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# AIR CARGO: A NEW FORCE IN MARKETING

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**D**URING the last year speculation regarding a rosy future for air cargo has given way to a more meaningful analysis of prospects in light of actual results achieved during and since World War II.

A real beginning has been made in applying the lessons learned during the war to the carriage of cargo by air on a commercial basis. Much of this action has come from new air transport companies organized to carry cargo on an exclusive or semi-exclusive basis. These companies have operated without economic regulation under certain exemptions in the Economic Regulations issued by CAB under the Civil Aeronautics Act of 1938, which exclude non-scheduled and contract carriers from economic regulation.

Paralleling the activities of these newcomers there has been a surge of cargo activity by the certificated airlines. Some of this was, no doubt, a consequence of having more equipment; some was due to the competition of the "non-scheds." It seems evident, however, that active competition in this field was necessary to initiate the "snowballing" process now under way.

Recent hearings before the Civil Aeronautics Board on applications for air cargo certificates of convenience and necessity by the non-scheduled carriers (and by one certificated airline) have focused considerable attention on the whole problem of air cargo and its place in the national transportation system. Here, *for the first time*, air cargo service is receiving an extensive, thoroughgoing appraisal by the responsible regulatory body. The results of this hearing will set the pace for future development of the air cargo business. Fortunately, a reasonable background of facts on air cargo is now available, as a result of the recent experience of the new and established carriers of

cargo. It will therefore be possible for the CAB to base its important decision on some rather sound indications of the economic characteristics of air cargo handling.

It is with the economic aspects of air cargo that this article is concerned. Economic factors are dominant in air cargo at this time for one basic reason — the business is probably as highly competitive as any business today. The air cargo carrier's competition is not so much with other air cargo carriers (although this is not inconsiderable) as with all other forms of transportation. The success or failure of any air cargo enterprise will depend little on hopes and glamour but rather, to a major degree, on tight economic considerations.

Basically, the airplane is not the most economical vehicle for carrying property. It is, however, the fastest, and this gives it all the economic advantages that attach to time-saving. The airplane's small size relative to the standard freight or express train also gives it certain advantages with respect to flexibility and frequency of scheduling, market coverage and other elements of shipping convenience. It is by exploiting the economic possibilities of time-saving and convenient shipping that air cargo can develop traffic in the face of a rather serious rate disadvantage.

#### HISTORY OF AIR CARGO DEVELOPMENT

Prior to the war the only air service available to shippers was with few exceptions, the expensive, somewhat limited, air express service offered by the certificated air carriers. The ton-miles of air express flown by these carriers amounted to 1.1 million in 1935; by 1940, the last pre-war year, the volume had increased to 3.5 million ton-miles.<sup>1</sup>

Although, percentage-wise, the increase between 1935 and 1940 indicated a healthy rate of growth, the actual volume was relatively insignificant. Air express volume in 1940 amounted to but .0006% of the total U. S. freight traffic and but 0.3% of the volume carried by Railway Express, the most expensive form of surface freight transportation.<sup>2</sup> Moreover, air express traffic in 1940 was confined almost wholly to the carriage of small, package goods, as indicated by the average air express shipment weight of 7.1 lbs.<sup>3</sup> Furthermore, through-service by air was limited to those cities (and immediately surrounding areas) receiving certificated airline service.

A number of reasons may be advanced for the failure of pre-war air express to make a more appreciable dent in the total transportation picture. First, despite reductions in rate from time to time, charges were still so high as to be virtually prohibitive for all except emergency and novelty types of shipments. At rates of 70-80c a ton-mile (approximately six times more expensive than Railway Express), few

<sup>1</sup> "Air Transportation in the Immediate Post-War Period," Curtiss-Wright Corp., 1944.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

shippers could find any advantage in utilizing air freight. Second, prior to the war the airlines were understandably devoting their principal efforts to the development of passenger traffic, that being the class of traffic most immediately susceptible to the advantage of rapid transportation at existing rate differentials. Third, the arrangement with Railway Express, whereby that agency performed the ground-handling and promotional services for air express, and whereby air rates were not allowed to fall below a certain level, also exercised some indirect restrictive influence. Finally, the basically higher cost of carrying goods in passenger planes, and the failure to use specialized cargo planes, retarded air cargo expansion. Relatively little effort was made to sell air cargo on a large scale, but with the high rate level then existing, it is doubtful if intensive promotional effort would have availed.

Since the end of the war air cargo volume has experienced remarkable growth. During 1946, the certificated and non-certificated airlines carried an estimated total of fifty million ton-miles, or over three times as much as was hauled during the six year period 1935-1940. Slick Airways alone carried more ton-miles of air cargo in the last two months of 1946 than were carried by all the air carriers in 1940.

Among the influences responsible for this sudden spurt in air cargo growth are: the availability, for the first time, of a true cargo service, capable of transporting shipments of almost any size to almost any destination point; the stimulus provided by contract operators using surplus equipment; the sharp reductions in rates resulting from increasing competition and specialized cargo operation; the intensive program of promotional and educational efforts; the increased reliability and dependability of operations; the extension of service to many off-line points by both certificated and non-certificated operators; and the high level of general business activity.

The impressive traffic record of the air cargo industry, particularly during the past six months, is tangible evidence of the tremendous potential demand for this service. However, the extent to which the potential demand may be converted into actual tonnage depends solely on the net economic advantages offered in speed, rates, dependability, and convenience of service. Any realistic evaluation of air cargo prospects should logically rest, therefore, on an appraisal of air transportation's advantages, viewed from the standpoint of these four criteria of service, to the various classes of shippers.

### SPEED

Speed is, of course, the greatest single advantage of air transportation over other media. This margin of superiority is best illustrated by a comparison of transit time on coast-to-coast service. Even with present types of aircraft, air cargo operators can pick up a shipment in New York in the afternoon and arrive at the West Coast the following morning. Faster cargo planes are expected to be in opera-

tion within the next year or two, offering pickup at the close of the business day and delivery at the other end early the following morning. By contrast, the best delivery time on a coast-to-coast haul by surface transportation (1940) was approximately 10-11 days by LCL freight; 9 days by carload freight; 9 days by forwarder; 4 days by rail express; and 4 days by parcel post.<sup>4</sup> Under existing conditions of congested traffic, the coast-to-coast time by surface transportation is even longer than indicated by these figures.

Normally, the airplane has a speed advantage over surface transportation on hauls of 100 miles or more. For passenger traffic the utility of the airplane on comparatively short hauls is indicated by the heavy air travel between such relatively closely spaced points as Boston-New York, New York-Washington, and New York-Philadelphia. For cargo, however, the time-saving must normally be measured in days, rather than hours, before it has practical value to the shipper or consignee. Thus, a shipper who now enjoys overnight service by surface methods of transportation will find little advantage to a saving of, say 4 or 5 hours in transportation time where that saving takes place during the non-business hours of the day.

Where air schedules can be arranged to provide *same day* door-to-door delivery, important advantages may, in some cases, result. Such a service, however, would be quite costly since it would require special, expedited ground handling services at both ends of the haul. Furthermore, the number of shippers who could take advantage of same-day service would probably be limited, since all arrangements for the shipment, and all the details of ground handling would have to be performed sufficiently early in the day for the shipment to be carried to the destination point and delivered to the consignee before the close of the conventional eight-hour business day.

For air cargo, therefore, the real speed advantage is found on comparatively long hauls. The greater utility of air cargo for long hauls, and the predominance of long-haul shipping in existing air traffic is evident from the experience of one of the leading contract carriers whose average length of haul during 1946 was about 1500 miles. This compares with an average haul (in 1940) of 351 miles for rail carload freight; 476 miles for LCL freight, and 517 miles for rail express.

Even for long haul movements, the practical business value of speedy transportation depends to a great extent on the nature and distribution problems of the particular product. At one extreme are certain types of low-value, bulky products such as coal, lumber, ore and other raw materials for which more rapid transportation would have little immediate benefit, and for which the *rate* of flow is more significant than speed of flow. These products ordinarily move in carlot loads and constitute the major part of the total traffic tonnage moving in this country. In 1940 railroad carlot traffic amounted to 362 million ton-miles, or approximately 70% of total intercity freight

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<sup>4</sup> *Ibid.*

traffic, excluding waterways and pipe lines.<sup>5</sup>

At the other extreme are certain types of highly perishable products for which rapid transportation is critical. Thus, with conventional methods of transportation, the shipment of such perishable items as fresh figs, lobsters, papayas and mangoes is largely restricted to local markets. Moreover, many types of produce which could be grown in quantity in California, Florida and elsewhere are not produced at all because of their high perishability and slowness of conventional methods of transportation. For such products (whose potential traffic possibilities are high), speed of transportation is vitally important. This type of traffic may take time to develop, however, since production and distribution processes must first be organized.

Between these extremes lies a great variety of perishables and finished goods which can benefit in varying degrees from rapid transportation, but for which the advantages must be demonstrated in terms of dollars and cents. Such advantages have already been demonstrated for an ever-growing list of products. With more intensive research and promotion, with declining rates, and with an ever-increasing interest on the part of the shipping public, further advantages for an ever-growing variety and volume of products may be expected to be found and demonstrated.

Many shippers of perishables have found that rapid air transportation can reduce spoilage, increase freshness, reduce packaging requirements, and bring a sufficiently higher price to warrant the higher transportation rate. They are finding, also, that a delay in harvesting, due to prolonged rain or other circumstances, need no longer result in the loss of their harvest. Growers may tree-ripen their products for a longer period and thus enhance their quality and taste. Moreover, the reduction in transit time can effect significant increases in the marketing life of various perishable commodities. For example, according to data introduced in the *Air Freight Case*, the marketing life of certain fresh fruits and vegetables in the Chicago market varies as follows with different methods of shipment:<sup>6</sup>

MARKETING LIFE (IN DAYS) IN CHICAGO

	<i>By Air</i>	<i>By Express</i>	<i>By Freight</i>
Apricots	9	6	2
Cherries	13	10	6
Figs	9	6	2
Nectarines	9	6	2
Plums	11	8	4
Asparagus	11	8	4
Broccoli	9	6	2
Cantaloupes	9	6	2
Green Corn	7	4	0
Spinach	9	6	2
Strawberries	9	6	0

<sup>5</sup> *Ibid.*

<sup>6</sup> California Eastern Airways Exhibit CEA-381.39, *Air Freight Case*, Docket No. 810, *et al.*

In many instances, the advantages of air transportation for perishable products have been sufficient to overcome the initial rate differential, and as a result of a considerable volume in perishable produce has already been carried. As indicated later, however, basic surface rates for the great bulk of fruit and vegetable traffic are still so much lower than air cargo rates that the exploitation of the advantages of rapid transportation has not yet been possible on a large scale.

Speedy transport is also advantageous in marketing many types of finished manufactured goods. Retailers, particularly in the apparel line, have found that rapid air transportation enables them to operate with smaller inventories and insures a closer adjustment between the supply of and demand for merchandise, especially during peak periods. Where the marketing periods are relatively short or highly seasonal, as in the case of furs, millinery, ladies' shoes and other wearing apparel, a saving of three or four days transportation time becomes a highly important competitive advantage. Rapid air transportation is also enabling many retailers to operate with fresher, newer stock. Companies operating a number of units throughout the country have used air cargo for the rapid adjustment of shortages or over-supplies between units, and mail order houses often find it of advantage to use air cargo for making bulk shipments to central distribution points.

In the past, the principal users of air cargo have been shippers of style goods, seasonal goods, goods changing in model, very high-value goods and perishable goods. The advantages of rapid transportation are not restricted, however, to these classes of users. The historical experience merely indicates that at the rates, standards of service and promotional efforts then in effect, these were the users who could derive immediate net advantage from the airplane's speed. As improvements are made in these areas, particularly in rates, it may be expected that shippers in many other lines will discover advantages to the use of air freight and that shippers in competitive lines will follow their example.

TABLE I

MAJOR CLASSES OF COMMODITIES SHIPPED BY AIR (1934)<sup>7</sup>

<i>Item</i>	<i>Percent of Shipments (April 1934)</i>	<i>Percent of Total Weight (July-December, 1934)</i>
Valuable Papers	28.3	21.5
Advtg. & Printed Matter	20.8	19.8
News Photos	14.3	1.6
Films	4.6	10.5
Parts: Auto, plane, machine tools	6.5	20.2
Newspapers	4.8	5.7
Clothing & Textiles	3.2	3.2
Miscellaneous	17.5	17.5

<sup>7</sup> Frederick, John H., and Lewis, Arthur D. "History of Air Express," 12 JOURNAL OF AIR LAW AND COMMERCE, 203, at p. 224.

In this connection, a comparison between the types of items carried in air transportation before the war and those being carried today, is illuminating. Tables 1 and 2 show the composition of air express traffic in 1934 and in 1939, while Tables 3, 4 and 5 show the types of commodities carried by three contract operators during selected periods in 1945 and 1946.

TABLE 2

MAJOR CLASSES OF COMMODITIES CARRIED BY AIR, APRIL 1939<sup>8</sup>

<i>Commodity</i>	<i>Percent of Total Shipments</i>	<i>Commodity</i>	<i>Percent of Total Shipments</i>
Wearing Apparel	10.8	Books	3.1
Motion Picture Film	4.7	Hardware	2.9
Misc. Machinery	4.7	Bank Securities	4.7
Printed Advtg.	6.6	Aviation Supplies	1.5
Electrotype	6.9	News Photos	6.0
Legal Papers	6.8	Phonograph	
Electric Products	4.2	Transcriptions	2.8
Automobile Supplies	4.1	Manifests	3.5
Magazines	5.6	Jewelry	2.6
Flowers	2.2	Drugs	1.4
		Miscellaneous	14.9

TABLE 3

TYPICAL SHIPMENTS JULY 1945—AUGUST 1946<sup>9</sup>  
AIR CARGO TRANSPORT, INC.

<i>Commodity</i>	<i>Pounds</i>	<i>Commodity</i>	<i>Pounds</i>
Flowers	301,150	Plastics	6,126
Fruits & Vegetables	22,138	Art Work & Printed	
Drugs	75,860	Matter	4,440
Fabrics	425,176	Dairy Products	450
Foodstuff	16,045	Radio & Radio Equipment,	
Clothing, Apparel	522,614	Phonograph Equipment	14,079
Furniture	14,590	Glassware	2,072
Seafood	140,389	Heavy Machinery	23,669
Newspapers, Publications		Machine Tools, Hardware	
& Books	933,406	& Metals	5,921
Dogs	130		

TABLE 4

ACTUAL COMMODITIES CARRIED BY CALIFORNIA EASTERN AIRWAYS, INC.  
MAY-AUGUST, 1946<sup>10</sup>

<i>Commodity</i>	<i>Percent of Total Volume</i>
Magazines	30.3
Flowers	21.0
Fabrics or Apparel	20.0
Grapes	4.2
Berries	3.0
Cherries	2.7
Hardware & Machinery	2.5

<sup>8</sup> *Ibid.* at p. 228.<sup>9</sup> Air Cargo Transport, Inc. Exhibit ACT-3, *Air Freight Case*, CAB Docket No. 810, *et al.*<sup>10</sup> California Eastern Airways, Inc. Exhibit CEA-517, *Air Freight Case*, CAB Docket No. 810, *et al.*

Oil Burners	2.2
Metal Wire	2.1
Mixed Fruits & Vegetables	1.9
Plums, Farm Tractors, Tomato Plants, Melons, Chemicals and Pharmaceuticals, Cheese, Mushrooms, Lobsters, Aircraft Parts, and Miscellaneous	11.1
Total Percent	100.0
Total Lbs. Carried	972,796

TABLE 5

MAJOR CLASSES OF COMMODITIES CARRIED BY NATIONAL SKYWAYS FREIGHT CORPORATION<sup>11</sup> AUGUST 1945 TO AND INCLUDING AUGUST 1946

<i>Commodity</i>	<i>Percent of Total</i>	<i>Commodity</i>	<i>Percent of Total</i>
Flowers	29.4	Produce (Vegetables)	4.4
Garments	22.3	Machinery	4.2
Store Merchandise	8.4	Animals	3.7
Fruit	7.7	Miscellaneous	3.3
Furniture	5.3		
Magazines	4.8	Total Percent	100.0
Film	4.5	Total Lbs. Carried	2,486,799

## RATES

It seems apparent that there are sufficient advantages to speed in transportation so that if no rate differential existed and if other elements of service were comparable, virtually all shippers of perishable and merchandise goods would use air cargo. So long as a differential exists, however, the problem for any individual shipper (or consignee) becomes one of determining whether the speed (and other incidental) advantage is worth the difference in rate.

In 1940 the rate for air express averaged between 70 and 80 cents per ton-mile. At these rates, the price for air transportation was so high that its use was restricted largely to emergency users and novelty types of shipment. The significance of a 70-80 cent rate in a competitive economy becomes more apparent when it is compared with average rates (1940) of 10 cents per ton-mile for Railway Express, 5.5 cents per ton-mile for less-than-truckload traffic and a fraction of a cent per ton-mile for many types of rail carlot freight.

Since the end of the war, however, air cargo rates have declined drastically. Today rates for air cargo range from as low as 10 cents per ton-mile, for plane lot shipments, to an average of 20 to 25 cents a ton-mile.<sup>12</sup> As rates continue to decline, and as they begin to approach surface carrier rates, it may be expected that shippers will accept air cargo at an increasingly accelerated rate. At 50 cents a ton-mile the incidental economies of air transportation in packaging,

<sup>11</sup> National Skyways Freight Corp., Exhibit NSF-39, *Air Freight Case*, CAB Docket No. 810, *et al.*

<sup>12</sup> Air Express rates are still considerably above these figures, however, averaging about 60 cents per ton-mile.

handling, reduced mileage, and reduction in spoilage are relatively insignificant compared to the initial rate differential. At 10 to 15 cents a ton-mile, however, these economies assume far greater significance and may result in completely eliminating the rate differential for certain types of commodities, and in reducing it to negligible proportions for other commodities. Hence, the lower the initial rate, the more significant are the advantages of rapid transportation and the more accelerated is the rate of traffic increase likely to become.

According to an analysis made by one of the applicants in the Air Freight Hearings, a shipment of 21,000 lbs. of cauliflower from California to Chicago costs 3.64¢ per net lb. by rail express and 1.92¢ per lb. by freight. The same shipment by air, at a 12¢ per ton-mile rate, and after giving effect to savings in tare weight, mileage, waste elimination and other economies, would cost the shipper 3.71¢ per net pound, or virtually the equivalent of the rail express rate.<sup>13</sup> A similar analysis for a Sears-Roebuck shipment of 4,101 lbs. of mixed merchandise from New York to Los Angeles showed the total transportation cost (including cost of cartons, labor in packing and unpacking, etc.) to be \$838.40 by Railway Express. Although, by air cargo the actual transportation charge for the same shipment is some \$50 higher than by rail express, the total cost is \$715.10, or \$123.30 less than rail express, due to the economies in packaging and handling made possible by using hangers instead of boxes for the shipment.<sup>14</sup>

With each successive rate decline air cargo has attracted new users on an experimental, infrequent basis, while at the same time shippers who used air cargo experimentally at the higher rate have gone over to regular usage at the lower rate. At the high rates prevailing before and immediately after the war air cargo was used regularly by a relatively small group of shippers sending highly perishable or extremely high-value products, and was used experimentally by shippers in other lines such as apparel goods and certain types of perishable goods. As rates declined, many of the formerly experimental shippers in these latter two lines became regular shippers and a new class of experimental shippers in the pharmaceutical, apparel, agricultural, machine tool and finished goods lines was attracted.

The outlook for further rate reductions in air cargo appears highly promising. With improved equipment, greater operating experience and improved load factors, direct flying costs should continue to decline steadily in terms of present price levels. New, specialized all-cargo planes are expected to be ready for operation within another year or two, making possible a substantial reduction in flying costs. Direct flying costs of the Douglas DC-3 Cargoliner, representing the older type of equipment in use today, have been estimated at 10.22 cents per ton-mile on a trip length of 500 miles. Comparable costs

<sup>13</sup> California Eastern Airways Exhibit CEA-381.27, *Air Freight Case*, CAB Docket No. 810, *et al.*

<sup>14</sup> California Eastern Airways Exhibit CEA-382.7, *supra*.

for the Douglas C-54 Cargoliner, representing the newer types of equipment in use today, are estimated at 5.07 cents per ton-mile. Representative of future costs are the estimated direct flying costs of 4.49 cents per ton-mile for the Boeing Stratofreighter.<sup>15</sup>

Ground handling expenses are also expected to decline, although the outlook here appears less promising than in the case of direct flying costs. Pickup and delivery especially for smaller shipments, have been particularly troublesome from the standpoint of both cost control and the rendering of satisfactory service. Because ground costs constitute a high portion of total costs, a solution to the ground handling problems must be found if air rates are to decline to truly competitive levels. One possible solution being seriously considered by some operators is to turn over the entire ground handling job to separate organizations who would be specialists in that field.

Rate estimates offered in testimony before the CAB, indicate that average air cargo rates as low as 12 cents per ton-mile may be in effect within the next year or so, and that average rates as low as 9-10 cents may be achieved by 1950. At these average rates air cargo could compete directly, on a price basis, for a large portion of the traffic customarily moving by Railway Express and for a substantial portion of the LCL freight traffic. (Total volume of Railway Express and LCL freight traffic in 1940 amounted to approximately 8.5 billion ton-miles.) At these rates, also, it may be expected that air cargo will have generated a substantial volume of new traffic, not previously moving in transportation at all.

If the rates estimated for 1950 are achieved, air cargo will no longer stand at the fringes of our transportation system, but will be an established, integral part of the entire system. It may still not be a mass carrier of goods, and still not compete for the heavy, bulk traffic moving by carlot rail, but it will probably be the normal method of shipment for a sizeable volume of finished goods and perishable goods.

Not until rates have been reduced to 5 or 6 cents a ton-mile, however, can air cargo expect to attract the major portion of perishables and finished goods traffic. The average long-haul carlot rate for fruits and vegetables is approximately 1.5 cents per ton-mile and the LCL rail express rate for fresh fish averages about 5.7 cents per ton-mile. The differentials between these rates and the estimated 9 cent rate for air cargo in 1950 would still preclude air carriage for normal shipment of most of these commodities.

#### DEPENDABILITY AND CONVENIENCE OF SERVICE

In choosing between various media of transportation, the shipper ordinarily considers not only advantages in speed and rates, but also advantages in dependability and convenience. Dependability means assurance that the shipment will be picked up and delivered on sched-

<sup>15</sup> The cost figures in this paragraph have been taken from United Air Lines Exhibit No. U34, *Air Freight Case*, CAB Docket No. 810, *et al.*

ule and in good condition. The convenience factor, on the other hand, includes preliminary arrangements for the shipment, frequency and timing of schedules, coverage of service offered, extent of packaging and handling required, handling of claims and the like.

The dependability of air cargo operations has improved steadily during the past year. The cargo operators, like the air passenger lines, have taken advantage of the many improvements in operating techniques and instruments growing out of the war. Assuming that the carriage of cargo will not be restricted to operations between fixed points, it may be expected that air freight operators will take advantage of alternate routes and will fly around the weather if necessary, to complete flights according to schedule. In such event, air cargo operations should be able to show a considerably better record of flights completed according to schedule than that shown by air passenger operations.

Although official records of dependability and safety of air cargo operations are not available, shipper testimony and other evidence presented in the *Air Freight Case* indicate that the record of dependability has been satisfactory. One of the largest air freight operators in the country stated at this hearing, that during four months of operation the company had experienced no major mechanical failures and but a single claim for damage to shipments handled. Delays in air cargo shipments are not unknown, however, and the operators are the first to admit that there is room for considerable improvement.

The convenience of air transportation for the shipper of freight has also improved steadily. The use of all cargo planes by both contract and common carriers now means that few shipments have to be refused because of size restrictions. Formerly, a shipment that could not be fitted into the relatively small cargo compartment of the conventional passenger plane could not be accepted.

Because of the relatively small size of the load carrying unit in air transportation, a high frequency of schedules can be offered. Moreover, the operator can move his equipment about more freely than the surface carrier and can fit his schedules more closely to the particular requirements of the shipper.

Before the war, through air service was available only to and from cities certificated to receive airline service. Today, as the result of extensions of service by the certificated operators and availability of service by contract carriers, air cargo shipments (subject to certain minimum loads) can be made to and from additional points in the country where adequate airport facilities are available.

Air cargo operators have also been able to add to shipper convenience by devising simplified and cost-reducing methods of packaging and handling. Air shipment of dresses and coats on hangers, instead of in boxes; reduction in special packaging, and icing, ordinarily required for protection against spoilage; and reduction in packaging

strength ordinarily required for protection against rough handling and inter-car transfers are examples.

#### AIR CARGO AND MARKETING

It seems evident from the foregoing discussion that the transportation of commodities by air offers certain inherent advantages over other forms of transportation. The principal advantages are speed, and, to a lesser extent perhaps, convenience. In a profit-and-loss system, however, the importance of these advantages must be measured in terms of the net economies (or price enhancement) which they produce, as compared with other forms of transportation. At rates prevailing before the war the inherent advantages and economies made possible by rapid transportation were not sufficient to overcome the rate differential except for a very small group of special, intermittent users. At these rates, therefore, air cargo occupied a position at the periphery of our transportation system, and the total tonnage carried was relatively insignificant.

At present rate levels, however, air cargo is beginning to establish itself as a conventional method of shipment for an ever expanding, though still relatively small group of shippers, and as an occasional method of shipment for a still larger group. With further rate decreases (and further improvements in service) the number of shippers in both of these groups may be expected to increase. Although air cargo has, and probably will continue to divert traffic from other forms of transportation, it can hardly be expected that air cargo will completely supplant any of the existing transportation media. Rather, it is believed that air cargo will, for the next few years at least, develop as a supplementary type of service for a fairly selected group of users, and will occupy a position alongside of rather than instead of existing methods of transportation.

Generalizations regarding the particular types of products which might benefit from air cargo at any given rate must be made with caution. With the high rates prevailing in the past, the products shipped by air cargo were found to fall in fairly definite categories. With narrowing rate differentials, however, the categories of products shipped have become much less clearly defined and a great number of products, not generally considered suitable for air movement, have found advantages to this method of transportation. Because of the special problems surrounding the distribution of any particular product, and because of the unique nature of air transportation, each product, or each class of products must receive separate analysis for properly determining the extent, if any, to which it might benefit from air cargo service.

At the rates expected to prevail over the next several years, it seems hardly likely that air cargo will effect broad revolutionary changes to our present distribution system. In some lines, of course, radical

changes to previous methods of distribution have already been effected. Marketing periods for certain types of perishable products have been lengthened; new markets for such products as lobsters, perishable flowers and tropical and semi-tropical fruits have been created; the period of tree-ripening of certain types of fruits has been extended; dresses and coats are being sent on hangers instead of in boxes; and sub-distributing points have been set up by mail order houses who formerly effected all distribution from a single point. Overall, however, broad changes in the mechanics of distribution as a result of the availability of air cargo are likely to come gradually, as new advantages are found, as rates are further reduced and as shippers adjust their operations to the new service.

By the time air cargo gets down to 6 cents a ton-mile or so, however, the availability of this form of transportation is likely to play an important and widespread role in decisions relating to plant locations, warehousing, production scheduling, product diversification and general sales policies.