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R52-1
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military rations:

"C" STANDS FOR COMBAT

Because today's foxhole-digging soldier or marine fights more as an individual than his World War I counterpart of the trenches, and since his battleground may be an arctic or desert waste barren of any food supply, it is essential that good food substantially packaged for individual use be provided him. The ration developed to meet the peculiar feeding situations impressed upon the fighting man by modern warfare, the famous "C-ration," fulfilled its task admirably in World War II, contributing much toward Allied victory. In an improved version, it is continuing to serve in Korea. The brief story of the C-ration on the following pages provides the reader with a typical example of the continuing process of ration development and improvement conducted by the Armed Forces. It must, of course, be added that the story of the C-ration is necessarily incomplete, for as methods of warfare change the ration will also continue to change . . . or it will give way to another as yet undeveloped ration better suited to the new conditions. Constant surveillance of the ration from the user's point of view, as indicated in the article, has made it possible thus far to keep the C-ration as up-to-date as any other modern "weapon" of war.

historical background

The need for a "combat" ration for the subsistence of the American soldier operating away from normal field ration supply lines was recognized as early as pre-Revolutionary War days when military action was closely akin to the guerrilla type of warfare. In 1759, for example, when Roger's Rangers stalked the wilderness and were isolated from their sources of supply for periods of several weeks, each man carried a bologna sausage and a bladder of corn meal as insurance against a scarcity of game on the trail. The chief virtue of this ration was doubtless its comparatively high stability.

Even as late as World War I, however, relatively little progress had been made in the development of a palatable special combat-type

ration. The one combat ration available throughout the war, named the Reserve ration, consisted of canned corned beef, and packages of hard bread, sugar, coffee, and salt. Based mainly on Army experience in the Civil and Spanish-American wars, this ration was "reserved" for use only if supply lines failed or were outdistanced by the troops. It was doubtless well named; no one used it unless he had to. Fortunately, there was no continuous need for the ration. Before World War I had advanced very far, the action had resolved largely into trench warfare and artillery duels from fixed positions. It was therefore possible to establish kitchens far up front and to employ large-unit type feeding of hot meals comparable to those prepared from the present-day A- or B-

ration. In consequence, there was little call for the Reserve ration. World War I ration theories continued to prevail after the war—in fact up to 1936—and the Reserve ration was left largely intact. No revision was suggested (at least not very vigorously) since the entire problem was considered largely academic in nature.

By 1938, however, there was a growing realization that “the next war” would probably be highly mobile as well as global—which altered the entire concept of feeding soldiers in the field. Ration design took a new turn, and, after much high-level planning the QM Subsistence Research Laboratory presented the forerunner of the C-ration as a possible “modern combat ration.” A new era in ration development had begun and the “carry-out” ration, so to speak, came into its own. The emphasis was on the adaptation of feeding to “fluid” as opposed to static warfare; characteristics of the so-called fluid warfare were high mobility and a swifter pace than was ever dreamt of in World War I. The thinking was no longer academic. When the opening gun-fire announcing World War II was heard in September 1939, it was very realistic indeed.

prototype of the present c-ration

In designing the prototype of the C-ration, the planners had little more to go on than the mere definition of their objective, namely: TO PROVIDE THE SOLDIER WITH A READILY CARRIED RATION WHICH HE COULD USE IN COMBAT, INDEPENDENT OF OUTSIDE SOURCES OF SUPPLY AND OF CENTRAL PREPARATION FACILITIES. The first ration of the C-type which received tentative approval of the three Services and the QMC Technical Committee was the Combat-Reserve ra-

tion, consisting of three cans of meat product. It was soon evident, however, that the three-can unit could not possibly provide sufficient calories, and a six-can combination including three meat units and three bread units containing biscuits, loaf sugar, and soluble coffee was substituted. Although the revised ration also contained a serious calorie deficiency, the main lines for future development were at least projected. This ration had stability, but palatability was by no means neglected.

After having passed through its initial in-use tests successfully, if not gloriously, the C-ration was brought back into the Laboratory for re-evaluation. In October 1938 the Laboratory proposed that the ration be revised to consist of six rectangular 12-oz. cans—three meat and vegetable components and three bread-type units containing bread, sugar, and coffee. This, quite obviously, was a complete meal pattern. Caloric value was 3348.

In June 1939, again on the basis of user tests, the Laboratory submitted a comprehensive report on the new ration to OQMG. It was now recommended that a 16-oz. round-type can be used in place of the less commercially-practicable rectangular product, and that meat components of the Laboratory's own design be substituted for the commercial canned meat-and-vegetable products which were not meeting the severe requirements of the field. The caloric value of the ration as now proposed was materially increased—to 4437, in fact.

By September 1939, the month war broke out, an OQMG sub-committee whittled the suggested meat components of the new ration down to three (beef stew, pork & beans, and meat hash), substituted a single type of biscuit for the three types recommended earlier, standardized the key-opening round cans, and

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designated the ration as Field Ration, Type C. The modifications were largely dictated by manufacturing considerations and the necessity for simplifying procurement to assure speedy acquisition in quantity. Here again we have a rather new note in ration development—the awareness of the need to consider manufacturing feasibility.

first procurement

The C-ration was adopted and standardized on 7 November 1939, and procurement was initiated for extensive field tests involving six divisions of troops. While this reversed the usual procedure—field test; user test; standardization; procurement—in this instance a ration of the “C”-type was so obviously needed and the ration as formulated seemed so promising in design that the procedure was expedited in the interest of an early large-scale trial.

As a result of the first extensive tests and the suggestions derived therefrom, the cans were reduced in size from 16 to 12 ounces, the number of biscuits reduced from nine to six, and a one-ounce chocolate bar added to the B-unit. While it was realized that greater variety was desirable in the meat items, procurement, as mentioned, had to be confined largely to items which could be obtained in great volume. It was also necessary to utilize as many sources as possible and that meant sticking close to the familiar items—those already established in commerce. The first large-scale procurement of the C-ration was begun in August 1941. Granted that the ration has been improved markedly in the years following the outbreak of war, notably, perhaps, in variety and palatability, it may be said that the C-ration as we now know it officially began its service career with this 1941 procurement.



When a fighting man is hungry, even cold C-ration is a welcome meal.

field-testing the c-ration

It was mentioned above that the C-ration, like all other rations, is never considered so perfect that there is no room for continued improvement. Furthermore, as combat techniques change or operations move into new geographical areas, what may have heretofore been entirely adequate must be seriously re-examined in the light of new conditions, new equipment, and new modes of warfare.

There are two principal sources of "raw material" for the improvement of existing rations and the development of new rations: (1) field tests; and (2) reports from users who have eaten the ration under actual combat conditions. While the latter may be considered as a kind of board of experts who have made the ultimate "field test," nevertheless, there still are a number of very important reasons why field tests simulating actual combat are essential. These relate largely to (1) the necessity for a preliminary test, (2) the relatively complete control over conditions that such a test affords, and (3) the greater possibilities for verifying attitudes reported. Thus, while the field-testing of rations is admittedly conducted under somewhat artificial conditions, the hunger of the soldiers involved is real enough and the results obtained generally provide a sound basis for final revisions prior to sending the rations into combat.

field test results in summary

The C-ration has undergone a large number of tests in the field since the first trial procurement in 1940. These include all possible geographical environments. The following comments highlight the practical nature of the suggestions obtained through such testing:

Tarryall, Pike Nat'l Forest, Colorado, June, July and August, 1944—63 days—52 men

The improvement in the C-ration embodied in the experimental and new types have rendered it highly acceptable, but the inherently "messy" side-opening of the cans adversely influences appetite. The components of the old C-ration had low consumption and poor acceptability ratings; but variety, good quality, and the use of common American foods have contributed to the excellence of the improved ration. Military efficiency, physical fitness, capacity for long marches, and morale were not only well-sustained but improved substantially on all rations.

Camp Indian, Bay, Florida, 1 November 1944—43 days 200 Infantrymen

The new type C-ration received the highest preference rating, followed by the old type C, 10-in-1, and K in that order. The packaged rations were not fully consumed for one-quarter to one-half of the man-meals. The new type C items were left over primarily because the men were not hungry—not because they were disliked. Stability of C-ration items was satisfactory.

Southwest Pacific, October-December, 1944, Test period 3 months—Test subjects—various groups ranging from 34 to 200 men

In the C-ration, the meat and beans were popular; the hash and stew were generally unpopular, and the biscuits were not very acceptable. It was recommended that consideration be given to elimination of the lemon juice powder and the meat and vegetable stew, and an increase in the quantity of coffee.

Nutrition Survey in Pacific Theater of Operations—Spring, 1945. One week and 50 representative troops at each place: Hawaii, Guadalcanal, Guam, Iwo Jima, Luzon, Okinawa

Exceptions to good acceptability in the C-ration included ham, egg and potatoes; and Type I and Type IV biscuits. The acceptability of the special rations by infantry troops was in the following descending order: new C-ration; 10-in-1; old C-ration; and D-bar. There was a clear demonstration that the acceptability of foods, a factor neglected until surprisingly late in the war, was a factor of great importance in nutrition. It was concluded that the general state of nutrition of troops in the various Pacific islands during the last year of the war was good. As the supply of fresh items increased, there was a build-up of canned items. The dispo-

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portionately large stockpiles included corned beef, corned beef hash, and meat and vegetable stew. In other words, the disliked items were not used and there was a great deal of wastage.

Exercise "Shiver"—Camp Shilo, Manitoba, Canada, and McDill Field, Florida—12 Jan. through 10 Feb. 1948—30 days—32 men

A high general level of acceptability of the ration (C-2)* was indicated throughout the experiment by the test troops using it. Items that were rated highly acceptable in the C-2 included cookies, candy, ground meat and spaghetti, jam, and cereal. Least liked were fruit cocktail and orange beverage powder. The low rating given the former may be attributed to its method of issue; namely, as the stable component on its day of consumption. The orange beverage powder was rated as lacking real orange flavor. It was simple and easy to eat. Many biscuits in the B-units were crumbled. The type of jam was not indicated, and there was not enough variety in the jams. The amount of soap was insufficient. The cellophane-type wrapping used for the sugar and beverage powders was difficult to open. Many wrappings were broken in shipment and handling. Number of openers was insufficient, and they were awkward to use with gloves. The heat tablets were difficult to ignite.

Arctic Winter Ration Trials of 1950, Moose Creek Bluff, Alaska, February and March, 1950—20 days—81 men

Can opener was difficult to use while wearing gloves. The crackers were broken and damaged. The starch-jelly discs were difficult to consume in extreme cold. Recommendations on the other items were as follows:

- 1) Improvement of flavor of Chicken and Vegetable, Beef Stew, and Ham and Lima Beans to that more typical of the product, or their removal from the rations.
- 2) Retention of Ham and Eggs with Potatoes as a component of this ration.
- 3) Reduction of the number of coffee packets from six to five.
- 4) Improvement of the quality and flavor of soluble coffee.

It will be noted that these are direct, candid, critical appraisals and that they tell ration planners and

* The 2 in C-2 indicates that this is the second revision of the original C.

designers what the weaknesses are and indicate the areas to which to devote additional research and development attention.

some representative, unedited responses

As noted earlier in this article, the best field test of all is the "final exam" a ration undergoes when used by troops in combat. Actually, the word "final" is not quite correct, for the C-ration and all other U. S. rations, it should be reiterated here, never reach the stage where they can be considered as "finalized." When they do the science of war as well as the science of food and the packaging of food will also be "finalized."

Korea has been an excellent testing ground for rations as it has been for other United Nations materiel of a less edible nature. A Quartermaster Corps officer on the staff of the Institute's Military Operations Office recently had the opportunity to interview a number of officers, principally of company grade, who had recently returned from the Korean action. Their comments—in some instances a little on the unflattering side due to long periods of subsisting on packaged rations—follow, along with a summary of the evaluations of the C-ration written by the interviewing QMC officer. It should be borne in mind that the respondents in this sample are not necessarily talking about the same "C-ration," as each new procurement of this ration is a revision in greater or lesser degree of the previous one, and, at the time these officers were in Korea, they may have subsisted on anything from a C-2 to a C-6 ration. In general, the comments indicate the ration is very satisfactory when used as it is intended to be used.

Major "D"—Infantry

"During my stay in Korea we had only the C-ration, an entire day's ration natur-

ally being issued at one time. Now, you can't put on a field-jacket and stuff nine cans of food in it, plus ammunition, grenades, etc., so two out of every three meals were thrown away as far as I was concerned. The men very seldom used the ration cartons. That is one of the first items they discard when the going gets rough, which leaves only pockets to put their food into. Something flatter that would fit more snugly to the body, something like a sardine can is needed.

"The nine cans of rations are too much for one day as the men very seldom eat all nine. If possible, put that much nutrition in a smaller package. In a static position, cooks can heat up the C-ration, but in a moving situation a man has to have something he can eat immediately and that he can easily carry. I have never seen men throw ammunition away but I have seen them throw food away.

"One thing I did notice about the C-4 rations was that the fruit was contained in two smaller size cans which everybody

liked. One reason was that the whole can of fruit was too much to eat at one sitting anyhow, plus the old story of wanting a flatter can. I have no complaint about the food. The food in itself was good. It was just that you couldn't carry enough of it around with you."

Lt. "W"—Infantry

"To me all C-rations are too greasy. There seems to be a lot of grease in practically every type of C-ration, and I don't think there is enough variety, although there is a thousand per cent improvement on what I had in Europe during the last war. But it seems to me there are many things being canned so there could be a lot of variety. I think if you gave a soldier in combat caviar day after day he would get sick of it and not eat it anymore. I liked a lot of things they put in C-rations until I had eaten it about a month and I got where I would open it and I couldn't eat it except the fruit. The cereal included in the C-ration could, I think, be dispensed with. You find it laying around the ground, thrown into holes, and so on. They should paint every can of C-rations in the front lines. That was one of the biggest headaches because, after troops have eaten their meals of C-ration, you could see their position, if the sun was shining, for a mile or two."

Lt. "F"—Armor

"As far as the rations go, I'll eat them only to keep from starving. We've been getting C-6 and C-7 over here. Must admit that they are a great improvement over those in the last war though. The inclusion of the plastic spoon was a terrific idea. I think the Pork and Beans and Beans with Franks are the best items. The hash is almost inedible, and the others mediocre. The beans can be eaten either hot or cold, and is the only one which can be eaten cold and still not taste too bad. Hamburgers in Gravy is a nice item when it can be heated. The packaging could stand more inspection. Quite often a box containing three meals is opened and you find three cans of beans or three cans of hash instead of a mixture. The coffee is O.K., and the cocoa isn't bad if you can possibly get it dissolved and mixed. Frankly, they are a great improvement over the last war, but I just can't go them unless it's a necessity."

Here again are frank, even blunt appraisals. There is an encouraging note, however—it is admitted, sometimes grudgingly, that the ration planners and designers have made



These Canadian soldiers in Korea find empty C-ration cans make suitable coffee cups.

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progress. The ration is getting better.

critique of comments on the ration

Based on the experiences of the officers quoted above plus perhaps a dozen others, a more detailed critique has been prepared by the Institute officer mentioned above. Following are the most important points gleaned as the result of the interviews:

1. Many complaints as to monotony are not the fault of the ration, as, in some cases, units subsisted on the "C" for as much as 30 days at a time—far beyond normal period of use. However, it was felt meat items might be improved and new varieties added.
2. It was generally felt that the size of the can used in the C-ration is very awkward to carry, and, as a result, the barest minimum will be retained by the soldier. If it is a question of food items or ammunition, he will always favor the ammunition.
3. Of the meat items the general opinions were as follows: Beans with Franks, Beans & Pork, Ham & Lima Beans were all very good, in fact the best of the entire lot. The Chicken & Vegetables was considered fairly good as was Chicken & Noodles. Hamburgers were good if they could be heated, but only fair when cold due to the quantity of grease and lack of flavor. The Ground Meat & Spaghetti was considered to be good except that it was rather dry and only mildly seasoned. Sausage Patties were definitely disliked cold and rated only fair when heated due to their being dry and tasteless. The Meat & Beans were not liked due to the meat being mushy and tasteless. The Meat

& Noodles was not liked either hot or cold. Beef Stew and Corned Beef Hash were generally disliked.

4. The fruit item was liked by everyone and there was no indication of dislike of any one fruit item. As long as it was fruit the men would eat it. An increased quantity would be desirable.
5. The jam was very much liked by everyone. There appeared to be no difficulty whatsoever in opening the cans. Some of the men opened the cans as they are designed to be opened; however, many of them used the can opener. Only one individual indicated an accumulation of jam cans. This was finally determined to be a result of serving the ration as a kitchen-prepared meal with no way to get the jam to the individuals being fed.
6. The coffee was very well liked by everyone. Quantities appeared to be about right although a few individuals indicated that an increase would be desirable. It is indicated that soldiers will, whenever possible, start a fire and make coffee whenever the opportunity presents itself. When questioned about the use of tea it was indicated that even though some men like tea they would not want even one package of tea if a package of coffee had to be eliminated.
7. A desire was expressed for a dehydrated soup in this ration so the soldier could make a hot drink as he does coffee.
8. The Dry Milk, whenever available, was very well liked. Even though most men drink their coffee black, they will use the milk in their coffee, the cocoa, or just eat the dry milk direct from the container.

9. It appeared that there was never a shortage of can openers; individuals have one or more on their dog tag chain or in their pockets. Plastic spoons were very emphatically desired and the men were very outspoken in regard to the rations arriving in Korea without these spoons. As a result of some rations arriving without spoons, whenever plastic spoons were in the ration they were kept by the soldier in his pocket for fear that the next ration might not have one.
10. It was suggested that the B Units be provided to be opened with the can opener only. The reason is that this is the only clean can in the C ration and nearly everyone uses it for his beverage drinks. When this can is opened with the key it makes a much smaller can and the sharp edges often cause cuts on the hands and about the mouth. They further indicated that many individuals presently open this can with the can opener and any damage to the components by the can opener was considered to be very minor compared to the benefit of the can when used as a drinking cup.
11. The C rations used by these individuals were the C-2, 3 and 4, and a few C-6's. Officers who served during World War II indicated a considerable improvement in all items, especially the C-6 over food items they were familiar with in World War II.
- Out of this mosaic of evaluations by qualified, and, if anything, unsympathetic observers there comes a rather new emphasis—the utilitarian features of the ration. Perhaps this means that the acceptability of the ration is approaching the point where it is of less concern to the user than are the utility features.

The proof of the pudding may be not in the eating—but in the spoon.

Without question the latest critique of the C-ration comes out of "Exercise Snow Fall." The ration was field tested in this operation by approximately 33,000 troops, 9-16 February 1952. Results of tests were excellent. The ration was well-received and liked by using troops. This does not mean that there were no suggestions for improvement. Briefly stated, these are:

1. Balance out caloric content of all 6 menus to comply with minimum Army caloric allowance of 3600.
2. Bring up vitamin A content in general. (This will require re-examination of individual components by nutritionists to determine most suitable carriers for this purpose.)
3. Check on acceptance on new animal products items as compared with current meat items. (Certain items such as pork and beans, while generally well-liked, still lose their appeal if over-used.)

In short the ration planners and designers are still in business.

Compiled by Norbert J. Leinen

DOCUMENTATION

In the rapid review of the historical data available on the C-ration contained in the opening section, use was made of *Ration Development*, Operation Studies No. 1, Vol. XII, prepared by Capt. John P. Samuels, Lieut. Robert P. McDevitt, Miss Marion C. Bollman, Major Walter MacLinn, Major Lyle M. Richardson, Captain Leo G. Voss, and edited by Captain Hewitt A. Conway and Miss Alice I. Meyer. Summaries of the ration trials, prepared by Capt. Thos. Moore, was the source for the material presented in the section devoted to the various field tests of the C-ration. For current appraisals by veterans of the Korean action, the sources were Lt. Col. George P. Tuxbury, chief, Military Operations Office, QMF&CI, and M.O.O. staff members Major W. O. Bradley and Major Thomas Plourde. Photographs courtesy U. S. Army Signal Corps.

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RATION, INDIVIDUAL, COMBAT (C-ration)

The Ration, Individual, Combat provides food for one man for one day (three meals). The daily calorific average of the ration is 3,619 calories. One ration weighs approximately 6½ lbs. and is easily carried by the combat soldier. The ration is packed in six different menus. Each ration provides one can of fruit for breakfast or dessert, a can of meat for each meal, a bread-type unit for each meal which contains either jam or cookies, and a beverage. In addition, a soup and a beverage are provided for "between-meal snacks," and candy, cigarettes, and comfort items are included.

Component Parts as of March, 1952

Menu 1

- 1—8-oz. can plums
- 1—12-oz. can beans with frankfurter chunks
- 1—12-oz. can chicken and noodles
- 1—12-oz. can meat, ground, and spaghetti
- 1—can each bread-type units 1, 2, 3
- 1—Accessory packet
- 3—Plastic spoons

Menu 2

- 1—8-oz. can pears
- 1—12-oz. can beans with pork
- 1—12-oz. can chicken and vegetables
- 1—12-oz. can sausage patties
- 1—can each bread-type units 1, 2, 3
- 1—Accessory packet
- 3—Plastic spoons

Menu 3

- 1—8-oz. can apricots
- or
- 1—8-oz. can pineapple
- 1—12-oz. can beans with frankfurter chunks
- 1—11¼-oz. can hamburgers
- 1—12-oz. can meat, ground, and spaghetti
- 1—can each bread-type units 1, 2, 3
- 1—Accessory packet
- 3—Plastic spoons

Menu 4

- 1—8-oz. can cherries
- or
- 1—8-oz. can applesauce
- 1—12-oz. can beef stew
- 1—12-oz. can beans with pork
- 1—12-oz. can sausage patties
- 1—can each bread-type units 1, 2, 3
- 1—Accessory packet
- 3—Plastic spoons

Menu 5

- 1—8-oz. can fruit cocktail
- 1—12-oz. can ham and lima beans
- 1—12-oz. can meat and beans
- 1—12-oz. can meat and noodles
- 1—can each bread-type units 1, 2, 3

- 1—Accessory packet
- 3—Plastic spoons

Menu 6

- 1—8-oz. can peaches
- 1—11¼-oz. can hamburgers
- 1—12-oz. can chicken and noodles
- 1—12-oz. can meat and beans
- 1—can each bread-type units 1, 2, 3
- 1—Accessory packet
- 3—Plastic spoons

B-1 Unit

- 4 crackers
- 1 cocoa beverage powder (disc)
- 2½ grams soluble coffee
- 4 grams soluble milk
- 6 grams sugar
- 1½-oz. jam

B-2 Unit

- 4 crackers
- 1 cookie sandwich
- 1 confection disc
- 2½ grams soluble coffee
- 4 grams soluble milk
- 6 grams sugar

B-3 Unit

- 4 crackers
- 1 cookie sandwich
- 2½ grams soluble coffee
- 4 grams soluble milk
- 6 grams sugar
- 1½-oz. jam

Accessory Packet

- 5 grams soluble coffee
- 4 grams soluble milk
- 6 grams sugar
- ½-oz. salt
- 1 packet of 20 cigarettes
- 2 books safety matches
- 1 package dehydrated soup mix, chicken with noodle or green pea
- 1 candy unit
- 1 bottle of water purification tablets
- 2 tablets of chewing gum
- 12 sheets of toilet paper