of the walls of the Refrigeration Section's Office, where it could always be quickly and readily inspected by everyone concerned. Immediate assistants of the officer-in-charge of the Refrigerating Section were dispatched to speed up the work at those plants showing a tendency to lag.

As a further and very important means of expediting the work, the general contractor was required to move to Washington all his engineers and draftsmen engaged on this work. These were established in the Refrigeration Section and in this manner the entire direction of the work was concentrated in one office, thus avoiding the delays otherwise always experienced in correspondence and in the correction and ok'ing of drawings.

Shipments and their Identification -

It was early appreciated that the ultimate success of the undertaking would be largely dependent upon the care taken in the packing and marking of the various items and the means provided to identify and locate the component parts of the project. Each package was prominently marked in large letters "ICE PLANT" and bore a serial

number and an index letter, the latter indicating the plant from which shipped. Detailed lists were prepared for each shipping package, these being distributed as follows:

One copy attached to package, usually by covering with a piece of tin and securely nailing to packing box.

One copy to Embarkation Officer.

Two copies to Engineer Officer in charge of work in France.

One copy for Refrigeration Section.

As these packing lists comprised approximately 1,000 sheets, an index was prepared which consisted of a grouping of the various parts of the plant together with number of the packages containing corresponding equipment. For example, valves for various purposes might for convenience be packed in the same box and if so the index would show that box number after each of the various groupings affected, such as "Boiler Feed Water Lines", "Main Steam Headers", etc.

By reference to these packing list and index lists, it was possible for the Superintendent of Construction in France to arrange material as unloaded in a systematic manner. The importance of this will be appreciated when it is remembered that ordinarily material is delivered to a construction job as it is required but this was out of the question on account of transportation considerations and the best that could be done was simply to get everything on the job as quickly as possible. These methods proved very successful and it was a source of both gratification and surprise that with one minor exception nothing went astray.

Personnel and Equipment for Erection -

The general contract did not include any work of erection, only materials and equipment f.o.b. plant of manufacture, so that it was necessary to ship to France not only personnel for erection but all necessary erecting tools, such as concrete mixers, wheel barrows, bilge pumps, power saws, surveying instruments, pipe fitting tools, as well as fairly complete machine shop equipment. Each civilian carpenter employed was

required to have and to take with him a full set of carpenter's tools.

As stated in the notes, a total of 260 civilians were employed for construction of this first cold storage plant. The advisability of employing these civilians was given very careful consideration and the decision to do so was largely influenced by the fact that mechanics, having desired qualifications, were mostly older men not included in the earlier draft. Except for the expense involved, no very serious objections developed to this employment of civilians. Such might not have been the case but for the care taken in the selection of the individuals employed. These men were not furnished through employment agencies but were personally selected by several former construction superintendents and foremen employed by the Refrigeration Section.

A separate contract setting forth all the terms and conditions of the employment was entered into with each man engaged. Since no form of contract could be found for the employment of civilians in the theater of operations in time of war, a form for this purpose was drawn up by the Refrigeration Section and after approval was printed. This form proved satisfactory and was found to cover adequately the numerous questions relative to the employment of these civilians which arose from time to time.

As stated in the notes, this civilian construction personnel was augmented by detachments of Engineer troops when such troops were occasionally available and later by Ice Plant Co. No. 301 consisting of 15 officers and 335 enlisted men. The civilians and enlisted men often worked together on much the same job, and very naturally this was not conducive to the best morale of the soldiers since the civilians received so much greater pay. Taking into consideration all conditions existing during the summer and early fall of 1917, it is thought that this employment of civilians for service with the A.E.F. was justified but that everything possible should be done to make such action unnecessary in any future case.

Construction Materials -

One of the very first problems to be decided by the Refrigeration Branch was the type of construction to employ, particularly whether this was to be fireproof. Originally only one plant was contemplated and a strong argument in favor of fireproof construction was the possible concentration in this one plant of nearly all the reserve beef supply of the A.E.F. The decision to use wood in the face of this strong argument for steel and concrete construction was the reluctance to withdraw from other channels the amount of steel required for this plant and also to the lack of information as to the availability of satisfactory concrete materials at the plant site.

Having taken the decision to use wood, various steps were taken to reduce the fire hazard. The main meat storage building, as well as the power house and other buildings, were completely covered externally, both roof and sides, with granite coated roofing, which was considered effective fireproofing. An approved system of fire mains was provided having hydrants properly located with respect to all portions of the project. Hand operated chemical extinguishers were liberally provided. Numerous hose reels, also hose carts, and several large chemical extinguishers on trucks were also furnished.

Fire hazard from four sources was recognized including electric wiring, smoking, spontaneous combustion, and incendiarism on the part of enemy spies. The electric work was put in open as this has been found more suitable for freezer buildings than conduit work, but the specifications were rigidly drawn and everything done to insure a high class job. Only thoroughly experienced electricians were used on this work. Smoking was rigidly prohibited anywhere in the vicinity of the project. To enforce this rule, as well as guard against spontaneous combustion and incendiarism, thirty men were carefully picked from Ice Plant Co. #301 and assigned to permanent guard duty. As a further precaution, fire drills were participated in by the entire personnel at the project both military and civilian.

Having decided on wood construction, there still remained the major problem of determining the kind of insulation to be used and its source of supply. Some

sixty-five carloads of wood shavings in bales were shipped for this purpose. These bales were not well secured with the result that there was considerable wastage in shipment, also considerable annoyance caused at ports of embarkation and debarkation. In view of experience with the first plant at Gievres, no shavings were shipped for the other plants but machinery was furnished for manufacture of shavings from rough lumber to be obtained locally. However, before the second plant was built at Bassens, there was located at Lavardac, south of Bordeaux, an old cork plant. A detachment was sent to operate this plant and with only a very little delay sufficient cork was furnished for insulation of the Bassens' plant. Corkboard, with insulating paper, was used for floor and ceiling and granulated cork with insulating paper for the walls.

Where the availability of insulating materials is not known, it is considered that the best plan in any future case will be to ship machinery for production of shavings from any form of wood to be obtained locally. For the short time that a refrigerating plant is likely to be used by an expeditionary force, shavings properly used will provide thoroughly satisfactory insulation. In fact, no appreciable difference was noted in the amount of refrigeration required for similar space in the shavings insulated Gievres plant and in the cork insulated Bassens plant.

Design of Plant -

Possibly even more important than the question of choice of construction materials, was the problem of plant arrangement. The plan adopted provided for a long narrow single story structure, the dimensions of the cold storage building at Gievres being 110 feet wide by 896 feet long. Docks at floor level and railroad sidings extended the full length on each side. The floor level above railroad tracks was set to correspond to car door level. As it was contemplated to handle only frozen beef quarters, no rails were provided but instead there were furnished flat hand trucks to be used for handling the meat to and from the storage rooms where it was piled on wooden mats to within a few inches of the overhead ammonia pipes. Failure to provide rails was the subject of some unfavorable criticism but there is no doubt that the practice actually followed was thoroughly satisfactory. As an illustration of the great handling capacity provided it may be cited that

the incoming and outgoing shipments at the Gievres plant reached a total of 3,600,000 lbs. frozen meat in one day. To avoid traffic congestions when loading and unloading large quantities of beef, a system of arrows was devised to direct traffic which greatly simplified supervision since each man knew in just what direction he was to move when his truck was loaded.

The capacity of the Gievres plant was rated at 5,200 tons of frozen meat in quarters, but this was based on a liberal allowance for trucking ways in accordance with the commercial practice, which thus makes it possible to ship from any desired portion of the stock. Under the conditions at the Gievres plant, there was no objection to the omission of most of these passageways with the result that at one time when beef arrivals were temporarily much larger than consumption, a total of 8,500 tons of frozen beef in quarters was stored in the Gievres plant.

Function of the Cold Storage Plants -

The plant at Gievres served three separate purposes as follows:

- (1) Means to re-freeze and sub-chill shipments from refrigerator ships and from the Base Section cold storage plants.
- (2) A reservoir to make possible regular supply to the A.E.F. as obviously refrigerator ships travelling in convoy could not possibly furnish a regular supply.
- (3) A supply point close enough to the advance section to minimize transportation irregularities. .

It is difficult to over-state the importance of the re-freezing and sub-chilling at Gievres. By the latter is meant the practice referred to in the cold storage plant notes of making shipments from Gievres out of a temperature of 0°F. This made the use of ice unnecessary. This practice was facilitated by the comparatively cool summer weather of France. It was found that when opened in the Advance Section seven days after being loaded from Gievres, meat would be in perfect condition. It was unfortunate that the

feasibility of making shipments in this manner without ice was not appreciated sooner as the 500 ton ice plant originally called for from the A.E.F. was completed but never used. It was originally thought that the Gievres plant would be called upon for large quantities of ice by the base hospitals but such demand never developed and what demand arose was supplied by the installation at the principal base hospitals of small ice machines having capacity to chill a room holding about 25 tons of beef and at the same time furnish about two tons of ice a day for the hospital requirements.

The first two functions of the Gievres plant also applied to the Bassens plant. In addition, the Bassens plant assured prompt unloading of vessels at that port without respect to the transportation facilities available to handle the cargo. The temperatures carried on the refrigerator vessels were usually rather high, which made it desirable to re-freeze and sub-chill shipments arriving at Bassens before forwarding to Gievres.

The function of the refrigerator ship, the McClelland, in the basin at St. Nazaire, was mainly to supply the troops of that Base Section, although it served to increase the total beef reservoir. In general, beef cargoes arriving at St. Nazaire were rushed to Gievres for re-freezing and sub-chilling.

The function of the Brest plant was entirely to supply local troops mainly from excess supplies carried by incoming troop ships and by cargo vessels having comparatively small refrigerator compartments.

Control of Beef Distribution -

The regulation of beef distribution by the Cold Storage Branch is fully described in the accompanying notes. Consideration was at one time given to a suggestion to handle beef supply with other items of subsistence, but it was realized that entirely different problems were presented in handling such a perishable product as frozen meat and it was deemed advisable to have this specialized work supervised entirely by men devoting their entire time and thought to it and who were especially qualified by previous experience for such duties. That this was a wise decision is borne out by the reports of the divisional

boards appointed after the armistice to report on all matters of supply during the campaign. The reports of the divisions of the Third Army were particularly noted and in every case these reports were very favorable as regards beef supply. The beef distribution system functioned without any serious hitch except for about one week in September, 1918, when available supplies ran low necessitating a temporary reduction in the fresh meat ration component.

The distribution of large quantities of meat without ice and with negligible losses was made possible by the convoy system described in the accompanying notes. It is stated as a positive fact that the satisfactory results obtained would have been absolutely impossible without convoys, due of course very largely to the condition of the French transportation system at the time.

A useful device employed by the Cold Storage Branch for quickly estimating the existing state of beef supply consisted of a large map on which were drawn circles at each cold storage point, the area of the circles being in proportion to the total storage available. These circles were colored red and superimposed on them were disks of the same size but colored blue. Both circles and disks were slotted at one point from center to circumference and were mounted so that the disks could be revolved to show any desired portion of the area as either red or blue. The portion shown as blue represented tons of beef in storage and the red portion empty storage space. The disks were adjusted daily based on telegraphic reports and in this manner the exact situation could at all times be seen by a glance at this map.

The 950 American refrigerator cars were indispensable to successful beef supply. At first these cars were assembled with ice bunkers but this practice was later discontinued in view of the satisfactory results being obtained with shipments in the insulated cars without the use of ice.

Deboned Beef -

Experience with deboned beef is fully described in the notes. Beef shipped in this manner requires only 40% of the storage space required by beef in quarters and proved thoroughly satisfactory. The officer in charge of the cold storage branch personally interviewed many mess sergeants in the advanced areas

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after they had been supplied with deboned beef and found that these men almost invariably favored the deboned beef, the only criticism ever offered being that they missed the bones for soup making. As this is not considered a serious objection and as deboned beef is so desirable in all other respects, it is thought that the plans for meat supply of any future expeditionary force should be based on deboned beef.

SIGNAL CORPS PICTURES OF ICE AND COLD STORAGE PLANTS, A. E. F.

- 10099 Ice and cold storage plant, general intermediate storage depot No. 2, from water tower in northeast corner of plant.
- 10100 Same as 10099.
- 10101 Beef storage house at ice and cold storage plant, Gievres, France.
- 10102 Ice storage and freezing buildings, boiler and engine room, Gievres, France.
- 10103 Smoke stacks, steel framework, brick foundations, and materials for construction of boiler and engine room, ice plant, Gievres, France.
- 10104 Same as 10103.
- 10105 Boilers from America in position at ice plant. Gievres, France. Mar. 3, 1918.
- 10106 Interior of freezing room, ice and cold-storage plant, Gievres, France.
- 10107 View from west end of ice plant, showing meat-storage and freezing buildings, Depot No. 2, Gievres, France.
- 10108 Same as 10107.
- 17648 Ice plant, which is the third largest in the world. Supply Depot, Gievres, France. July 25, 1918.
- 20072 An ammonia compressor at the great ice plant, Gievres. The entire plant, one of the largest in existence, was brought over and constructed by Americans.
- 20154 Refrigerating plant at Gievres.
- 36236 Bird's-eye view of storage yards and warehouse at ice plant, Gievres, France, December 2-6, 1918.
- 36237 Power plant and condensers, Gievres, France, Dec. 2-6, 1918.
- 36238 Beef storage, showing railroad cars and portion of power plant, Gievres, France, Dec. 2-6, 1918.
- 36253 Engine Room, Gievres, France, Dec. 2-6, 1918.
- 36263 Boiler room, Gievres, France, Dec. 2-6, 1918.

- 39506 Rear of cold storage plant at Gievres, France. This plant covers $2\frac{1}{2}$ to 3 acres and was built on a site which in January, 1917, was forest of pine trees. Plant comprises boiler room of 2700 boiler horse power and engine room of 2000 engine horsepower and furnished electric light for ice plant, enlisted men's quarters and neighboring quarters. Plant uses 20 tons coal per day. Nov. 30, 1918.
- 39507 Quartermaster refrigerating plant, southeast end, showing four low pressure, pumps and large concrete water reservoir for use in case of break down in pumping and for fire purposes. Gievres, France, Nov. 30, 1918.
- 36508 Quartermaster refrigerating plant with two 450 and two 200 ton ammonia compressors. Showing one of four electric generators for lighting of entire camp. Gievres, France. Nov. 30, 1918.
- 36509 Engine room of Quartermaster power plant, two 200 ton, three 300 ton compressors and lighting generators. First concrete was poured for construction of this plant on Dec. 6, 1917, and the plant was in operation early in May 1918. Gievres, France, Nov. 30, 1918.
- 39510 Feed water heaters and boiler feed pumps. Gievres, France, Nov. 30, 1918.
- 39512 Loading platform on south side of Quartermaster cold storage house. U.S. Army refrigerator box cars having capacity of 42,00 pounds are placed on sliding from main line of railroad. One of these cars can be loaded in two hours, and with a force of 12 men, - four men in car, 4 in freezer, 2 handling trucks, 1 checker, and 1 man stationed to open and close door of cooler. Nov. 30, 1918.
- 39513 All American refrigerator beef train standing by power station of Quartermaster cold storage plant. These cars were shipped from America in sections and assembled in France. 950 of these cars are in use in Quartermaster Corps of A.E.F. in transportation of frozen beef. Gievres, France, Nov. 30, 1918.
- 39532 Ammonia condenser of cold storage plant. Gievres, France, Dec. 1, 1918.
- 39534 Roof of refrigerating plant, showing length of beef storage house. Gievres, France. Dec. 1, 1918.
- 49717 Cars on ice plant spur waiting to be loaded. Gievres, France, Jan. 12, 1918.
- 23217 Refrigerator Plant under construction Bassens Docks, Bordeaux, France. Aug. 24, 1918.

23218 Another view of Same.

- 23219 Huge water tank to be used for cooling at the Refrigerator plant. Basens Docks, Bordeaux, France. Aug. 24, 1918.
- 23220 Placing the four 200 horsepower boilers into position. Bassens Docks, Bordeaux, France. Aug. 24, 1918.
- 23221 Three 250 horsepower engines will operate this plant. Bassens Docks, Bordeaux, France. Aug. 24, 1918.
- 23222 View of refrigerator plant and artesian well with storage tank of 50,000 gallons. Bassens Docks, Bordeaux, France, Aug. 24, 1918.
- 40311 Refrigerating plant at Bassens, Bordeaux, France.
-