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2-1-1932

## Freight Rates and the South Dakota Farmer

M.R. Benedict

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# Freight Rates and the South Dakota Farmer

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Agricultural Experiment Station  
South Dakota State College  
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Brookings, South Dakota**

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## TABLE OF CONTENTS

	Page
Foreword .....	3
Transportation as a Phase of Production .....	3
The Dependence of Commercial Agriculture on Railway Transportation .....	5
The Nature of Railway Costs and their Relationship to Class Prices .....	7
How the Rate Structure Came To Be as It Is .....	9
The Effects of Different Types of Rates .....	13
Trends in Rate Levels .....	16
The Problem of Joint Through Hauls .....	17
Rates Usually Change Slowly .....	17
What Happens When Rates are Changed .....	17
The Effects of a General Rate Change .....	23
A General Percentage Change in all the Rates for a Given Product .....	24
Localization of Potato Production .....	25
Changes in Potato Rates 1917 to 1923 .....	26
When Rates on Other Products of the Area are Also Af- fected .....	29
The Measurement of Farmers' Response to Price .....	30
How Potato Prices are Made .....	30
Conditions of Production in Area No. 1 .....	45
Conditions of Production in Area No. 5 .....	46
Conditions of Production in Area No. 7 .....	47
The Effects of Rate Changes on Other South Dakota Products .....	51
Elements in a Freight Rate Policy for South Dakota .....	52
The Means of Protecting the State's Interests in Rate Matters .....	58
Appendix .....	60

# Freight Rates and the South Dakota Farmer

By M. R. Benedict\*

## Foreword

The discussion here presented undertakes to give a simple, non-technical explanation of the nature of the farmer's freight rate problem. It is designed for use by farmers, high school students, and others who are not attempting to go into the matter exhaustively. The conclusions here expressed in simple language are, however, based upon a rather extensive and complex study of the problem which has been in progress for two years and is too lengthy for publication in bulletin form.

The effects of given rate changes are different for each product and the specific results of such changes can only be shown by separate studies of the various products. In view of the fact that many complicated relationships are involved, most of which have as yet been little studied, one of the simplest of the cases—that of potatoes—has been taken in the present study. Similar studies for other products are needed. More accurate results will be obtainable when statistics relative to volumes of production, prices, and farmers' responses to prices are better and more complete than they now are.

## Transportation as a Phase of Production

Goods which are to be used by consumers must consist of things consumers want and must be in forms suitable for consumer use. They must also be located where they are wanted at the time consumers want to use them. In the terms used by the economist, goods which are to be useful to consumers must have form utility, place utility, and time utility. The process of production is largely that of providing or increasing these utilities in commodities or of providing services which are desired. If we view the process of production in this light we can readily see that there is no basic difference in the work of the farmer, of the railroad, and of the warehouseman, so far as their relation to production is concerned. A bushel of wheat which has been produced on the farm is more useful than the soil constituents and air and water which went to make it up. This same bushel of wheat is more useful to human beings who are going to use it there if it is in Minneapolis rather than in South Dakota. Likewise if it is wanted in March, it is more useful to the consumer in March than it is in September. The services which have put it in the right form, at the right time, and in the right place have, therefore, been productive. Production does not end when the product leaves the farm but continues practically up to the time

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that the ultimate consumer begins to use the product. Those processes which have to do with transferring the ownership from one group to another, carrying the risk of price changes, providing necessary market information, etc., are not so easily understood as a part of the process of production. Transportation, however, can readily be seen to be definitely and clearly a part of the whole process of producing the product desired by the consumer.

The problem of distribution of the final value of the product between the various agencies concerned with it is not, then, one of division between producers and non-producers but is a question of division among a series of producers of different kinds of utilities. This is the problem of pricing for the various services contributed. Nevertheless, the problem of pricing these services is not the same for the farmer, the carrier, and the warehouseman or processor, and it is this fact which warrants a separate consideration of the freight rate problem since freight rates represent the pricing of that service contributed by the railroads.

In the case of farmers, of storage houses, of mills and packing plants, and other similar agencies, it has been generally assumed that, if more than the proper share of the total value of the product is going to one of these types of service, more than usual profits will appear in that phase of industry and this will result in more capital and more competitors being drawn into it until profits in that branch of business are brought to a level with those in other phases. It is largely upon this philosophy of the regulation of profits by competition that the United States government's attitude toward business has been built up. Certainly this adjustment is not perfectly made and some of these producing groups get more or less than an equitable share of the part finally paid by the consumer. Yet the equitable division indicated above does tend to be approximated in a rough sort of way except in the case we have here under consideration. For this one group of producers in the chain this method of price-making has very little significance.

Suppose a railroad charges more than enough to provide a fair return on its investment and expenditures. Can someone else step in and offer competing service? Not in most cases without building another railroad, an undertaking which requires years of effort and millions of dollars in investment. Even if that is done there is a good possibility that there is not enough business to support both roads, and in striving to get business from each other they will put rates too low and both will go into bankruptcy. This has happened many times in the rate wars of the past. The reasons for this lie mainly in two factors. The first is the fact that so large a part of the total expense for railroads is in the form of interest on its fixed investment in right of way, grades, rails and ties, depots, switch yards, etc.; much of it represented by bonds on which definite interest must be paid. Not only does this expense go on regardless of the volume of traffic, but much of the operating expense is also little related to volume of business. Wages of telegraph operators and section hands and many of the expenses concerned in train operation go on even if the trains are loaded to only half their capacity. Where this condition exists any additional business that can be acquired will add to the net earnings if it pays anything more than the additional expense involved; that is the expense which would not have been incurred if it had not been hauled. Yet all freight cannot be hauled at

such rates or there will be no income to pay bond interest and other fixed expenses—expenses which go on regardless of the amount of freight hauled and which represent so large a part of the total railroad expense. Therefore, when two roads try to compete in rates, in their struggle for additional business, they cut rates far below maintenance returns and must either go into bankruptcy or come to some agreement as to rates. Such an agreement, if reached, is likely to place rates higher than they need to be to provide a continuous and satisfactory railway service.

The other factor grows out of the fact that other railroads are likely not to be so located that they can compete at given shipping points. This is not true of mills, packing plants and warehouses in the larger centers even though these do have in many cases a high proportion of fixed expense.

Thus, unlike the returns in businesses in which individuals and firms can come in or go out easily, or in which there can be effective competition because a large number of firms are located at the same place, railway rates cannot be fixed by competition. They are more like such natural monopolies as telephone systems, sewer and water systems, electric light companies, gas companies, etc., few of which have their rates established through competition.

When this characteristic of railway rates came to be recognized, the federal and state governments gradually assumed control of them. The Interstate Commerce Commission was established by an Act of Congress in 1887 and has gradually been given more and more authority to fix these charges, to govern stock and bond issues of the railways, and to prevent undesirable practices of various kinds in railway financing and operation, in so far as interstate hauls are concerned. Most of the states have established state railway commissions whose duty it is to provide similar control relative to rates on hauls beginning and ending within a state. Partly because of the fact that most railway hauls do involve interstate moves, these state commissions have in recent years devoted much activity to representing the particular interests of shippers in their states rather than to acting in the judicial capacity above indicated. They have taken part in the hearings before the Interstate Commerce Commission, opposing rate increases affecting their states, advocating rate decreases, etc.

## **The Dependence of Commercial Agriculture on Railway Transportation**

The places naturally adapted to the growing of any given crop are ordinarily rather widely distributed over large areas. The places where these crops are wanted are likely to be centralized in very different parts of the country or of the world. For example, in the United States, the areas best suited to cotton production are in the southeastern quarter of the country. The heaviest demand for cotton both for manufacture and for use has been in the northeastern states, several hundred miles from the areas best suited to its production. Much of the wheat produced in the Great Plains area finds its eventual usefulness through shipment to Liverpool, England, or even to the Mediterranean ports. So far as those desiring these commodities are concerned, it is a matter of indifference whether they are produced where they can be produced with the least effort and where a large amount of effort must be put into hauling them to where they are desired,

or whether more effort is put into producing them and they are hauled a shorter distance. Thus, for example, fresh tomatoes may be produced under glass in New England with a very high growers' cost and with little transportation cost, or they may be produced in the open in Florida at a low growers' cost but with a high cost for transporting them to New England for use. Supposedly these two methods of production are more or less in balance with each other. If, however, something occurs to decrease the cost of shipping tomatoes from Florida to New England it has the same economic effect as though Florida were moved closer to New England. This results in a lowering of the total cost of putting Florida tomatoes on the New England market and thereby gives Florida producers a competitive advantage over the greenhouse operators in New England. If Florida production is easily expanded this may result in increased production and a lowered price in New England with only a part of the advantage going to Florida land owners. If Florida production cannot be increased, the effect will be to increase the value of the use of land in Florida. This, in turn, is likely to be reflected in higher land prices. This phase of the matter is more fully developed in a later section.

We can readily see, therefore, that the amount of freight rate charged has much to do with the relative economic locations of different areas. In other words, the rates that must be paid to haul the products from South Dakota farms to their markets measure economically the location of the farms in the state. If rates are lowered these farms are in effect moved closer to their markets. If rates are raised they are moved farther away. There was a time not long ago when these South Dakota farm lands were too far distant to be of any importance in the production of the food and clothing of the world, except for such as could be used by the Indians who lived in South Dakota and for such hides as could be shipped down the Missouri river. Then came a time when wheat and corn could be moved over rough trails to Yankton and Sioux City and shipped by boat down the river and possibly around to New York, Boston or Liverpool. At the same time herds of cattle could be driven to the markets along the Missouri river. South Dakota, by means of these trails, had been moved nearer to its markets. At the same time some of its markets were moving nearer to it.

From 1880 to 1900 railways reached into the state and, economically speaking, this area took a tremendous stride towards its markets. It was now possible for most of the ordinary products to be shipped. Though their price, less freight and handling, still did not leave as much as their growers wanted or needed it now did not take more than the crops would bring in the market to carry them there. There was even a little margin left after paying for the labor and other expenses of production, so South Dakota land came to have a value. Since then rates have for the most part gradually worked to lower levels and prices in the central markets have ruled higher so that, in spite of higher operating costs, there was for many years a continuously widening margin between operating costs and returns to farmers in this area. These margins could be used as a return on the ownership of land. As the size of this margin grew or seemed likely to grow, higher and higher values were placed on South Dakota land, and out of this grew the rapid rise in land prices that characterized the period from 1900 to 1920. Not all of this rise was due to changing economic distances, that is, to freight rates. Much of it was due to increases in prices while freight

rates remained unchanged, or at any rate did not rise as fast. Some of it was due to the introduction of new inventions in the way of large-scale machinery which made possible production of crops at lower operating costs and therefore made the use of the land show a wider margin of profit. Some of the increase was due to efforts put in by settlers in building roads, schools, etc. This created an intangible income to those living in the area which was not directly evident in price margins. But the effect of all of this was very similar to that which would have resulted if railway rates had been gradually reduced throughout this period. Larger margins remained as a basis for higher valuations on South Dakota land.

South Dakota had been placed during this period at an economic distance from areas producing other types of goods such that exchange was practical and profitable. It could produce those things for which it was best adapted and exchange them for products of other areas for which those areas were best adapted, both areas reaping an advantage by the exchange. Transportation relationships had become such that a modern commercial agriculture was possible. Such specialization is possible only if the costs of transportation are less than the added costs of producing products under unfavorable conditions or than the value of the sacrifices entailed in going without them.

Such development in the interchange of products, on the basis of the comparative advantages of production in the different areas, is a distinct advantage to all of the areas concerned but gives rise to many of our most difficult agricultural problems. It involves production for a distant and sometimes little known market. It involves unavoidable consideration of the effects on that market growing out of increased or decreased production in other competing areas. It involves, as we shall see later, a considerable series of problems which grow out of the fixity of such charges as those for railway transportation when farm and central market prices move sharply up or down. Nevertheless, the kind of farming that has now come to be taken for granted is an impossibility except as there is available a cheap and efficient transportation service.

### **The Nature of Railway Costs and their Relationship to Class Prices**

Out of the high fixed cost situation noted above, which makes price fixing by competition impossible and necessitates governmental regulation of rates, grows another peculiarity of freight rate relationships. This peculiarity manifests itself in the opportunity and incentive which are provided for the maintenance of different rates on different commodities for the same haul. From very early times in railroad history, such different rates have been made on different classes of goods for identical hauls. That is, clothing and other high value goods are put in class 1 and pay a relatively high rate per 100 pounds. Cheaper articles moving in larger volume take classes 2, 3, 4, etc., with successively lower rates. Brick, cement, coal, and iron ore may pay only a little more than the actual direct expense of moving them; yet, because their volume is so great, they may be among the most profitable enterprises of the road. The small profit per ton on many tons amounts to more than the large return per ton on a few tons. This, however, is not the real reason for class rates. Rates are usually



made low enough on each class of freight so that it will not be prevented from moving. Clothing will ordinarily be shipped even if rates are high. Brick, ore, and other heavy low-value products will not be shipped any great distance unless rates are very low. If the rate on them covers more than the direct cost of moving them they add something to the income available for paying fixed expenses and thus help to defray some of the expense which would otherwise have to be borne by the more highly valued products. Thus, contrary to the view of some, these low rates on some commodities do not necessarily increase charges on the high value commodities but may lower them. It depends on whether they pay more than they add to total expenses, and the justification of such low rates hinges to some extent on whether these commodities would still move if higher rates were charged. The rate which is charged is then placed somewhere within a given range, the upper limit of which is that rate which would be so high as to prevent movement and the lower limit of which is a rate that will just cover the special costs of moving this class of freight. The upper limit is ordinarily termed the value of service. It supposedly represents the addition which is made to the value of the product by transporting it and is, of course, difficult to determine with any great degree of accuracy. The lower limit which just covers the special or additional costs involved is also a difficult level to determine accurately but it can be approximated. In most cases, rates have come to be adjusted for each class of goods somewhere within this rather wide range. It will be readily apparent that this leaves much room for difference of opinion as to whether each class of commodities is paying its proper share of the total cost of operating the railroads, and the decisions as to how much each class shall pay and what commodities shall be put in each classification have been largely the result of custom, of special representation of given industries, and of arbitrary decision.

Class rates are characteristic of monopoly enterprises. An electric light company can charge 10 cents per kilowatt hour for current used for lighting and 5 cents for power current delivered over the same wires, but it could not do that if some competitor stood ready to sell lighting current at 5 cents. Yet without the lighting service at 10 cents, it might not be possible to provide the power current at 5 cents, and without the sale of the power current it might not be possible to provide the lights at 10 cents. In a similar way, the classification of freight along present lines would be very difficult if railroads were not monopolies, and even with the degree of monopoly now existing the upper limits of certain class rates for hauls of moderate distance are being considerably lowered by the fact that truck service is available in a competitive way. In fact, the rates on livestock, on household goods, and on various classes of merchandise are apparently, in many cases, above the upper limit of the range which has been indicated. As a result, considerable volumes of these commodities are tending to move fairly long distances by truck.

In addition to the class rates, it has long been customary to make special lower rates called commodity rates on important commodities moving in considerable volume in any given direction. These commodity rates ordinarily apply only on carload lots and are the ones that most largely affect the general movement of freight. Class rates apply more largely to high value goods and to small shipments. A very large part of the total freight

movement now occurs under commodity rates. This is being still more emphasized by the present tendency to move many of the l. c. l. (less than car-load lots) by truck.

### How the Rate Structure Came To Be as It Is

How did the rates from South Dakota and surrounding states come to be as they now are? The answer to this must be that the structure grew up piecemeal and largely by trial and error. In the early stages of railway development, railroads tried out various rates to see how high they could be placed for different classes of goods and their different lengths of haul without cutting down business. In general, the attempts to ascertain such levels were more a matter of guess than of any careful investigation. Little is known as to how high a rate many articles will stand for given hauls. This depends, of course, to quite a large extent upon the level of prices prevailing in the central markets. Even the lower limit to rates, at which they will contribute nothing to the overhead of the carrier, is very hazily known. Just as in the operation of farms, the operation of railroads involves many joint costs and this makes it difficult to decide how these costs shall be divided between the different commodities or services. The charging of such costs must be more or less arbitrary.

The earliest developments in railroad rate making were supposedly almost wholly from the point of view of carriers, who charged on each class of goods and for each locality, those rates which would provide the largest profits for the railway companies without too great a sacrifice of good will. Beginning around 1870, when prices had fallen to very low levels and depression was general throughout the country, a great deal of agitation developed for some control of railroad rates. It began to be recognized that railroads were so situated as to be able to exact arbitrarily a charge which did not necessarily bear very much relation to the costs of providing the services furnished. The approach to meeting this problem was largely along two lines: one, for legislatures to attempt to fix rates by law; and the other, to establish some form of commission which could inquire into the details of the problem and decide, after hearing both sides of the case, what the rate on a given commodity for any particular haul, should be. It very soon became evident that no legislative body could decide intelligently about the thousands of individual rates which must be provided in the movement of the country's freight and passengers. The agitation finally culminated in the creation of the Interstate Commerce Commission in 1887. This body was given the duty of investigating rate structures, hearing complaints, and deciding on cases of personal or regional discrimination in rates. It was found after a time that the act creating the Commission gave it insufficient power for dealing effectively with the problem, and its powers were greatly increased by the Elkins Act of 1903, the Hepburn Act of 1906, the Mann-Elkins Act of 1910 and the Esch-Cummins Act of 1920. As a result of these additions to the basic law, the Interstate Commerce Commission now has practically full authority to decide both how high and how low rates on given commodities and for given communities shall be. It also has very wide authority in controlling the issue of railway stocks and bonds, the building of new railway extensions, and so forth.

Effective control of rates by the government made relatively little headway until the passage of the Hepburn Act of 1906. The Interstate Com-

merce Commission had been set up in 1887 but its powers had been largely curtailed by adverse court decisions in the latter part of the century. By 1906 the general outlines of the rate structure had been developed even for such newer sections as South Dakota. Since 1906, and even more since 1910, the rates have been subject to control by the Interstate Commerce Commission but the Commission does not make changes in specific rates or for specific areas except as convincing evidence is presented to it that the existing rate is improper. The tendency has been, therefore, to leave the structure in its main outlines similar to what it was when first developed. A great many hearings have been held, however, in which individual rates have been changed. Also, very considerable changes in relationships have come about as a result of the percentage changes made in all rates during and shortly after the World War.

South Dakota has a somewhat different rate situation than most of the states surrounding it. It is crossed by only one of the transcontinental lines, the Chicago-Milwaukee-St. Paul and Pacific, and this is a recently constructed line which has not been able to gain the volume of traffic enjoyed by most of the transcontinental lines. North Dakota is crossed by two transcontinental lines—the Great Northern, and the Northern Pacific—both carrying a heavier volume of traffic than the Chicago-Milwaukee-St. Paul and Pacific. On the south, Nebraska is crossed by the Union Pacific and by the Chicago-Burlington and Quincy which, through its connections, is virtually a transcontinental line. There is a tendency for rates along transcontinental lines and other main lines to be made somewhat lower than rates on branch lines and other less heavily used routes. This is due to the fact that traffic density enters to quite an extent into decisions as to the reasonableness of rates. The reason for this has been indicated above. Much of the expense in railway operation consists of the cost of owning and maintaining the right-of-way, grades, rails, ties, depots, etc. If there is much traffic over the line, this expense can be spread over many tons of freight. If there is only a little traffic, it cannot be spread so widely and must be higher per ton. Some question may be raised, however, as to the adequacy of this line of reasoning, in view of the fact that certain areas near the ends of the lines may be contributing very heavily to the volume of freight moving over sections of the line nearer to the market centers, yet may themselves show relatively light traffic volume. In other words, there is room for question as to whether traffic density should be given as much significance in rate decisions as it now is and whether the volume of originating freight should not receive relatively more consideration.

This situation has, at any rate, tended to give rise to a rate structure in which hauls from North Dakota and Nebraska, similar in length to those from South Dakota, are rather substantially lower in many cases. Not only has this been true but some of the competing areas, especially where they included cities of fairly large size, have started earlier in providing effective representation of their interests at Interstate Commerce Commission hearings. The South Dakota Railroad Commission was created in 1885, but only in comparatively recent years has it been provided with facilities and personnel to make possible effective presentation of the interests of South Dakota shippers in such hearings. In addition to this, the nature of the South Dakota products has been such as to make difficult the concerted

and effective presentation of the interests of the shippers. The state's products are primarily those of its farms. No large markets are included within the borders of the state. Representation in such semi-legal matters is expensive and requires a very high degree of technical training on the part of those taking part. Large market centers, especially Chicago, Minneapolis, Omaha, and Kansas City have usually been in a position to give suitable representation to their interests. Farming groups such as those in South Dakota have been dependent in the main on such representation as could be given to their interests by the South Dakota Railroad Commission and on testimony presented by representatives who do not have a high degree of technical information concerning the subject. Out of these various factors has developed a rate structure in which South Dakota shippers have a somewhat higher general level of rates than do the surrounding states, particularly those on the north, south and east.

In 1918 it became necessary for the national railroad administration to raise rates by twenty-five per cent. The prices of farm products were rising rapidly, however, and had at this time gone up more than twenty-five per cent. Thus, the advance made did not depress the margin of profit which could be assigned to the use of land even though expenses of operating land had already risen to some extent. Prices of farm products continued to rise and the valuations placed on land continued to grow.

The war ended. Railroad properties were in poor condition. Expenses were high and incomes inadequate. The Interstate Commerce Commission decided that a drastic increase in freight rates was necessary. On August 26, 1920 this increase was put into effect. Rates for the section in which South Dakota lies were increased thirty-five per cent and those in much of the territory east of Chicago were increased forty per cent. Since such an increase would not immediately change the volume of production and the prices paid in the central markets this naturally took a sizeable part out of that portion of the central market price remaining to the farmer. Costs of operation did not immediately change so the main portion of the decrease fell on the margins which represented the payment for the use of lands.

Almost at the same time, American grants of credit to European countries, with which these countries had been buying American farm products, began to run out. Accumulated war supplies were put on the market. An abrupt change had been made in the credit policies of the Federal Reserve system of the United States. As a result of all these factors farm prices in the central markets of the country fell to very low levels compared to the high prices previously prevailing thus further increasing the severity of the reduction in the returns to farmers. These falling central market prices with the sharply raised freight rates served to pinch out much of the return which might be assigned to the use of land. This combination of circumstances had, of course, a disastrous effect on land prices. A relatively small change in the average price to the farmer for his grain or other crops can, if continued, affect land values very greatly. For example, with a corn yield of forty bushels per acre a change of five cents per bushel means \$2 per acre per year. This is a five per cent return on a difference of \$40 per acre in the value of land if we assume all of the costs to have remained unchanged.

Naturally the 1920 advance caused much complaint from farmers. Since the decline in central market prices and the advance in freight rates had

occurred almost simultaneously, there was some little tendency for the whole trouble to be attributed to freight rate increases. It was, in fact, much more largely due to the declines of prices in the central markets. Nevertheless, the Commission was induced, in view of the difficulties faced by the farmers of the country, not because of prosperity of the carriers, to make a general reduction in rates which amounted for most of South Dakota to approximately thirteen per cent.

Since the time of these large changes in rates, there have been hundreds of hearings before the Interstate Commerce Commission in efforts to work out a satisfactory adjustment of the whole group of rates and of the relative rates from different areas and from different markets. Since these relationships have important effects on the incomes of South Dakota farmers and on the valuation of South Dakota lands, it is important that the general public gain as clear an understanding as possible of the way in which South Dakota farmers are affected by these changes. Hearings are still under way and no doubt will continue for many years in an effort to gain a better balance in the methods of meeting the necessary expenses of carriers; and in determining what income carriers are properly entitled to, what services shall be provided, and how these expenses shall be distributed as between different classes of shippers and different areas. The various effects of rate changes are, as we shall see, very complicated, and the interests of South Dakota farmers are affected not only by the changes in their own rates but by the changes in rates affecting other areas.

In many cases the rates prevailing have been affected considerably by the nature of the competition. As a usual thing, the longer hauls if they can be made by water, especially the larger bodies of water, can be made more cheaply that way than by rail. As a result, in those cases where water transport is available, railroads tended to make lower rates in order to get a share of the business. Such lower rates may not affect adversely the other shipments over these same railway lines. If such business nets more than the special costs involved, it will help to some extent in paying the overhead of the carrier even though a much larger portion of such overhead might otherwise be considered its proper share. This affects the situation as to shipments into and out of the Great Plains area as compared to shipments to or from the west coast. There has been a considerable tendency to hold down west coast rates relative to those applying in the Intermountain and Great Plains areas because, if this were not done, more of this through business would go to the shipping lines operating through the Panama Canal. Such through freight as is carried by these roads probably helps to carry some of the charges that would otherwise have to be assessed against the Great Plains and Intermountain shipments. It is in fact possible that still lower rates to the west coast would be advantageous to all concerned including the railroads.

It must be recognized that, particularly in the early history of railway development, the carriers have been subjected to very great pressure for special concessions to particular localities and to particular individuals. For example, a given locality which could send large shipments by one or more routes might use this fact as a threat to force given lines to make concessions to it. If this could be brought about, the competing lines would, of course, tend to be forced to meet such concessions. In a similar way, very large individual shippers exercised a considerable weight of bargaining power in dealing with the carriers. It has been one of the chief func-

tions of the Interstate Commerce Commission to prevent such discrimination and it is because of this tendency that the Commission was finally granted authority to prevent the lowering of rates except by its permission as well as to prohibit the raising of rates. Its aim is to provide for fair treatment in the matter of rates and service to all communities and all individuals. Nevertheless, the effects of early discriminations in favor of given localities can still be seen in many parts of the rate structure.

Full discussion of these aspects of the matter would carry us far beyond the limits of this bulletin and the reader who wishes to go into them extensively can find very adequate discussion in a number of books dealing with railway rates.<sup>1</sup> Neither will an attempt be made here to go into the question of what the general level of rates should be. This hinges on a very complicated body of thought relative to methods of valuation, forms of corporate organization, and so on, which is in itself a separate field of study.

### The Effects of Different Types of Rates

We have seen that railway rates virtually must be fixed by public agencies. It follows, therefore, that the economic distances between various areas and the market centers and between different market centers are rather arbitrarily fixed. It also follows that the adjustments in rates on raw and finished products and between carload and l. c. l. shipments, and so forth will largely determine where given products will be produced, where the market centers will be located, how large they will be, and whether manufacturing will be carried on near the source of raw materials or near the consuming centers. If l. c. l. rates for a given commodity are very high in proportion to carload rates, it may pay to ship in carload lots to rather small distributing houses in such towns as Brookings, Huron, and Watertown. If carload rates are about as high as l. c. l. rates it may be that Minneapolis or Sioux City wholesale houses can, because of their size, under-sell the small wholesale houses in the towns mentioned and ship out in small lots from these larger centers. In a similar way the location of manufacturing enterprises is affected by the relative rates on raw and finished products. The nature of the balance between these types of rates will then be an important factor in building up or in checking certain types of distributing and manufacturing business for South Dakota. If a business is of such a nature that it can only be handled efficiently by very large units then it will probably continue to be carried on in the larger cities. This probably applies to flour milling and to certain types of grain and livestock markets. On the other hand, if size of the business unit does not greatly affect costs, its location may be determined very largely by relative rates on raw and finished products.

It might seem that class rates and commodity rates provide about all of the modification needed in adapting the rate structure to the situation. Such is not the case, however, and there are a great many complicated variations to these general bases of charges. Only a few of these will be mentioned as illustrations. For example, it is practically impossible to provide for a specific published rate on each commodity from each railway shipping point to every other railway shipping point in the country. Even

<sup>1</sup> See for example—W. Z. Ripley, "Railroads, Rates and Regulations," Chapters VI and VII or Eliot Jones, "Principles of Railway Transportation," Chapters VI and VII.

without such provision, railway tariffs are extremely voluminous and complicated publications to deal with, and relatively few local railway agents are fully familiar with them. To avoid this extreme complication, the practice has developed of building up rates from a combination of two or more separate rates. For example, an l. c. l. shipment of goods destined from New York to Redfield, South Dakota would be assigned to a class. The published tariffs would give a rate for this class of freight from New York to Chicago and from Chicago to Minneapolis and a local rate direct from Minneapolis to Redfield or, possibly in some cases, a local rate direct from Chicago. These two or possibly three separate rates would be added together to give the rate applying. Most rates for commodities moving from west of the Missouri river to points east of the Missouri, or vice versa, have what is known as a rate break at some one of the so-called Missouri river gateways such as Sioux City, Iowa; Omaha, Nebraska, etc. This is mainly a means of simplifying the process of determining rates on individual shipments, but it also has grown up partly as a result of the efforts both of individual railroads and of particular cities to bring about rate adjustments which will tend to force shipments through certain channels.

In a similar way, as a means of simplifying the publication of rates and of equalizing competition, blanket rates have been applied to considerable zones. Where this occurs, any shipping point within a range of possibly as much as 100 miles or more can make given long distance shipments at the same rate. For example, corn shipped from Oldham, South Dakota to Seattle, Tacoma or Portland will take the same rate as corn shipped from Aberdeen, South Dakota although the distance shipped is much greater in the one case than in the other. These blanketings ordinarily do not affect short local shipments.

Another type of rate known as a proportional rate operates to lower the rate on a second phase of a shipment which may or may not be made. For example, coarse grains moving into Omaha and Nebraska from points in Iowa may take a certain rate from shipping point to Omaha. If later, this grain or equivalent grain, is bought by someone who proposes to ship it to southwest points such as those in Nevada and California, the into-Omaha billing may be presented and by means of it a lower rate than that regularly charged will apply on the further shipment to southwest points. Such rates frequently do not apply to all shipments into the first market center but only to those from certain areas. In that case, in-shipments carrying this billing may bring higher prices than similar qualities which do not afford such privileges. In other cases, transit rates are provided. For example, if wheat is shipped from North Dakota to Minneapolis, is there inspected and sold and possibly combined with other wheat, and then is shipped through to some eastern point, it may be allowed to move under the same rate as though the shipment had been unbroken from beginning to end.

Other special rates may be provided in the form of lower than regular rates when grain and other products are moving for export, or on goods which are imported. This is not intended to be an exhaustive listing of the various types of freight rates but is intended to illustrate the great variety of influences which may have to do with the rate applying from one given point to another, especially if the distance is great. Whether all of these types of rates can be justified from the standpoint of public policy is too extensive a problem for discussion here. The Interstate Commerce Com-

mission has at various times raised some little question as to the need for and propriety of transit rates, proportional rates, and so forth. These have, in many cases, grown up as a result of the selfish efforts of given market centers and railway companies to develop and maintain their own businesses. The private agencies concerned with these adjustments are not particularly concerned with the development of rate structures which will be most economic from the standpoint of shippers and consumers. If products can be forced through more than one market center or forced into uneconomic roundabout hauls, this may be advocated as a means of increasing the profits of given agencies. Shippers and consumers are, however, interested in having performed only those services which are necessary, and in having rate adjustments which will favor the most direct and economic movement of commodities.

Out-of-line hauls may be justified in some cases if they mean bringing together into larger units the marketing or processing activities connected with the handling of the given commodity. Just what economies are involved in these larger marketing units can not be very clearly stated at this time, as very little study has ever been given to them. For example, it would appear that feeder steers shipped from western South Dakota and to be fattened in southeastern South Dakota might logically change ownership somewhere between these two sections, possibly at some point such as Huron, instead of being shipped to Sioux City or Omaha and then shipped back a considerable distance for fattening. Yet, most shippers of feeder steers are reluctant to place them on sale on as small a market as that at Huron for fear that there will not be enough competition for them. They prefer to make the longer shipment in order to get the advantage of a larger market center. Just how much advantage there is in this no one can say with very much positiveness. It would appear, however, that a rate structure which would bring about a larger number of shipments of steers into Huron and would encourage their being offered there might develop a market of sufficient size that it would provide what is believed to be the necessary amount of competition.

One of the aims in calling attention at this point to the very complex array of different rates is to emphasize the shippers' problem in connection with them. A given shipment if moving very far, may be eligible to several different combinations of rates and some of these combinations may be considerably higher than others. Most local railway agents are not widely enough informed on these points and do not have adequate tariffs at hand to provide without fail the cheapest combination for a given shipment if it is moving any considerable distance and over an unusual route. Where the customary shipments move in regular channels, the lowest rate combination is much more likely to be common knowledge. In the case, however, of such a commodity as potatoes shipped from South Dakota which may move great distances in a great variety of channels, very considerable savings can often be made if a trained traffic man can check the routings and rates applying. Not infrequently, organizations shipping several thousand cars a year may find it possible to recover many thousands of dollars each year in overcharges on such shipments. Most railroad companies provide for the checking of such overcharges in their own offices, but many of them slip by. The provision of special expert service in that connection is one of the economies derived through some of the larger scale cooperative and corporate enterprises handling farm prod-



ucts. As a rule, the individual and the smaller agency can not afford to employ expert help of that kind.

## Trends in Rate Levels

Another aspect of the whole rate problem which needs brief mention is that of the general trend of rates charged. It might seem that this should be easily measured and shown. As a matter of fact, it is very difficult to get representative figures showing the situation for the thousands of individual rates which are applied to various products in the United States. Also, it is very difficult to get a clear view of the relative charges for different groups of commodities such as those for farm products and those for products of the mines or those fabricated products coming from factories. In general, it is safe to say that the level of rates was moving gradually downward from the period of the 1890's to the time of the World War. Figures are often presented in this connection which may be misleading. Earnings are often stated in terms of amounts paid per ton-mile, that is, per ton of freight hauled one mile. If the kinds of freight remained unchanged, this would in many cases give a fairly good picture of the changing situation as to railway charges from the shippers' standpoint. Such a ton-mile rate, however, is usually an average. It may include some groups of rates which have risen and some which have declined. Also, if a carrier has had a shift in the type of products hauled, say an increase in the volume of coal, iron ore, or something of that type, it may show a considerably reduced charge per ton-mile at the same time that no change has occurred in the actual rates for given commodities. Reports of ton-mile earnings must, therefore, be interpreted with some little care. Not only this, but the relationship of these to railway net earnings is not one that is readily apparent. Most railroads have a capacity for hauling much more freight than they ordinarily do haul. This is especially true of the carriers throughout the West and South. As these areas develop, the volume of traffic tends to increase and this increase in traffic may increase net earnings very much more rapidly than it increases total freight revenue. An analysis in terms of ton-mile earnings will not show the situation as to this. If the business of a given carrier has been increasing rapidly, ton-mile earnings may have declined; yet net earnings may have increased very materially. The question of how much of such gains should properly be allowed to the carriers and how much should be retrieved for the public in the form of lower rates is one of very wide interest but also one of extreme difficulty. Periods of depression ordinarily mean periods of low volumes of traffic. This is not so generally true in the case of carriers handling largely farm products as in the case of those more dependent on other types of freight, but where it occurs, there is a very large shrinkage in railway revenues and one of such a nature that it may be unwise to make hasty rate adjustments in connection with it since much of the difficulty may be removed when business picks up again. On the other hand, considerable hesitancy should be exhibited in cutting rates unduly on the basis of net earnings which look particularly high in a period of great prosperity when the volume of freight has been such as to use the facilities of these carriers in a much fuller degree than usual.

## The Problem of Joint Through Hauls

Still another important problem which has to be met by national regulatory agencies has to do with the proper division of payment for joint through hauls. For example, a shipment of grain may originate in South Dakota, be hauled by the Chicago and Northwestern railway to Chicago and there be transferred to the Baltimore and Ohio Railway to be hauled to Baltimore for shipment to Liverpool. Because of their strategic location the so-called trunk-line roads operating from Chicago to the East coast have in the main been relatively prosperous. Much freight assembled or distributed by other lines must of necessity move over these trunk lines. The trunk lines have, therefore, a heavier traffic density than those lines more directly concerned with originating freight and may be in a stronger bargaining position because of the large volumes of freight moving westward over them. (Rate competition between them is prohibited.) In the determination of rates the tendency has been to give considerable weight to the traffic density, that is, to the number of tons moving over each mile of line. The originating lines contribute of course to the traffic density on trunk lines nearer the market but do not themselves show a heavy traffic density. How much of a given through rate will go to the trunk line carrier and how much to the western line originating that freight must of necessity be determined somewhat arbitrarily. This, like many of the other problems involved, is of such a nature that a very definite basis for decision is not available.

## Rates Usually Change Slowly

Another aspect of the whole problem of rates which must be given serious consideration, is that which involves the slowness of change in rates, or, to state it another way, the rigidity of the rate structure once it has been established. To the farmer, accustomed as he is to sudden and violent changes in the returns to him, the emphasis on precedent which is very noticeable in all rate matters seems to give that factor an undue amount of weight. Careful consideration of all aspects of the matter will show convincingly, however, that grave injustices will be done if rates are changed frequently and violently. Large volumes of investment have been made on the basis of given rate relationships. Unwarranted losses to some and unwarranted gains to others may easily arise out of ill-conceived and sudden changes in these relationships. This does not mean that modifications in the direction of a more equitable balance should not be made, but it does emphasize the difficulty of finding a definite basis on which to make such adjustments. The nature of the injustices resulting from sudden and violent rate changes is more fully developed in later sections of this bulletin.

## What Happens When Rates are Changed

Freight rate changes usually belong to one of two general types. They are specified changes in the rates applying to movements from some particular area or region and do not greatly affect the rate structure as a whole, or they are general percentage changes in all rates over the whole country or at least over considerable parts of it. Rate changes of the first type are much the more common and are usually made after careful investigation by the Interstate Commerce Commission, and after hearings

have been conducted by that body at which the various parties interested may present arguments for or against such changes. The initial impetus for such rate adjustments usually comes through an application by shippers for lower rates or for rate adjustments, or through application by carriers for an increase in rates. Occasionally carriers ask the privilege of introducing a lower rate in order that they may meet certain competition and draw a larger share of the business.

The other type of rate change, namely, a percentage increase or decrease usually occurs as a result of some large and widespread disturbance in conditions, ordinarily from a considerable change in the purchasing power of money or in the general level of wages. For example, the Interstate Commerce Commission made three such general percentage changes in the period from 1918-1922, the first two being advances to allow for the large advances in wage rates and costs of materials, the third one being a decrease which was considered to be justified by the drop in the general price level and the increased purchasing power of money and by the serious depression in the incomes of shippers. Wage scales, however, being in dollars and cents rather than in purchasing power could not be adjusted very rapidly to a lower level of prices so that the railroads have in recent years faced a difficult situation because of high wage scales and a level of rates which was not as high proportionately. They have had some decline in cost for materials and there have been some decreases in wage rates and changes in labor classifications. The difficulties confronted by the railroads have, however, been somewhat eased by the very large volume of traffic carried by the roads during most of the period from 1920 to 1930. The hauling of an increased volume of freight does not ordinarily increase expense in proportion to the increase in income to the railroads.

With earnings on investment well below the five and three-quarters per cent indicated by the Interstate Commerce Commission as a fair return, the railroads, especially those in the West, have undertaken serious efforts to secure a new percentage increase in the whole level of rates. This effort was defeated by the shippers in the hearings carried on in 1925 and the years immediately following. The years 1930 and 1931 have shown a marked decline in the volume of freight moved and this has decreased net earnings of the railroads more than proportionately. Consequently a new effort is now under way in the form of an application for a fifteen per cent increase in the general level of rates. This has not, at this writing, been decided.

Consideration will first be given to the nature of the effects arising from changes in individual rates or in rates affecting only relatively small areas. No definite criterion can be set up as to what such a rate should be. The previous discussion has shown that the range between the special costs of providing this service and the levels at which the freight will not move, in other words the value of service, is very wide in most cases. A rate anywhere within this range may be fairly well justified under certain conditions, therefore the basis of decision comes to be a comparison of this rate with rates on other lines for similar hauls under similar conditions as to cost of operation and volume of traffic. While that is probably the principal basis for decision, precedent also has quite a good deal to do with the decisions of the Interstate Commerce Commission. Though two rates for similar hauls may be different, if they have always been that way they do not represent any such serious injustice as if one is changed and the

other left as it was. Valuations on land and on the equipment used in handling the transportation and warehousing business in a given area come to be adjusted roughly to the prices which prevail locally as compared to those in the central markets. If an arbitrary change is made which alters this relationship it adds to or detracts from the values of such lands and equipment thus increasing or decreasing undeservedly the values of property held by given individuals. In cases where a change of this kind affects the flow of products, possibly decreasing materially the volume of business done in one market center as compared to that of another, very large gains or losses in the value of investments may be made without any merit on the part of those gaining or fault on the part of those losing. For this reason the various market centers are likely to oppose many of the rate changes proposed either by shippers or by carriers, partly because it is hard to foresee what the effects of given changes will be and partly because starting a series of rate changes may upset a very complicated set of long established and carefully adjusted intermarket relationships. These centers will, of course, advocate changes which will clearly strengthen their individual positions.

To take one of the simplest cases first, let us suppose the freight rate on wheat from Aberdeen, South Dakota to Minneapolis, Minnesota to be raised from 20 cents per cwt. to 25 cents. This means an advance from 12 cents per bushel to 15 cents. Who will be affected by such a change?

If a large part of all the wheat in the United States came from growers right around Aberdeen, and if a reduction of three cents in the price received by these growers would cause them to cut down production, then the whole country's production would be noticeably lessened, and prices throughout the country would rise somewhat. Thus the initial decrease in price to growers at Aberdeen would, in the course of a few years, tend to be offset by an increase in the general price of wheat throughout the country. Part of the increased freight charge would thus be borne by the growers of wheat around Aberdeen and part by the consumers of that wheat, probably by the bakers and by householders who bake their own bread since flour prices usually change with the price of wheat but prices of bakery bread are likely not to change with any small change in the price of flour.

But these are not the conditions. Wheat growers around Aberdeen, though they grow a great deal of wheat, do not grow any large part of the whole United States wheat crop, and small changes in price do not materially affect the acreage or production of wheat in that territory. Therefore, a rate advance such as that mentioned would not be expected to raise prices in the central markets of the country. In fact for export types of wheat, it would be necessary to diminish the world supply if central market prices were to be advanced. If handling agencies continue to operate on about the same buying margin as before, the effect of such a rate advance will be then to lower the price of wheat at Aberdeen about three cents per bushel below what it would have been if such rate change had not been made.

The next question has to do with how this will affect the activities of and the returns to farmers in the area. This is not so easily answered. The kinds and relative amounts of products farmers in a given area can grow depend a good deal on how they supplement each other as to demands for labor and land. Some crops are grown continuously which return much lower incomes per hour than others on the same farms. Oats, for example, seldom give as high returns for the labor put on them as corn does. Yet

it pays to grow oats because they use time in a different part of the year than that required by corn, and there is no other use for this time that will add to the net income of the farm as much as the growing of these oats does.

Because of these differences in competition between crops at various periods in the year, a reduction in the price of one crop may or may not cause a reduction in the amount of that crop grown. If there is some other crop which uses labor at about the same time and which was nearly as profitable before; and if it has not had a decline in price, some acreage will probably be transferred to its production. This will tend to diminish production of the first crop and lessen the losses suffered from its decline in price. More frequently, however, there is no other kind of production that the farmer can turn to readily; or, if there is, it is very possible that its price has also declined leaving the two in the same relationship as before. If that is the case, there will be no profit in a transfer to other lines of production and no appreciable shortening up of supplies will occur until prices reach a point so low that they do away with all the return from land and most of that from buildings and equipment owned by the farmer; that is, until it does not pay to operate part of the land. It will usually pay to operate the land so long as there is any return for the use of buildings, equipment and labor which would not otherwise be used.<sup>2</sup>

Prices paid to farmers vary a good deal from year to year, and it is not always easy for them to see when the price relationship between competing lines of production has changed definitely enough to make it advisable to shift from one to the other. Such a change as that we have indicated is therefore likely not to be recognized by the farmer. It will operate to lower his income, but will not be distinguished from the other factors affecting his prices.

Naturally the first effect of the change will be on the farm operator and on the owner of share-rented lands. Suppose that a farm operator is renting for cash a 400 acre farm which is normally expected to yield fifteen bushels of wheat per acre, 200 acres being in that crop. If his cash rental is three dollars per acre, or \$1200 in all, this assumes that the use of the land and buildings is worth that much to him.<sup>3</sup> A reduction of three cents per bushel on the 3000 bushels of wheat produced is a decrease of \$90 per year in the operator's income, his expenses supposedly staying the same. The burden of this charge is pretty certain to fall, for a year or two at

<sup>2</sup> This is the heart of the present day agricultural problem. Prices for practically all of the agricultural products have gone down so that there is little advantage in shifting from one to another, and the needed shortening up of supplies is difficult to bring about except as prices become so low as to squeeze out all income from the less efficient land and fixed investments. Prices of the different products of course do not rise and fall in exact accord with each other and a given percentage decline in one may affect its profitability in a much greater extent than the same percentage decline in the price of another product will do. Rapidly changing price levels such as those of recent years may therefore make it advisable for any given farmer to shift from one line of production to another even though both kinds of product are suffering from heavy production. Usually, however, shifts from major to minor crops cannot be made on a sufficient scale to aid the major crop and serve only to swamp the market for the minor crop.

<sup>3</sup> This is not an exact statement of the situation. The rate he must pay as rental in order to get the use of the land depends on what the poorest renters who succeed in getting that kind of land are able to pay. The tenant under consideration may be able to make more from such land than it is necessary for him to pay in order to get it. On the other hand, once he is established on a given piece of land he may, if his receipts decline, be allowing all or most of the lessened income to come out of returns for his own labor rather than to move off the land. The final result depends a good deal on the length of time taken into account and the amount of similar rentable land available.

least, directly on the farm operator reducing his net income by that amount from what it otherwise would have been. It may continue to rest wholly on the operator. On the other hand, he may recognize rather clearly this reduction in his income, and, because of it, bid less for the use of the land when he next renews his lease. If this occurs such lowering of rentals may be less or more than the \$90 reduction in operators income.<sup>4</sup> In this case the changed freight rate may come eventually to rest to a greater or less extent on those who owned land at the time the change was made or shortly thereafter. Since the income producing ability of land tends to be translated into altered valuations on land, the ultimate effect may be a change in the relative level of land prices for the area.

It is evident from the above discussion that the final resting place of the changed income depends a great deal on local conditions and on the length of time considered. It is probable that most of it continues to rest on the farm operators with the owners of the land taking the next largest share. In some localities, however, this relationship may be reversed.

The case just considered is one of the simplest. A more complex one may be represented by a change in the rate on wheat or flour beyond Minneapolis, say from Minneapolis to Chicago. If there is still no alternative route equally cheap this may operate much like the first case discussed except with the added complication that some of the change may fall on the dealers in Minneapolis. However, in view of the large number of competing dealers in Minneapolis, this is not probable. But if there is an alternative route, say by way of Sioux City which has been getting a small volume of the grain because of its not being as convenient, the change may serve to turn considerable of the business to the Sioux City route with very little reduction in the price paid to growers around Aberdeen. Such a change would serve to build up Sioux City at the expense of Minneapolis. It would affect primarily the dealers, warehousemen and other service agencies in these two centers. It would affect producers of wheat in the Aberdeen territory only through such difference as there may be in the superior services and facilities available in Minneapolis.

It will be seen from this that a change in rates beyond the first market center or even between it and the originating territory may serve, not to change prices to the growers but only to change the routing of the traffic. Such a change, however, would merely increase the prosperity of one carrier at the expense of another and would not serve to increase the income

<sup>4</sup> Some very important factors operate to prevent free and easy adjustment between the factors of production of such changes in income. If they are large enough to be clearly recognized, they are pretty likely to show up in lower bids for land both as to rentals and as to purchase prices, but a change in the number of people wanting to farm; that is, perhaps, a change in industrial conditions may serve to offset such a change in bids for land and to leave rents and prices where they were. Such a change in the number of bidders would probably, however, have forced a change if it had not been for the counteracting effect of the change in freight rates. If conditions are such that the operator cannot force the charge onto the land owner, he may lessen its bearing on himself to some extent by lower bids for hired labor or it may even appear in a larger defalcation on borrowed funds and thus show up partly in a higher interest rate charged in the area, thus coming more largely from the super-marginal farmers of the area. Owner operators will, of course, take such reduction in their combination incomes without facing the problem of division of returns between land income and operation income. They may, however, bid less for labor. Both classes of farmers may decrease purchases and thus cause some indirect effects on groups other than those on farms. In still other cases the lowered income may operate to speed up the adoption of lower cost production methods such as greater use of machinery, etc.

The reader who wishes a fuller consideration of the effect of land income on land values will find helpful a study by C. R. Chambers. "The Relation of Land Income to Land Value," U. S. Department of Agriculture, Bulletin 1224.

of the carriers as a whole. Such a rate will usually be advanced only if competing rates are to be advanced accordingly. Any such change will, of course, also be strongly opposed by the market center or centers likely to be adversely affected. Market centers ordinarily are not much concerned with the level of rates but only with the routing of freight. They hold strongly for the advantages that have been theirs in an earlier stage of development, and are likely to slow up or prevent needed adjustments to the development of new market centers and diversion points.

A very small difference in rates or advantage in sales outlet is sufficient to divert shipments from one route to another. Rates thus serve to build up certain cities as selling centers and as places for warehousing, milling, packing, etc. To perform some of the functions required in marketing, very large centers are needed. For example, the risk-taking activities involved in hedging grain cannot be carried on effectively except in such large centers as Chicago and Minneapolis. Other functions such as storing, blending, processing, etc., may be carried on nearly as well in centers of moderate size. Comparatively little study has so far been given to the advantages and disadvantages of different sized market centers for performing such functions.

It has generally been assumed that South Dakota would be benefitted and stabilized by a greater diversification of its industries and activities. From a transportation standpoint, the approach to the problem of bringing this about should be through study of the marketing and processing functions performed on South Dakota products, and the relative costs and efficiencies of performing these in centers outside the state as compared to those of carrying them on within the state. In some cases, the reason for a given location of the activity is a rate advantage. In others, it lies in lower costs other than those of carriage. Where the first cause is operative, efforts directed toward certain readjustments of rates are very likely to encourage the development of the activity within the state. Where a considerable difference in cost advantage results from large scale handling, it is not likely that any rate changes which are possible of attainment will serve to bring the activity within the borders of the state.<sup>5</sup>

It does not follow from the fact that residents of South Dakota may consider it desirable to retain within its borders more of the activities connected with the storing, merchandising, and processing of their products that the Interstate Commerce Commission or other agencies concerned will endeavor to bring this about. Other states and cities wish to retain these activities and to add others to them. Justification of any move for more decentralization of such functions must rest primarily on one of the following propositions which in turn must be adequately demonstrated to the Commission (a) that a given rate situation is discriminatory (as shown by comparison with other rates for similar hauls and conditions) or (b) that a change in certain directions would be socially desirable through (1) lessening the real costs of performing given services, or (2) stabilizing conditions through decentralization and diversification of activities.<sup>6</sup>

It is not usual that a rate change from only one shipping point is seriously considered. A change ordinarily involves rates from a group of ship-

<sup>5</sup> Differences in tax conditions and the possibilities of economical combination of a given activity with others are regarded as cost differences. Such complementary and supplementary relationships often determine the location of a given business activity.

<sup>6</sup> By "real costs" is meant the input of human effort and of materials needed to carry on the activity.

ping points and aims to maintain approximately the previously existing competitive relations between them. It is evident that if the rate, say from Aberdeen to Minneapolis, is increased without changing that from Groton or from Ipswich, these towns will be able to pay relatively higher prices, and to draw to themselves some of the grain business which has customarily gone through Aberdeen. Such conditions in exaggerated form may cause grain to be hauled through a given town to a competing shipping point especially since the advent of truck hauling on a large scale. Such conditions may arise from rate changes on one of two parallel railway lines or on opposite sides of a state line such as that between South Dakota and Minnesota where somewhat different policies as to rate making have affected the situation.<sup>7</sup> The Interstate Commerce Commission usually grants relief in the more flagrant of such abnormal competitive relationships.

### The Effects of a General Rate Change

The discussion so far has dealt with the relatively simple situation where one rate or a small group of closely related rates is changed. Much more complicated are the various changes and reactions when a general rate increase or decrease is made. In the previous discussion it has been possible to assume without doing serious violence to the facts of the case that there would be no effect on the general level of prices in the market area as a whole. When all rates are raised or lowered it is hardly justifiable to make this assumption, though supplies and prices of some types of products may be little affected. The effects of such changes will be most pronounced in the case of bulky, low-value products which do not enter largely into international trade.

A rate change which applies to all types of products at once leads to insurmountably complicated analysis if its effects are followed out in detail. A better understanding of these effects will be provided, however, if a general advance in all rates applying to a given product is analyzed, the rates on competing lines of production being assumed to stay the same. Nevertheless it is possible to indicate some of the more important effects of rate changes affecting all products. It is needful to keep in mind that such a general change, for example an advance in all rates, does not necessarily depress production of all commodities. Though prices of all may be depressed in certain areas, they are not depressed equally. Thus a change which lowers prices sharply for one product of the area may make it profitable to increase production of some other less affected product even though the price of the latter may be lower than it has been.

General percentage changes affect prices in the outlying areas much more than in those areas lying near the major consuming market centers. This results from two separate aspects of the matter.

First, the fact that the original rates from the outlying sections are higher. Thus a 25 per cent increase in a 42-cent wheat rate from Newell, South Dakota to Minneapolis amounts to 10.5 cents per cwt. while the

<sup>7</sup>Because of the presence of large market centers within its borders, Minnesota can sell many of its products without an interstate haul. South Dakota's products nearly all move across state lines to reach their first large market centers, and the rates governing are nearly all determined by the Interstate Commerce Commission. The influence of the Minnesota Railroad Commission can be exerted more effectively for hauls beginning and ending in Minnesota.



same 25 per cent increase on the 17 cent rate from Flandreau, South Dakota to Minneapolis amounts to only 4.25 cents. If we assume central market prices and handling charges to remain unchanged, the Newell farmer finds his price depressed by 6.3 cents per bushel. The Flandreau farmer's price, on the other hand, is decreased by only 2.55 cents per bushel. In other words, the actual dollars and cents change has been more than twice as great in western South Dakota as in eastern South Dakota.

Secondly, since prices are lower for the same quality of product as the distance from the central markets increases, the percentage changes are still more significant. Let us assume that a given grade of wheat is worth \$1 per bushel in Minneapolis and that freight on it from Newell, South Dakota is 25.2 cents per bushel. Handling charges are assumed to be 5 cents per bushel. Price to the farmer at Newell will then be 69.8 cents per bushel or something near that. Local prices are not usually quoted in fractions of cents so such adjustments would, of course, be approximate. The use of fractional cents as here done aids, however, in a clearer presentation of the nature of the changes resulting. If rates are now increased 25 per cent, other things remaining unchanged, the price to the farmer at Newell will become 63.5 cents, a drop of a little over 9 per cent. The Flandreau farmer's price, on the other hand, was 84.8 cents. This is now reduced by 2.55 cents or 3.1 per cent. Even were a flat increase of so many cents per bushel made in the charge for hauling, it would still be a larger percentage of the price at Newell than of that at Flandreau.

It is evident from this that general percentage reductions in rates tend to stimulate outlying areas as compared to areas near the market centers, and that general percentage increases tend to depress these areas more than those nearer the market centers. Even though no rate changes occur, prices in these outlying areas tend to be more unstable if considered in percentage terms. This is due to the larger amount of the fixed charges between them and the central markets. Thus, if wheat drops to 75 cents per bushel at Minneapolis, other things remaining equal, the Newell farmer will have suffered a 36 per cent drop in his price while the Flandreau farmer will have experienced only a 30 per cent decline in his price.

The preceding discussion has indicated that frequent general percentage increases and decreases in rates tend to upset conditions in outlying areas to an undesirable extent, causing overstimulation in the one case and excessive depression in the other. This tends to encourage undesirably speculative development of such lands. General percentage changes also upset settled intermarket relationships in many and scarcely predictable ways. Such changes usually must be followed by hundreds of hearings involving adjustments on specific rates, and usually should be avoided if possible. Also if such changes must be made, there is much to be said for making them flat changes of equal amounts on all rates for a given product in order to lessen the serious upset of the relations between areas near the market centers and those situated farther out.

### **A General Percentage Change in all the Rates for a Given Product**

For many products, the changes made in freight rates are a minor element in determining where their production will occur. For these, other reasons for a given localization of production are likely to overshadow

freight rates to such an extent that no clear view of the effects of freight rate changes can be obtained by study of their prices and production. On the other hand, for a bulky, relatively low value crop like potatoes, hay or sugar beets, freight rate changes produce effects which can be studied with some degree of accuracy. Likewise, for such manufactured goods as cement, brick, lumber and for raw materials such as iron ore and coal, the effects of rate changes are identifiable and to some extent measurable. In most cases, however, data have not been collected with the precision and localization needed for satisfactory study of inter-area relationships such as those here under consideration.

Some of the developments growing out of significant rate changes can be more readily studied for the potato crop than for many of the other agricultural products, and this crop has for that reason been used as illustrating these changes. The crop is bulky and heavy in proportion to its value. Its production and consumption are carried out almost wholly within the United States. High acre yields, high prime costs and effective competition of other crops for the use of the land make the reactions of supply to price more definite and recognizable than they are for many of the other crops. Changes in all rates for one commodity and not involving other commodities are not ordinarily made. The use of this assumption is merely an artificial simplification to clarify presentation.

### Localization of Potato Production

The commercial late potato crop is grown mainly in localized areas which may be outlined roughly as follows:

Area No. 1.—Maine

Area No. 2.—New York and Pennsylvania

Area No. 3.—New Jersey

Area No. 4.—Michigan

Area No. 5.—Wisconsin

Area No. 6.—Minnesota and North Dakota

Area No. 7.—South Dakota

Area No. 8.—Colorado

Area No. 9.—Nebraska

Area No. 10.—Idaho, Montana, Wyoming, and Utah

Area No. 11.—Washington and Oregon

Area No. 12.—Minor areas in Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, Iowa, Illinois, Nevada, and California

Each of these commercial areas supplies a considerable consumer demand in its immediate vicinity, and in addition contributes toward the general supply moving more or less in the direction of the center of population.<sup>5</sup>

This movement of potatoes tends to be toward the highest price section of the market which lies in most years somewhere in the section including Cincinnati, Ohio; Pittsburgh, Pennsylvania and New York City.

<sup>5</sup> The commercial potato areas do not in any of the cases cover a whole state. Study of price and production relationships must usually be on the basis of state figures, however, because nearly all of the available price and production data are reported by states rather than by natural or economic areas. This lessens the accuracy of any studies that can be made at the present time since combining prices for surplus and deficit production areas within a state gives a figure that is not representative of either.

Prices are roughly graded down as greater distances from this high price section are reached, except that they may rise again in the section which includes the Pacific coast states.

### Changes in Potato Rates 1917 to 1923

A few typical rates will illustrate the character of the changed rate situation for potatoes as between 1917 and 1923. Some of the more representative of these are shown in Table I.

TABLE I  
Representative Changes in Potato Rates Between 1917 and 1923

	Rate per cwt. in 1917	Rate per cwt. in 1923
Caribou, Maine to New York City .....	\$ .33	\$ .565
Wayland, N. Y. to New York City .....	.18	.285
Greenville, Mich., to Pittsburgh, Penn. ....	.215	.34
Hawley, Minn., to Chicago, Ill. ....	.27	.415
Idaho Falls, Idaho to Chicago, Ill. ....	.55	.77

Let us now consider the nature of the developments which have resulted from these changes. When such rate changes first go into effect, it is reasonable to suppose that central market prices will not be different than they would otherwise have been. The immediate effect is presumably to lessen the prices paid to growers by the amount of the increase in transportation charges, except as dealers margins may be narrowed. The changes indicated above are large enough, however, so that we may expect them to have eventually some effect on the acreage devoted to potatoes in these various areas. The increase of 14 cents per bushel in the charge for transporting Maine potatoes would mean, with a 259 bushel yield (1924-28 av.) \$36.26 per acre, a very significant item. Even in other areas with their lower yields the reduction in acre returns would be significant and probably such that growers would recognize it. For example, an increased charge of 8.7 cents per bushel on the 103 bushel yield of Minnesota and North Dakota for the same period amounts to \$8.96 per acre, and the 13.2 cent increase on a 155 bushel yield in the Idaho section involves a change of \$20.46 in income per acre. These are large changes in proportion to the usual valuations placed on the use of land, and are almost certain to throw some of the land into different uses than they would have had if such changes had not occurred.

It will be necessary to consider, not the actual changes in production that occur, but the changes which farmers make in the amounts of land, fertilizer and labor used in growing the product. The actual outturn in any given year depends largely upon the weather, but year to year yield differences tend to average out so that the general level of production over a period of years depends mainly on the inputs of land, labor and fertilizer indicated above. Freight rates ordinarily are not changed at frequent intervals. Adjustments of production to them have therefore more chance to work themselves out than do the adjustments to ordinary price changes.

Obviously such adjustments cannot take place on any considerable scale short of one year's time, and they may occur almost imperceptibly over a period of years. They will occur only as some more profitable use can be made of the land, labor and capital used for producing the crop un-

der consideration. For such a crop as potatoes which requires much irksome hand labor, production may decline even though it still nets more dollars per acre than competing crops. Some farmers may conclude that the income is not enough larger to compensate for the toilsome labor involved. Omitting this consideration, it is evident that the amount of decrease in production in response to a price decline will depend on the other lines of production which can be turned to. If, as in Maine or in North Dakota, these are relatively low income crops, such as oats or other small grains, a drop in potato prices is not likely to affect production very much. On the other hand, if some alternative crop, such as sugar beets in Idaho, canning peas in Wisconsin or corn in the corn belt, is nearly as profitable as potatoes, a small decline in the general level of potato prices may cause considerable transference to competing crops, especially if the latter require attention at the same period of the year. In the case of potatoes, competition is likely to be mainly for labor rather than for land as they take relatively little land in proportion to the labor required.

Let us suppose that the first effect of the rate change is to cause less land and labor to be devoted to potato production in all of the areas. If crop conditions are normal this will cause a shortening up of supplies and a central market price higher than that previously prevailing. For some of the areas near the market centers this higher price is likely to more than offset the small advance in rates which has occurred. Thus in the second or later years following, these close-in areas may show a production above that which they had before the rate was advanced.

Such an increase in the prices at the market centers will have offset to some extent the price declines in the outlying areas but not enough to compensate for the large reductions which have been made there. These areas will therefore tend to maintain a production somewhat below what they previously had, while the more central areas will tend toward a somewhat higher production in response to the somewhat higher prices which are likely to prevail in the market centers. Such a change in rates has then changed the comparative advantages of different areas for the growing of potatoes. The more central areas have been given a greater advantage in this line of production; the outlying areas have been placed at a greater disadvantage.

The change indicated above may or may not be in the interest of society. The basic question involved is this: Is it more advantageous to maintain low rates and encourage the use of more of the land lying at a considerable distance from the centers of population, or to maintain relatively high rates and encourage the application of more labor and capital to the land lying nearer the centers of population? It is not the primary purpose of this bulletin to attempt an answer to this question of policy. Its purpose is rather to make more clear the nature of the effects which may be expected from any given line of procedure in rate making, though some general features of policy are suggested in a later section.

Such changes in comparative advantage are of considerable importance to farmers since they affect farm incomes and land values. They occur from a number of causes, some working in one direction, some in another, so that any given change in the comparative advantage of a particular section for growing a given crop may be partly or wholly offset by some other change which has an opposite effect. The amount of the product produced depends both on the relationship of this area to other areas producing the

same crop and on the relationship of this crop to other crops grown in the same area. When conditions become less favorable for the production of a certain crop in a given area this does not ordinarily cause the crop to be dropped out of production, for some portions of the crop are produced at much greater costs than are others not only as between different farms but for different parts of the production of the same farm. When a farmer extends his production of potatoes from ten acres to fifteen acres, he does so by taking labor and land from some other crop or crops, for example, from corn. It may be that some reduction in the labor applied to corn will have little effect on the amount produced, but as more and more labor is taken from it, the importance of this labor in terms of corn produced becomes greater and greater per unit. On the other hand, as it is added to the production of potatoes its productivity per unit is likely to decrease there except as the potato acreage is increased proportionately.

When the farm organization is well-planned, these competing enterprises are carried to such extents that it just pays to use the last units of labor applied; that is, that the expected production from them only just warrants putting them in, and supposedly these last units are of about equal value in each of the enterprises or crops needing labor at that time. Such final units are, of course, worth more at some times of the year than at others. Time devoted to putting up alfalfa hay, for example, may be worth as much as a dollar an hour. Such time will not be devoted to corn or potato production unless the loss from neglecting these at this particular time is likely to be greater than a dollar for each hour's work omitted. At some other time of the year, available labor may be almost worthless, except for leisure, unless it is applied to a given crop or enterprise. At these times, labor is likely to be used even if the return expected is very small. In other words, the opportunity cost of such labor is low.

When the price of a given product such as potatoes is changed to a lower level, this balance between it and the products of other enterprises on the farms growing potatoes is upset. It may now be profitable to devote more time to corn or alfalfa and less to potatoes, since the value added by putting it on potatoes will be less than that added by putting onto these other crops. Potato production will thus decline but not disappear. It is not the relationship of average costs that governs the situation but the cost of adding marginal units of production. In such a case, some growers in a community who have been producing at high costs, may drop out of the given line of production entirely. Others may turn to a larger use of machinery and maintain or even increase their production.

If only one crop has been directly affected in the way above indicated, it is very likely to show a decline in production in areas where the price decrease, due to the rate advance, is materially greater than the increase at the market centers which has resulted from any shortening of production which may have occurred. On the other hand, this transfer to other lines of production may increase the supply of them in such a way as to affect their prices. It can thus be seen that any marked change in the freight rate structure is much like a stone thrown into a quiet pool of water. It sets up ripples of change which act and react throughout the whole industry.

When these effects are translated into farm incomes and into valuations placed on land, they are merged with one another and become less noticeable. For example, if a 200-acre farm grows 20 acres of potatoes

and the income from potatoes is decreased by \$10 per acre, this would appear to eliminate more than the rental or return on land which could be imputed to the use of that 20 acres. However, this is merged with the rest of the business of the farm, which as a whole now nets \$200 less on the whole acreage of the farm, an amount which is only \$1 for each acre. This is a return of five per cent on \$20 per acre, and the farm is, theoretically at least, worth \$20 an acre less than it was before.

The preceding analysis has indicated that a general rate advance on potatoes may be an advantage or a disadvantage to the growers in a given area. Which it is, will depend on where the area is located. The higher rates, if they reduce production in such areas as Idaho, Colorado, Minnesota and Nebraska, will tend to raise prices in such areas as western New York, Michigan, and possibly even Wisconsin by more than the amount of the freight increase on potatoes from these areas. Potato lands in these sections will tend to be relatively more valuable than they were, in spite of the fact that their leading product now has to pay a higher charge in reaching its market. In the more distant areas incomes and land values will be definitely reduced.<sup>9</sup>

### When Rates on Other Products of the Area are Also Affected

It has so far been assumed that the prices of competing products on the farms concerned remained unchanged. If a general percentage advance in all rates has been made, this is not in accord with the facts. The prices of all the products will at first have been reduced. But these reductions will not be alike for the various products even though the percentage change is the same. Suppose, for example, we take a rate of 55 cents per cwt. on potatoes and of 32 cents per cwt. on corn and assume that the yields of these crops for the given area are 120 bushels and 50 bushels respectively. These charges amount to 33 cents and 18 cents per bushel. If each of these is increased twenty per cent, the prices will be reduced by 6.6 cents per bushel for potatoes and by 3.6 cents for corn. At the yields indicated this means a decrease of \$7.92 per acre in the return for potatoes and of only \$1.80 per acre for corn. This may make it profitable to shift some of the potato acreage to corn even though both rates have been increased by the same percentage. Thus it is very difficult to foresee the effect of any given rate change or price change since production of a given product may be stimulated in spite of what appears to be an adverse situation. This is especially true when the pressure for current funds to meet fixed obligations is taken into account. Where taxes or interest on mortgage debt have to be met, many farmers may, in order to acquire a given sum, increase their production of certain cash crops when prices decline. This upsets what might be considered the normal response of production to price and may lead to an unbalanced condition in production and prices for a number of years.

<sup>9</sup> In the Idaho area this effect has been more than counteracted in recent years, partly by the fact that the area was in a developing stage so far as potato production was concerned and partly by the fact that prices of competing products were adversely affected in a still greater extent, thus causing farmers to turn toward potato production even though their prices had fallen. This has also affected the situation in South Dakota to some extent.

### The Measurement of Farmers' Response to Price

In spite of these many complicating factors, it appears that the only guide available in estimating the probable effects of rate changes on the prices in different areas and on the relations between areas lies in attempting to find the usual response of acreage and production to price changes for each area, the effects of varying supplies on the level of prices for the market area as a whole and judging from these the net effects of given changes in freight rates. This is therefore the procedure that has been used in the present case.

The problem of estimating response of farmers to price changes is different here than in the case of ordinary price changes for the reason that a freight rate change is usually made and then is left at its new level long enough for many of the adjustments growing out of it to be made.<sup>10</sup> This is more like changing a price and holding it fixed for some little time at the new level. Farmers' adjustments, in so far as they are responses to price changes, are responses to the prices expected, not to the prices preceding. The prices of the preceding year or years are of value in estimating the price farmers are attempting to adjust to only to the extent that they indicate what the farmer was probably expecting in the way of price. For example, when potatoes are very low, bringing the farmer say only twenty cents per bushel, it is not safe to assume that the acreage he produces the following year is the acreage he would be willing to grow at twenty cents per bushel. He knows that years of extremely low prices are very often followed by years of extremely high prices. What he is expecting may be this high price or it may be some price nearer the average. If prices have been above or below their usual trend continuously for two years or three a better indication is given as to what the response might be if prices stayed at these levels. Accordingly, more weight has been given in the present study to the acreage responses following two or three years of high prices or a similar period of low prices. Even these responses have been modified; as we are concerned here with the question of what would be the effect if the price were raised or lowered so much and held there; for this is what happens when freight rates are changed. Price tends to be above or below what it otherwise would have been and to stay in that relationship for some time.<sup>11</sup>

### How Potato Prices are Made

To understand how a general change in freight rates will tend to affect the price of potatoes, it is necessary to consider how the price of potatoes is made. The price of potatoes fluctuates widely from year to year because when the crop is large, the price must be very low if all of it is to be absorbed or enough of it left unmarketed to bring into balance the supply

<sup>10</sup>This is not always the case. The time between the 35 per cent increase in August, 1920 and the reduction made in January, 1922 was not long enough to permit of very much adjustment to the changed rate situation.

<sup>11</sup>This factor in the situation makes it undesirable to use in this case the procedure followed by L. H. Bean in his study, "The Farmer's Response to Price," *Journal of Farm Economics*, 1929, pp. 368-385, and by others where response is indicated by percentage change from the acreage in the preceding year. With that procedure an acreage which is actually above the trend may show as a minus observation (if it is a reduction from an exceedingly high acreage) while an acreage that is below the trend may show as a plus observation (if it is an increase from a very low acreage). A no-change observation would appear at the zero line even though the actual acreage is much below or much above the trend.

offered and the amount wanted by the public. On the other hand, if the crop is small, prices rise to very high levels before enough people turn to alternative foods to make it possible to balance quantities available and quantities demanded. The most important single factor in the level of potato prices for any one year is the total supply of potatoes grown in the United States for that year. It is not possible to determine at any given time just what the price would have been for larger or smaller supplies than those which actually existed. There is only the given supply for that year and an average price at which it moved into consumption, and no way to know what the consumers would have paid had the crop been ten per cent larger or twenty-five per cent smaller or some other size. Dr. Holbrook Working has, however, computed the probable change in price in the Cincinnati market for different sized United States productions by taking the prices observed for different years and the volumes of United States production corresponding to them. This does not give an exact picture of the relations between supply and demand for potatoes, but it does afford the best

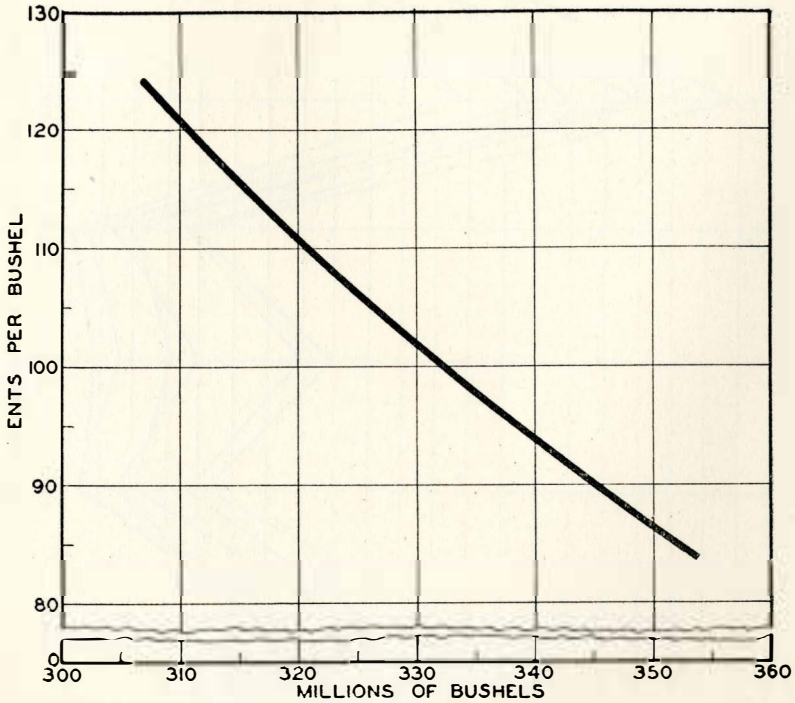


Fig. 1.—Approximate Relation of the United States Supply of Potatoes to Potato Prices at Cincinnati, Ohio (Adapted from the curve shown by H. Working, "The Statistical Determination of Demand Curves," Quarterly Journal of Economics, Volume 39, pp 503-539).



CENTS PER BUSHEL

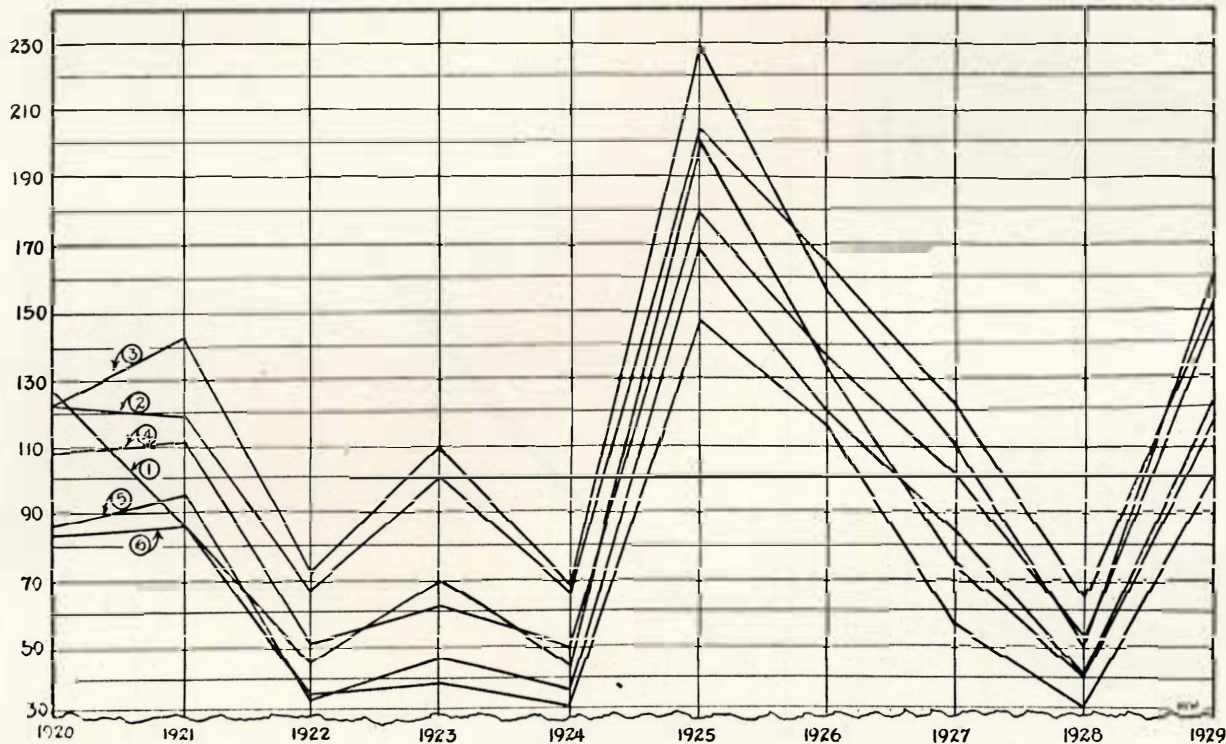


Fig. 2.—December 1, Farm Prices 1920–1929 in Areas 1–6 as shown in Figure 3, page

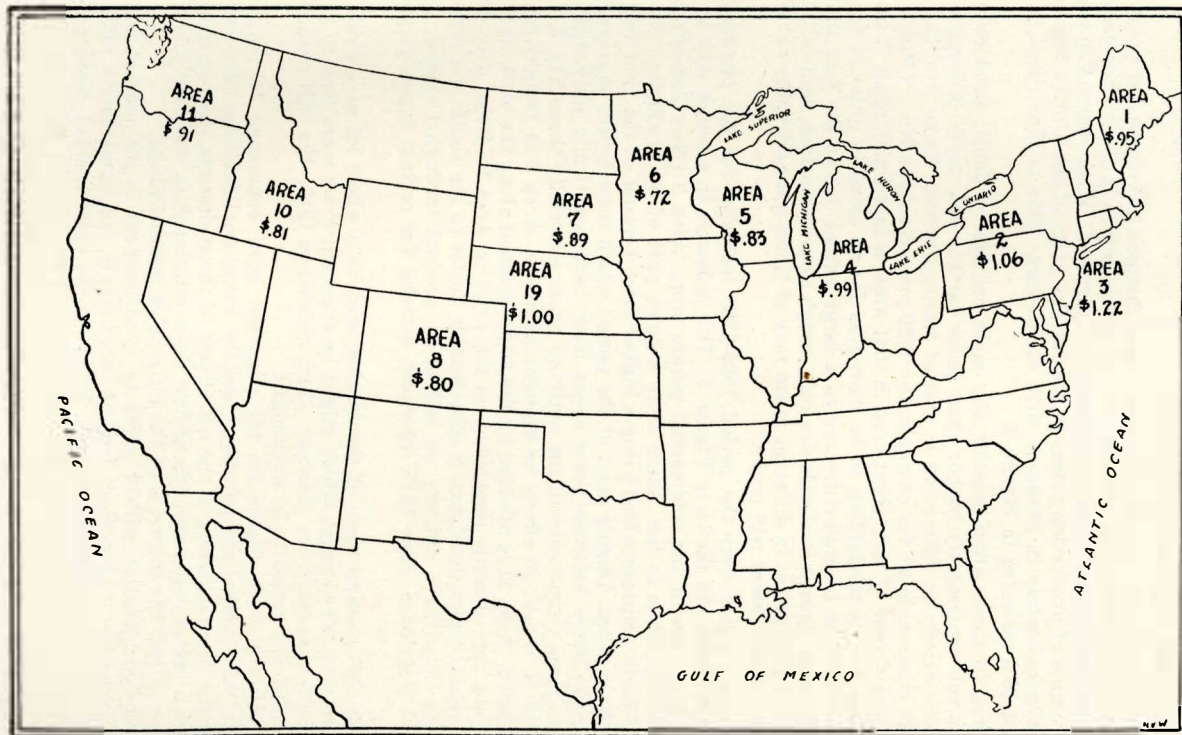


Fig. 3.—Average Farm Prices of Potatoes over the period 1920-1929 for the Principal Producing areas in the United States.

basis available for estimating the nature of this relationship. A curve computed on the basis of the relationships found by Dr. Working for the Cincinnati market is shown in Figure 1.<sup>12</sup>

In this study it has been assumed that changes in volumes of potato production will affect the general level of potato prices in the higher price section of the country about as indicated in Figure 1. With changes in the total volume of production prices in the various parts of the United States react approximately in harmony with each other. This is illustrated for Areas 1 to 6 inclusive in Figure 2.

Prices in those areas nearest the main centers of deficit production tend to run consistently higher than those farther out, these differences being due chiefly to differences in cost of transportation. Some irregularities are observable as, for example, the 1920 price for Area No. 1 (Maine) which was a year of very short crop in that area, a fact which made it unnecessary for its production to be moved as far as usual in order to find a market. Other irregularities are to a large extent due to the fact that the best price figures available are only rough approximations, and to the possibility that prices in different areas may at times get noticeably out of line before movement will occur.

Average prices over the period 1920-1929 inclusive for the principal producing areas are shown in Figure 3. This indicates in a rough way the direction of flow of the commercial potato crop. Area 3 (New Jersey) is hardly comparable to the others since a large part of its production consists of early potatoes which bring a higher price because of the time they reach the market. During most of the period which these prices represent the freight rates between these areas have been practically unchanged. If these rates were lowered, the outlying areas especially those like 6, 7, 8, 9, and 10 would, in effect, be brought nearer to Area 2 in freight cost and in price. Area 11 is affected by the large demand along the west coast, and is not very directly dependent on the price in Area 2. Even Area 10 has in recent years developed a considerable outlet to the south and west, and does not depend entirely on selling its product through Chicago. It also has developed some little specialty demand for certain types of potatoes.

With this general view of the market area as a whole let us consider the nature of the changes which might be expected if we were now to return to the rate basis for potatoes which existed in 1916. We will assume other rates and prices to be unchanged.

It will not be profitable for the purposes here concerned to follow through the involved computations and the many qualifications necessary in arriving at an estimate of the net effects of these changes. Our purpose is to get a better understanding of how these relationships work out and of how they affect the interests of the citizens of South Dakota.

First consideration will be given to what happens in the market centers. Obviously, a change in freight rates would not immediately affect the supplies of potatoes produced. Prices in the chief market centers of Area 2 would remain practically unchanged. Prices in the other market

<sup>12</sup> H. Working, "The Statistical Determination of Demand Curves," *Quarterly Journal of Economics*, Vol. 39, pp. 503-539, 1925. It is, of course, entirely possible that a curve of slightly different shape would be found if a different period of years were used in the computation. However, a later computation is not available, and it is believed that these relationships would not change very rapidly or very drastically.

centers, such as Chicago, Minneapolis and Boston, would be brought somewhat closer to these and the prices in the producing areas would be raised relatively still more. Over a period of years this would tend to stimulate production somewhat, especially in those areas where the changes were greatest in amount.<sup>13</sup>

The amount of such stimulation of production can only be estimated by careful analysis of the apparent effects of given price changes on the inputs farmers devote to the given line of production. Making such estimates as seem to be warranted as to the amounts of such increase in production over what it otherwise would have been, these increases can be totaled for the various areas and their effects on the general level of potato prices for the United States can be judged by reference to the relationships shown in Figure 1, if this is assumed to reflect reasonably accurately the relations between supply and price.

This increased production, if it occurs, will tend to lower the general level of potato prices for the market area as a whole. Such reduction reacts in turn to offset some of the stimulus to increased production which has been indicated above.

What happens is more like that which occurs when an additional amount of wheat is dumped into a moving car of wheat. At first, a hummock remains where the last wheat was dumped, but with the shaking of the car, this grain gradually spreads to all parts of it raising the entire level somewhat, and exerting approximately an even pressure at all points. In considering the effects of a general rise in freight rates, such as that which occurred between 1918 and 1922, the rates to nearby consuming markets and from nearby producing areas were raised as well as those from the principal producing sections to the principal market centers. These innumerable minor changes in relationships have probably affected in some degree both demand and supply factors in many parts of the area. It is obviously impossible to follow them out in detail. However, a summary of the probable effects of such a return to 1916 rate relationships for potatoes is given in the following pages.

For each of the twelve areas a "normal" acreage and a "normal" price are shown in Table II.

This "normal" price is the average price for the period 1921 to 1929. The "normal" acreage for any given year is the acreage represented by the area's trend figure for acreage in 1925.

Except for Area 3 which is really a semi-early production area not strictly comparable with the others, and Area 12 which is hardly a commercial section, the high price area of the market is No. 2 with the other areas as far west as No. 7 roughly oriented to Area 2 in accordance with their locations. The price figures given for Areas 7, 8 and 9 are considerably affected by the fact that they are averages for states containing considerable sections which do not produce enough potatoes for local consumption. These prices like those for Area 12 are higher than the prices in the commercial potato sections of these areas. Beyond and

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<sup>13</sup> It must be recognized, of course, that the degree of response of farmers to relatively small price changes is still very problematical. Such response as does occur is, however, probably much more definite for modifications such as those here under discussion than for ordinary small price changes of similar amounts. If they do not occur, the incidence of the rate change falls almost entirely and directly on the farmers, who are operating or owning land at the time the change is made.

TABLE II  
 "Normal" Acreage and "Normal" Price of Potatoes by Areas—1925

Area	Price	Acreage	Yield	Production*
1	\$.95	147,000	249	36,603,000
2	1.06	534,000	112	59,808,000
3	1.22	67,900	136	9,234,000
4	.99	463,700	98	45,442,600
5	.83	264,500	106	28,037,000
6	.72	486,900	95	46,225,500
7	.89	73,500	81	5,953,500
8	.80	99,300	141	14,029,500
9	1.00	97,100	88	8,544,800
10	.81	156,700	153	23,975,100
11	.91	130,700	132	14,084,400
12	1.24	295,500	112	33,096,000
TOTAL	-----	2,793,000		325,033,800

\* Based on 1920-1929 average yields.

to some extent in Area 7, the influence of the southwestern demand prevents a drop to the level these prices would have if they depended entirely on the outlets in the direction of Area 2.

One of the most difficult elements of the problem is that of deciding what changes in price relationships may properly be assumed through the restoration of the 1916 level of rates. If all potatoes moved to or through the large markets, the problem would be simplified, but they do not. Many of them are sold locally. Marked quality differences occur and various factors enter in to lessen the definiteness of these relationships. It is evident, for example, that a difference of eleven cents between Maine and western New York does not cover the cost of shipment from Maine to New York. The narrowing of this margin is due partly to quality differences and partly to the fact that both of these areas ship to a common market center, New York City.

There is an important demand in New England and in some years the production situation has been such as to bring the Maine price actually above that in Area 2. This happened, for example, in 1920. This and the 1925 price, which was only four cents below that in Area 2, have entered into the average prices for the different areas and tend to cloud the price relationships which exist in most years. For example, the spreads between the prices in Maine and those in Area 2 were: in 1921, \$.33 per bushel; in 1923, \$.29 per bushel, in 1926, \$.31 per bushel; and in 1927, \$.38 per bushel.

The selection of the rate or group of rates likely to be most significant in changing relative prices within the market area must rest to a considerable extent upon the judgment of the investigator, based on records showing the direction of movement and the relative volumes going to various destinations. A sampling process is not suited to the problem since rates which have relatively little influence on the general price structure would receive equal weight with those which are much more significant.<sup>14</sup>

To use as a measure of the changed area relationships, the changes in rates from principal producing areas to the market centers which seem to affect them most involves, therefore, more or less arbitrary procedure, but

<sup>14</sup> Data on primary destinations of shipments are available for most of the areas in the reports made by shipping point inspectors of the United States Department of Agriculture.

appears to be the only feasible attack except that of simply comparing relative prices before and after given rate changes.

The rate changes on which the changed area price relationships have been based are the following:

For Area	Rate per cwt.	
	1916	1925
1 Caribou, Me., to New York City -----	\$ .33	\$ .565
2 Wayland, N. Y., to New York City -----	.158	.285
3 Hightstown, N. J., to Philadelphia, Penn. -----	.105	.25
4 Greenville, Mich., to Pittsburgh, Penn. -----	.184	.33
5 Waupaca, Wis., to Cincinnati, O. -----	.21	.385
6 Hawley, Minn., to Cincinnati, O. -----	.364	.52
7 Hayti, S. D., to Cincinnati, O. -----	.391	.505
8 Greeley, Col., to Kansas City, Mo. -----	.35	.50
9 Hemingford, Neb., to Kansas City, Mo. -----	.25	.385
10 Idaho Falls, Ida., to Cincinnati, O.* -----	.658	.99
11 Sunnyside, Wash., to San Francisco, Cal. -----	.40	.555
12 -----	-----	-----

\* The rate under which these potatoes move is nearly the same whether they go to New York, to Philadelphia, to Cleveland, or to Cincinnati.

These are considered to be typical of the heaviest channels of movement or at least of the most significant lines of causation in price relationships.

To estimate the relationships involved it is necessary to make from the available data estimates of the production which would occur in each area for given prices in Area 2, both before the rate change and after it. From these are derived the data necessary to indicate the supply which can be expected in the whole market area when given prices prevail in Area 2.

These productions for the various areas are shown in Tables III to XIV inclusive, which follow.

TABLE III  
Area No. 1

With Price in Area 2 of	Price in Area 1 before the rate reduction	Price in Area 1 immediately after the rate reduction	Production in Area 1 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 1 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.25	\$1.31	37,701,090 bu.	38,010,000 bu.
1.26	1.15	1.21	37,335,060 bu.	37,537,000 bu.
1.16	1.05	1.11	36,969,030 bu.	37,150,000 bu.
1.06	.95	1.01	36,603,000 bu.	36,800,000 bu.
.96	.85	.91	36,419,983 bu.	36,535,000 bu.
.86	.75	.81	36,236,970 bu.	36,350,000 bu.
.76	.65	.71	35,870,940 bu.	36,112,000 bu.

\* Amounts computed graphically.

TABLE IV  
Area No. 2

With Price in Area 2 of	Price in Area 2 before the rate reduction	Price in Area 2 immediately after the rate reduction	Production in Area 2 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 2 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.36	\$1.36	65,788,800 bu.	65,788,800 bu.
1.26	1.26	1.26	63,994,560 bu.	63,994,560 bu.
1.16	1.16	1.16	62,200,320 bu.	62,200,320 bu.
1.06	1.06	1.06	59,808,000 bu.	59,808,000 bu.
.96	.96	.96	57,515,680 bu.	57,515,680 bu.
.86	.86	.86	55,123,360 bu.	55,123,360 bu.
.76	.76	.76	53,229,120 bu.	53,229,120 bu.

\* Amounts computed graphically.

TABLE V  
Area No. 3

With Price in Area 2 of	Price in Area 3 before the rate reduction	Price in Area 3 immediately after the rate reduction	Production in Area 3 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 3 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.52	\$1.50	10,619,560 bu.	10,650,000 bu.
1.26	1.43	1.40	10,157,840 bu.	10,200,000 bu.
1.16	1.32	1.30	9,696,120 bu.	9,735,000 bu.
1.06	1.22	1.20	9,234,400 bu.	9,280,000 bu.
.96	1.12	1.10	8,865,024 bu.	8,900,000 bu.
.86	1.02	1.00	8,403,304 bu.	8,450,000 bu.
.76	.92	.90	7,849,240 bu.	7,925,000 bu.

\* Amounts computed graphically.

TABLE VI  
Area No. 4

With Price in Area 2 of	Price in Area 4 before the rate reduction	Price in Area 4 immediately after the rate reduction	Production in Area 4 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 4 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.29	\$1.30	49,986,860 bu.	50,100,000 bu.
1.26	1.19	1.20	48,169,156 bu.	48,160,000 bu.
1.16	1.09	1.10	46,805,878 bu.	46,930,000 bu.
1.06	.99	1.00	45,442,600 bu.	45,570,000 bu.
.96	.89	.90	44,533,748 bu.	44,500,000 bu.
.86	.79	.80	43,170,470 bu.	43,300,000 bu.
.76	.69	.70	41,807,092 bu.	41,930,000 bu.

\* Amounts computed graphically.

TABLE VII  
Area No. 5

With Price in Area 2 of	Price in Area 5 before the rate reduction	Price in Area 5 immediately after the rate reduction	Production in Area 5 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 5 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.13	\$1.16	31,401,440 bu.	31,710,000 bu.
1.26	1.03	1.06	30,279,960 bu.	30,600,000 bu.
1.16	.93	.96	29,298,665 bu.	29,580,000 bu.
1.06	.83	.86	28,087,000 bu.	28,415,000 bu.
.96	.73	.76	26,915,520 bu.	27,250,000 bu.
.86	.63	.66	25,513,670 bu.	25,925,000 bu.
.76	.53	.56	23,111,820 bu.	24,600,000 bu.

\* Amounts computed graphically.

TABLE VIII  
Area No. 6

With Price in Area 2 of	Price in Area 6 before the rate reduction	Price in Area 6 immediately after the rate reduction	Production in Area 6 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 6 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.02	\$1.03	57,781,875 bu.	58,000,000 bu.
1.26	.92	.93	54,083,835 bu.	54,400,000 bu.
1.16	.82	.83	49,923,540 bu.	50,200,000 bu.
1.06	.72	.73	46,225,500 bu.	46,300,000 bu.
.96	.62	.63	43,914,225 bu.	44,100,000 bu.
.86	.52	.53	41,602,950 bu.	41,850,000 bu.
.76	.42	.43	38,329,420 bu.	39,200,000 bu.

\* Amounts computed graphically.

TABLE IX  
Area No. 7

With Price in Area 2 of	Price in Area 7 before the rate reduction	Price in Area 7 immediately after the rate reduction	Production in Area 7 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 7 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.19	\$1.18	6,608,385 bu.	6,580,000 bu.
1.26	1.09	1.08	6,429,780 bu.	6,400,000 bu.
1.16	.99	.98	6,191,640 bu.	6,150,000 bu.
1.06	.89	.88	5,953,500 bu.	5,930,000 bu.
.96	.79	.78	5,834,430 bu.	5,800,000 bu.
.86	.69	.68	5,696,290 bu.	5,620,000 bu.
.76	.59	.58	5,358,150 bu.	5,290,000 bu.

\* Amounts computed graphically.



TABLE X  
Area No. 8

With Price in Area 2 of	Price in Area 8 before the rate reduction	Price in Area 8 immediately after the rate reduction	Production in Area 8 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 8 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.10	\$1.11	15,011,565 bu.	15,060,000 bu.
1.26	1.00	1.01	14,730,975 bu.	14,770,000 bu.
1.16	.90	.91	14,450,385 bu.	14,485,000 bu.
1.06	.80	.81	14,029,500 bu.	14,050,000 bu.
.96	.70	.71	13,187,730 bu.	13,280,000 bu.
.86	.60	.61	12,345,960 bu.	12,420,000 bu.
.76	.50	.51	11,223,600 bu.	11,350,000 bu.

\* Amounts computed graphically.

TABLE XI  
Area No. 9

With Price in Area 2 of	Price in Area 9 before the rate reduction	Price in Area 9 immediately after the rate reduction	Production in Area 9 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 9 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.30	\$1.30	9,484,728 bu.	9,484,728 bu.
1.26	1.20	1.20	9,142,936 bu.	9,142,936 bu.
1.16	1.10	1.10	8,886,592 bu.	8,886,592 bu.
1.06	1.00	1.00	8,544,800 bu.	8,544,800 bu.
.96	.90	.90	8,288,456 bu.	8,288,456 bu.
.86	.80	.80	8,032,112 bu.	8,032,112 bu.
.76	.70	.70	7,690,320 bu.	7,690,320 bu.

\* Amounts computed graphically.

TABLE XII  
Area No. 10

With Price in Area 2 of	Price in Area 10 before the rate reduction	Price in Area 10 immediately after the rate reduction	Production in Area 10 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 10 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.11	\$1.23	27,331,614 bu.	28,525,000 bu.
1.26	1.01	1.13	26,132,859 bu.	27,400,000 bu.
1.16	.91	1.03	24,934,104 bu.	26,350,000 bu.
1.06	.81	.93	23,975,100 bu.	25,170,000 bu.
.96	.71	.83	23,016,096 bu.	24,180,000 bu.
.86	.61	.73	21,817,341 bu.	23,200,000 bu.
.76	.51	.63	20,378,835 bu.	22,050,000 bu.

\* Amounts computed graphically.

TABLE XIII  
Area No. 11

With Price in Area 2 of	Price in Area 11 before the rate reduction	Price in Area 11 immediately after the rate reduction	Production in Area 11 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 11 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.21	\$1.22	16,760,436 bu.	16,850,000 bu.
1.26	1.11	1.12	15,915,372 bu.	16,000,000 bu.
1.16	1.01	1.02	15,070,308 bu.	15,140,000 bu.
1.06	.91	.92	14,084,400 bu.	14,180,000 bu.
.96	.81	.82	13,098,492 bu.	13,160,000 bu.
.86	.71	.72	12,112,584 bu.	12,200,000 bu.
.76	.61	.62	10,985,832 bu.	11,100,000 bu.

\* Amounts computed graphically.

TABLE XIV  
Area No. 12

With Price in Area 2 of	Price in Area 12 before the rate reduction	Price in Area 12 immediately after the rate reduction	Production in Area 12 Corresponding to the given price in Area 2 before rate reduction*	Production in Area 12 Corresponding to given price in Area 2 after adjustments following rate reduction*
\$1.36	\$1.54	\$1.54	34,419,840 bu.	34,419,840 bu.
1.26	1.44	1.44	34,088,880 bu.	34,088,880 bu.
1.16	1.34	1.34	33,757,920 bu.	33,757,920 bu.
1.06	1.24	1.24	33,096,000 bu.	33,096,000 bu.
.96	1.14	1.14	32,434,080 bu.	32,434,080 bu.
.86	1.04	1.04	31,441,200 bu.	31,441,200 bu.
.76	.94	.94	30,448,320 bu.	30,448,320 bu.

\* Amounts computed graphically.

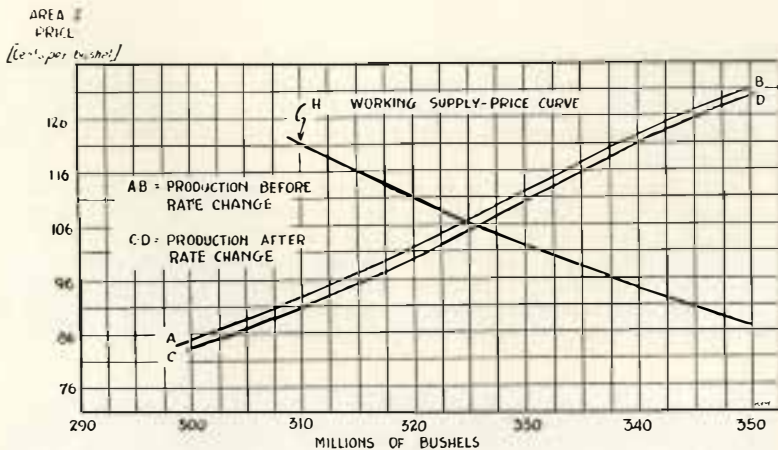


Fig. 4.—Curves Showing the Total Late Potato Production Which Will Tend to Occur With Given Levels of Prices in Area 2 Before and After Rate Reduction.

From the series of Tables III to XIV showing production which would tend to occur in the various areas with a given level of prices in Area 2, after readjustments have been made, we are able to construct Table XVI, showing total late potato production tending to occur with given levels of prices in Area 2. This represents the approximate position of the new supply curve while the position of the supply curve before the change is indicated by the prices and quantities shown in Table XV. These are shown graphically in Figure 4. By relating these to the curve of prices paid with given supplies offered as presented in Figure 1, it is possible to estimate the effects of these supply changes on the prices paid by consumers.<sup>15</sup>

The Working curve converted into quantity figures and actual prices by applying his percentages to the "normals" developed for Area 2 is shown

TABLE XV  
Production Tending to Accompany Given Prices in Area 2 Before the Rate Change

Area	Bushels produced at \$ .76*	Bushels produced at \$ .86*	Bushels produced at \$ .96*	Bushels produced at \$1.06*	Bushels produced at \$1.16*	Bushels produced at \$1.26*
1	35,870,940	36,236,970	36,419,983	36,605,000	36,969,030	37,335,060
2	53,229,120	55,123,360	57,515,680	59,808,000	62,200,320	63,994,560
3	7,849,240	8,403,304	8,865,024	9,234,400	9,696,120	10,157,840
4	41,807,092	43,170,470	44,533,748	45,442,600	46,805,878	48,169,156
5	23,111,820	25,513,670	26,915,520	28,037,000	29,298,665	30,279,960
6	38,829,420	41,602,950	43,914,225	46,225,500	49,923,540	54,083,835
7	5,358,150	5,596,290	5,834,430	5,953,500	6,191,640	6,429,780
8	11,223,600	12,345,960	13,187,730	14,029,500	14,450,385	14,730,975
9	7,690,320	8,032,112	8,288,456	8,544,800	8,886,592	9,142,936
10	20,378,835	21,817,341	23,016,096	23,975,100	24,934,104	26,132,899
11	10,985,832	12,112,584	13,098,492	14,084,400	15,070,308	15,915,372
12	30,448,320	31,441,200	32,434,080	33,096,000	33,757,920	34,088,880
Total	286,782,689	301,396,211	314,023,464	325,033,800	338,184,502	350,461,213

\* Price in Area 2.

with the supply curves from Tables XV and XVI in Figure 4. The change in the level of the point of intersection indicates the probable change in the prices paid by consumers. With this change as a basis, we can estimate the approximate effect of the changes in returns to growers in the various areas.

Under the rate structure now prevailing, production and price tend to reach equilibrium at the trend figure for production and at a price of \$1.06 per bushel in Area 2. This trend figure for production is for 1925, approximately 325,033,800 bushels for the late potato producing areas. At the lower level of rates prevailing in 1916 and under the assumptions made in this study, this equilibrium would tend to occur with a price of \$1.05 in Area 2 and a total production of late potatoes of 325,400,000 bushels. Thus,

<sup>15</sup> The supply-price curve shown by H. Working for the Cincinnati market in "The Statistical Determination of Demand Curves," op. cit., is taken as representing the percentage changes from the equilibrium price existing in the initial situation. Its use rests upon the assumption that the Cincinnati conditions are representative of those in Area 2, and that the percentage changes in price with given percentage changes in volume of production have not materially changed since the period studied by Working.

if no change in other charges or margins occurred, and if elasticities of supply and of demand are as here indicated, consumers would tend to pay on the volume of potatoes previously used \$3,250,338 less, but to buy in addition to these 1,366,200 bushels which would not have been taken at the higher price.

It must be evident that so small a change in price may not affect consumption, and that the adjustments here indicated may be over-refinements of a situation in which such minute adjustments do not occur. The results shown represent, however, an averaging of the opposing effects of deviations which are much larger than this. The more significant changes will be found in the changed relationships of the various producing areas to each other. Nevertheless, the tendency over a period of years should be,

TABLE XVI  
Production Tending to Accompany Given Prices in Area 2 After the Rate Change

Area	Bushels produced at \$ .76*	Bushels produced at \$ .86*	Bushels produced at \$ .96*	Bushels produced at \$1.06*	Bushels produced at \$1.16*	Bushels produced at \$1.26*
1	36,112,000	36,350,000	36,535,000	36,800,000	37,150,000	37,537,000
2	53,229,120	55,123,360	57,515,680	59,808,000	62,200,320	63,994,560
3	7,925,000	8,450,000	8,900,000	9,280,000	9,735,000	10,200,000
4	41,930,000	43,300,000	44,500,000	45,570,000	46,930,000	48,160,000
5	24,600,000	25,925,000	27,250,000	28,415,000	29,580,000	30,600,000
6	39,200,000	41,850,000	44,100,000	46,300,000	50,300,000	54,400,000
7	5,290,000	5,520,000	5,800,000	5,930,000	6,150,000	6,400,000
8	11,350,000	12,420,000	13,280,000	14,050,000	14,485,000	14,770,000
9	7,690,320	8,032,112	8,288,456	8,544,800	8,886,592	9,142,936
10	22,050,000	23,200,000	24,180,000	25,170,000	26,350,000	27,400,000
11	11,100,000	12,200,000	13,160,000	14,180,000	15,140,000	16,000,000
12	30,448,320	31,441,200	32,434,080	33,096,000	33,757,920	34,088,880
Total	290,924,760	303,817,672	315,943,216	327,143,800	340,663,832	352,693,276

\* Price in Area 2.

like that of most other reductions in cost, some lowering of price to consumers and a somewhat higher price to producers of the product. The actual responses in any given year are, of course, caused by relatively large and distinguishable differences in prices or in costs or both. The change indicated is small enough, however, to warrant some question as to whether any significant advantage would actually reach the consumer of the product. So small a change might easily be absorbed in the margins taken by handling agencies. The objective in this study has been mainly to trace the effects of such a change on farmer producers of the product. The emphasis is therefore placed mainly on the changes in prices paid to these farmers in the various areas. Further analysis of the relation of retail to farm prices is needed to bring out fully the influence of such changes upon prices paid by consumers.<sup>16</sup>

If the tendency for equilibrium to be reached at a price of \$1.05 per bushel in Area 2 and at the trend rate of production is a correct estimate, and if the relationships of prices in the other areas to those in Area 2

<sup>16</sup> Some aspects of this problem have been discussed by G. F. Warren and F. A. Pearson — "Interrelationships of Supply and Price," Cornell Bulletin, No. 466. A criticism of their conclusions, "Middlemen's Margins as a Cause of the Agricultural Depression" by H. I. Richards appeared in the Journal of Farm Economics for October, 1930.

have been correctly estimated, we may now undertake to trace the effect of the rate change indicated upon farm incomes from potatoes in the various producing areas. The changes in gross returns from potatoes are shown in the following summary.

Area	On Basis of Present Rate Structure			On Basis of 1916 Rate Relationship				
	Equilibrium Price	Equilibrium Production	Gross Value of Production	Equilibrium Price	Equilibrium Production	Gross Value of Production	Change in Gross Value of Production	
							Increase	Decrease
	dollars	bushels	dollars	dollars	bushels	dollars	dollars	dollars
1	.95	36,603,000	34,772,850	1.00	36,950,000	36,750,000	1,977,150	---
2	1.06	59,808,000	63,396,480	1.05	59,568,768	62,547,206	---	849,274
3	1.22	9,234,400	11,265,968	1.22	9,234,400	11,265,968	000	000
4	.99	45,442,600	44,988,174	.99	45,442,600	44,988,174	000	000
5	.83	28,037,000	23,270,710	.85	28,300,000	24,055,000	784,290	---
6	.72	46,225,500	33,282,360	.72	46,225,500	33,282,360	000	00-
7	.89	5,950,500	5,295,500	.87	5,925,000	5,154,750	---	140,750
8	.80	14,029,500	11,223,600	.80	14,029,500	11,223,600	000	000
9	1.00	8,544,800	8,544,800	.99	8,523,438	8,438,204	---	106,596
10	.81	23,975,100	19,419,831	.92	25,075,000	23,069,000	3,649,169	---
11	.91	14,084,400	12,816,804	.91	14,084,400	12,816,804	000	000
12	1.24	33,096,000	41,039,040	1.24	33,096,000	41,039,040	000	000

The preceding summary has shown the estimated changes in growers' gross income from potatoes in the various producing areas. Areas 3, 4, 6, 8, 11, and 12 show no change either in price or in production under the changed rate structure. In these areas, a one-cent decrease in the spread between them and Area 2 was offset by the one-cent decrease in the general level of prices.<sup>17</sup>

The areas favorably affected are 1, 5, and 10. Those adversely affected are 2, 7, and 9.<sup>18</sup> The increases in gross income are as follows:

Area No. 1	\$1,977,150
Area No. 5	784,290
Area No. 10	3,649,169
Total	\$6,410,609

The decreases in gross income are as follows:

Area No. 2	\$ 849,274
Area No. 7	122,115
Area No. 9	106,596
Total	\$1,077,985

Potato growers as a whole then would tend to receive, with a return to the 1916 rate structure, \$5,322,624 per year more for potatoes than at

<sup>17</sup> For Area 12 this is merely an assumption; as no computation of the changes for the small volumes in these widely scattered producing sections was attempted.

<sup>18</sup> This apparently illogical result is due to the fact that the advances in rates from these areas to their principal markets were materially less between 1916 and 1925 than those from some of the other areas. Thus, a restoration of the earlier rates reduces their relative advantage.

present. Consumers, if the lower level of wholesale prices were reflected fully to them, would pay about \$2,200,000 less for one million more bushels of potatoes. Considerable further investigation would be necessary to permit of even so rough an estimate of the change in gross returns to carriers for hauling potatoes.

If we accept the preceding estimates as representing approximately the gross changes in income to potato growers, we still must take into account the fact that these are not net changes. If potato acreages were increased, such increases were made at the expense of other crops, and if potato acreages were decreased some additional land was made available for other crops. The effects of these altered productions of other crops on the farmer's net income must therefore be considered also. If no alternative crop comes near to being as profitable per unit of input as the potato crop, little shifting from other enterprises will result from an increase such as that occasioned by a reduction in freight rates. In that case, the gross effects shown above represent approximately the net effects on incomes to farmers. If, however, shifts from or to other products nearly as valuable per unit of input are readily possible, the effect of the rate change upon income to the factors of production in a given area may be very small.

For an appraisal of such offsetting effects, we must look to the competitive situation in the various potato producing areas and a consideration of the quantitative shifts in production, in other words, to such farm management data as are available for the various areas.

It is not the aim of the present study to follow out this phase of the matter exhaustively. Information on competitive relationships and probable opportunity costs is not equally available for all producing areas. Not only is the available information insufficient to warrant an attempt at complete analysis but such complete development is not essential to one of the major interests of the study; namely, that of pointing out its implications as to national transportation policy. The principles involved will be indicated in the situation shown for two or three representative producing areas. We shall, therefore, take up for more or less detailed consideration only three of the areas involved; namely, Areas 1, 5, and 7.

### Conditions of Production in Area No. 1

In the chief potato growing sections of Area 1, potatoes constitute practically the only cash crop. In 1919, 94.5 per cent of the gross incomes from Aroostook county potato farms came from potatoes, 3.2 per cent from other crops, and 2.3 per cent from livestock and livestock products.<sup>19</sup> The only other crops of importance are oats and hay.

The elasticity of potato acreage is, as we would expect under these conditions, relatively slight. Little additional land is readily available for potato production when prices are high enough to justify expansion, and if prices fall the next alternative product, oats in most cases, returns so much less per acre that potatoes will tend to be held to the usual acreage. The change in price which a return to the 1916 rate relationship is estimated to make, would, using the figures given above, increase potatoes in the area by 588 acres. If this were acreage transferred from the produc-

<sup>19</sup> See U. S. Department of Agriculture Bulletin 1188, p. 11 and U. S. D. A. Farmers' Bulletin 1289, p. 5.

tion of oats, there would be a shrinkage of \$14,752 in the other income of the area which would offset to that extent the gain shown for potatoes.<sup>20</sup>

A further charge which will offset part of the gain from increased potato income is the extra cost of growing potatoes over that of growing oats. This can only be roughly approximated as no cost figures are available which show the additional expense involved in potato production as compared to small grain production. The largest cash item is for fertilizer, a current estimate of this expense being \$50 per acre. Other expenses in excess of those for the production of oats have been estimated at \$45 per acre (\$30 for labor and \$15 for material costs).<sup>21</sup>

This item amounting to \$55,860 added to the \$14,752 sacrificed in value of oats makes a total deduction of \$70,612 from the gross gain of \$1,977,150 leaving a net gain of approximately \$1,906,538.<sup>22</sup>

### Conditions of Production in Area No. 5

In Area 5, the principal crops competing with potatoes in the chief potato producing section are corn, rye, oats, and hay. The most direct competition is, in most cases, with corn since the two crops occupy about the same place in the rotation and require labor at about the same time. Since potato acreage has been increased by 2,493 acres we may reasonably assume these to have replaced corn. Corn yields are not as high in the potato section of the state as in the areas farther south, but are larger than those in the northern part of the state. Figures for the potato area of the state are not separately available, nor have suitable farm management data been developed for a careful appraisal of the changes which would be likely to occur in the internal organization of the farms affected. We may say that roughly the other income of these farms will be decreased by the average acre value of the 2,493 acres devoted to corn, and that the expenses will have been increased by the excess which potato production costs over the cost of growing corn. The estimated additional cash costs per acre for potato production as compared to corn production under Wisconsin conditions are as follows:

Seed .....	\$12.26
Spray materials .....	1.99
Bags and barrels .....	.29
Miscellaneous .....	.10
	\$14.64 <sup>23</sup>

In addition to this the potatoes would require substantially more labor than the corn. However, since the change in most instances would be small

<sup>20</sup> Value of oats crop computed from average of 1921-25 yield and price as given in U. S. Department of Agriculture Yearbook 1928, p. 719. The figures thus shown give an unwarranted appearance of exactness. They are, of course, only very rough approximations.

<sup>21</sup> See U. S. Department of Agriculture Bulletins 1188, p. 13 and 1446, p. 25.

<sup>22</sup> For crops which show so large a difference in acre value as in this case and consequently so little elasticity of acreage, these offsetting influences are of relatively little significance. In a more flexible situation with closer competition between crops, they may have more important influences.

<sup>23</sup> Estimates based on U. S. Department of Agriculture, Bulletin 1188, p. 13.

on any given farm, it is probable that no material change in the cash expenses of the farm would occur on this account.

Increase in gross return from potatoes ---	\$784,290
Decrease in return from corn -----	\$72,796 <sup>24</sup>
Increased expense on potatoes -----	36,498
	<hr/>
Total deduction -----	109,294
	<hr/>
Net increase in return to the area -----	\$674,996

### Conditions of Production in Area No. 7

In Area 7, it turns out that the new spread is greater than that before the change in rates. This is due to the fact that the rate increases from Area 7 to Cincinnati during the period 1916 to 1925 were considerably less percentage than those from some of the competing areas. The advance in rates had been only 11.4 cents per cwt., whereas, that from Hawley, Minnesota was advanced 15.6 cents and even from Waupaca, Wisconsin the increase had been 17.5 cents. South Dakota's relative position would, therefore, be adversely affected by a restoration of the 1916 rates, its spread below the Area 2 price being one cent greater than it was in 1925. Deducting in addition the one cent lower estimated level of prices for the whole market area would give Area 7 a price two cents lower than that prevailing before the rate reduction.

The supply situation in Area 7 is relatively inelastic. This is due in large measure to the way in which the potato enterprise is fitted into the farm business. Potato production on these farms tends to be held at about the acreage which the farm's labor supply can handle during the digging season. This comes ahead of the season for picking corn, and interferes chiefly with fall plowing, which is not an operation requiring specific timing. Since, in most years, potatoes return much more per acre than any of the competing crops in this area, they tend to hold at about the same acreage unless prices fall very low, and cannot readily be expanded when prices rise, since extra labor is not very readily available. If prices rise, expansion is likely to result more from drawing new farms into the business than from materially larger acreages on the farms already growing potatoes.

The change in acreage is almost negligible, only 250 acres. The gross change in return to the area may then be regarded practically as the net change. Assuming, however, that this 250 acres is transferred to corn the following deductions from the gross decrease in returns may be made.

Gross amount of decrease -----	\$140,750
Lessened materials cost for 250 acres not in potatoes at \$9.58 per acre -----	\$2,395
Added value of 250 acres of corn at 33 bushels per acre and \$ .55 per bushel <sup>25</sup>	4,537
	<hr/>
Net decrease in area income -----	\$6,932
	<hr/>
Net decrease in area income -----	\$133,818 <sup>26</sup>

<sup>24</sup> Based on 1921-25 average yields and prices as shown in U. S. Department of Agriculture Yearbook for 1928, p. 705.

<sup>25</sup> Figures from South Dakota Agricultural Experiment Station, Bulletin 226, pp. 39 and 41.

<sup>26</sup> Ignoring the value of the labor released for other uses.



The estimates shown above for the results of transfers of production resources to or from other lines of production are extremely rough, and are presented more to illustrate the nature of the changes than as exact computations. Their presentation in numerical form gives an impression of exactness which is not warranted by the accuracy of the data. Farm management studies have not been worked out in such a way as to show the nature of the balance between enterprises and the curves of diminishing return for final units of land devoted to each crop.

Further refinement has not been undertaken in the present study for several reasons: First, because the data available for computing the gross changes indicated is subject to too wide a range of possible error to make such refinements very significant; and, second, because such development would involve an excessive inclusion of detail, more suitable, for other studies, and would lessen the emphasis on the major outlines of the relationships shown. It is these major outlines with which we are concerned in seeking to understand and develop freight rate policies.

Further detailed area studies will eventually, no doubt, be developed out of the type of farming studies which have been a first approach to the problem. In these, each shipping area will be analyzed, and the nature of the curves of diminishing net return for each crop on each major farm type under various price relationships will be developed. When this is done, a much more accurate appraisal will be possible both of production response and of the net effects of such responses and price changes as are here described. The development of such a body of research will aid materially not only in the problem of estimating the effects of freight rate changes, but in similar estimates for tariff changes, in forecasting probable price tendencies, and in planning more effective programs of production adjustment.

In the absence of such detailed studies, considerable improvement can be made in these figures whenever and wherever more localized price and production figures can be obtained. A study of the effect, on acreages of other crops, resulting from the changes in price relationships for a given crop will then be feasible. Study both of the immediate reactions and of the trends of the acreages for different crops in the same area will be fruitful in these more detailed and localized analyses. Such an approach will represent an attempt to appraise the probable changes in costs and returns by studying their influence on farmers' actions. Rational action on the part of the farmers must therefore be assumed, and all needed information cannot be secured in this way, but a check on other data will be provided, and considerable indication as to costs can probably be made available with less expense and earlier than will probably be possible in a direct attack upon the ascertainment of the costs themselves.

The analysis has considered so far only the first phase of the incidence of such rate changes; namely, its effect upon the income of the farmer as an operator. How long do such adjustments as are here indicated take to work out, and to what extent do they continue as an increase or decrease in operating income and to what extent are they reflected in land rents and land prices?

For the larger changes in price, acreage seems to follow with only a relatively short lag. Corn, for example, showed a December first farm price of \$1.345 in 1919 with an acreage of 97,170,000. Acreage continued to increase to 104,324,000 in 1924 though prices fell to \$ .67 in 1920, \$ .423

in 1921, \$ .658 in 1922, and \$ .726 in 1923. It must be remembered, however, that the trend of increase in corn acreage had been held down through the war period by shortage of labor and emphasis on other kinds of production. A drop from \$ .982 in 1924 to \$ .674 in 1925, and \$.642 in 1926 brought a drop in acreage from 101,359,000 in 1925 to 99,713,000 in 1926 and 98,393,000 in 1927. In the case of potatoes, there are seldom more than two successive deviations in the same direction from the average price or average acreage. Low prices and high acreage are usually concurrent. There are numerous exceptions to this but two years are usually sufficient to bring an acreage adjustment to any important price change and such adjustment is usually excessive. Wheat acreage was greatly expanded during the World War period, and after the price decline of 1920 and 1921 did not reach its low until 1925. Its decline was somewhat retarded, however, by the beginning of new developments in production methods which were causing increases in some areas while others were declining. This latter factor probably accounts for the upward swing in acreage in 1926, 1927, and 1928 in spite of further declines in price.

For the larger price changes then, we may expect acreage adjustments, usually excessive ones in two to three years except where important factors in cost or in demand are changing. For small changes, such as those shown in this and the preceding chapter, it is probable that they are not sufficient in themselves to cause conscious acreage adjustments except in the most significantly affected areas. That the oscillations of price and production do tend to occur about a new lower or higher level does seem a reasonable deduction, however, from the preceding data and discussion. The whole must, however, be regarded as an adjustment to a moving equilibrium the locus of which is reflected in the trends of prices and of production. Important dynamic elements are continually affecting the situation. Some of these, like the development of new areas are relatively slow, and are roughly allowed for in the acreage trends. Some which are more episodic in nature can be less definitely dealt with. It is even possible that these smaller price changes especially those resulting from the less important rate changes are entirely neglected in the responses to the larger price changes and thus do not affect production at all. If that is the case, the full cost of a rate advance or the full gain of a rate reduction tends to be reflected in the farmer's return, not only in the period immediately following the rate change but continuously thereafter. This is probably not the case, however, for those areas which are most affected.

In areas like Maine, where potatoes constitute the major crop, interest, rents, and land values tend to be based on present and expected incomes from potatoes. It is evident that a change such as that here discussed may cause very significant changes in land value if fully reflected in prices to growers. The increase of \$ .05 per bushel in Area No. 1 represents, when applied to the 249 bushel-per-acre average yield for the area, a difference of \$12.45 per acre. This is sufficient if fully recognized and translated into land prices to affect valuations in the area profoundly. It represents a return of five per cent on \$249 per acre. Five per cent is higher than the net returns usually found on land valuations, three to four per cent being more usual.<sup>27</sup>

<sup>27</sup> C. R. Chambers in United States Department of Agriculture, Bulletin 1224, "Relation of Land Income to Land Value," p. 27, finds an average ratio, except in the south, of three per cent for 1920. This is probably lower than usual because of the high expectations of increase in land values which prevailed at that time.

It cannot safely be assumed that all of this change would be reflected in land prices since no one factor of production can absorb all of such an increase in return. With higher returns to given factors the proportions of the factors will tend to be altered thus diffusing such gains among them to some extent. Nevertheless, there is an indication of sufficient change to be of very great importance in its effect on the area.

The translation of the changed per acre incomes into land rents and land values is less striking with the smaller yields prevailing in other areas but is still significant. In Area 2, a decrease of one cent per bushel with an average yield of 112 bushels represents \$1.12 per acre which, capitalized at five per cent is \$22.40 per acre.

In Area 5, the increase of two cents per bushel on an average yield of 105.5 bushels means \$2.11 per acre or five per cent on \$42.20 per acre.

For Area 7, a decrease of two cents per bushel on an average yield of 81 bushels is \$1.62 per acre, a five per cent return on \$32.40 per acre.

In Area 9, the reduction of one cent per bushel on a yield of 88 bushels is \$ .88 per acre, a five per cent return on \$17.60 per acre.

In Area 10, the area most strikingly affected as to price, the change of eleven cents per bushel on a yield of 153 bushels makes a very important change, \$16.83, a five per cent return on \$333.60.

Such changes do not, of course, affect whole areas in this striking way. Not only are the gains somewhat diffused among the different production factors. Rentals and land values are not based directly upon the returns from some one crop, but upon the composite of returns that can be secured from the whole group of crops that must be grown. In most areas, the whole farm cannot be put into potatoes. In fact, the potato acreage is likely to be a minor part of the total. These increases or decreases will, therefore, tend to be spread over a larger acreage so far as their effects on rents and land prices are concerned. For example, in Area 7, the \$32.40 decrease in valuation due to lower income from potatoes would represent \$518.40 for the sixteen acres shown for a typical 240-acre farm of this area. Spread over the 240 acres, this would represent a decline of \$2.16 per acre. Where potatoes occupy a larger part of the farm area as in Maine or Wisconsin, the effect on the whole level of land prices would be more pronounced.

Even if the final incidence of these changes in rates appears in a changed valuation of land, however, we still must consider the time required for such adjustments and something of the nature of the intermediate adjustments. Readjustments in land values, especially if they are downward, are very slow. In 1920 land prices in the United States reached their highest point with an index of 170 on the basis of 1912-14 prices. The following years were marked by extreme declines in farm incomes and by some recovery especially in 1924 and 1925. However, the index of land prices continued downward throughout the ten years following 1920.

The rate of decline has slowed up in recent years, but it still is not evident that the bottom has been reached. It is apparent, therefore, that a change in net farm income is not immediately converted into higher or lower land values. If ten years or more are required for land values to reach the new level, part at least, of the incidence of the change must in the meantime have been borne by some other element in the situation. The first incidence of such a change is undoubtedly on the farmer as an operator. The division of returns, contracts for land rental, prices paid for

land, etc., have been made on the basis of the previous level of incomes and costs. If the level of income becomes noticeably lower, the rentals paid and the bids for the purchase of land, will gradually be adjusted to the new level but probably not in less than two to three years even in the case of rentals. Where the rental is on a share basis, the customary shifts from one share to another are so large that a change is not likely to be made unless income changes are very pronounced. Share rents are usually one-half, two-fifths and three-fifths, one-fourth and three-fourths, etc. Since custom has a great deal of influence in determining these shares, a change such as that in freight rates is likely to fall rather permanently on both operator and land owners in accordance with their relative shares in the product. Farmers who both own and operate their land are likely to look upon the reduction as a decline in their incomes as operators rather than in the income from land. They absorb this because they cannot well do anything else, but resist strongly tendencies toward lower land prices. Land prices do gradually respond to the lowered income situation, but not necessarily in the full amount of the change. In the difficult times of adjustment in the years just following a rate increase, the farmers' standard of expenditure may be lowered, but land may continue for a more or less indefinite time to absorb more than what would have been its residual share under the initial rate situation.

It is probable that an increase in the return imputable to land will be much more quickly reflected in land prices. The competition for additional land when more profits appear is much more effective than is that which would cause a downward movement in prices. In the latter case, few sales occur except as they are forced by the distress of the farm owners.

Much of the effect of an income change such as that occasioned by a rate change falls then on the operators of farms, part is diffused through an effect on prices paid for labor, changes in demand for and prices of fertilizer, middleman services, etc. The major portion probably comes eventually to appear in the form of altered land values.

### **The Effects of Rate Changes on Other South Dakota Products**

The preceding discussion has dealt with a product in which the effects of rate changes show up more plainly than they do for most of the products grown in South Dakota both because the product itself is bulky and heavy and because the market area is somewhat limited. For most of the other products of South Dakota farms, the effects are less evident and clear cut. Wheat, for example, is sold in a market in which minor changes in the United States supply probably have little effect on price. For spring bread wheats a short crop small enough to necessitate importation of Canadian wheat will influence prices materially, but such changes are due mainly to weather and are not likely to be significantly changed by any slight change in the volume of production which might grow out of a slightly higher or lower price to growers. The durum wheats are still less likely to be affected as to central market prices since nearly all of this wheat is exported. We may, therefore, look chiefly to the situation of the grower and to the relationships between market centers for any effects which may result from these rate changes. The small number of bushels

produced per acre also serves to make the effects of these price changes less noticeable. If, for example, a wheat rate is changed from \$ .30 to \$ .25 per cwt., a change of three cents per bushel, this on a yield of fifteen bushels per acre is only \$ .45 per acre, a not very significant amount. Yet this is a return of five per cent on \$9.00 per acre in land valuation. It is probable that such a change in rates falls almost wholly on the operators and owners of land and that there is very little shifting of it to other shoulders. Much the same may be said of rates on such of the other grains as actually move. For livestock and livestock products the situation is much the same. It is scarcely conceivable that growers will change significantly their production of cattle, sheep, or butterfat because of the freight rate on it. A rate change tends, therefore, to be reflected rather simply and directly in a changed income to the farm operator. Since it is relatively small in amount and not clearly visible to him it may pass more or less unnoticed. Nevertheless it may represent a larger change in his income than many of the changes in marketing methods or legislation on which he spends much time and thought.

For such bulky crops as hay, the influence of freight rate changes is very pronounced and may easily eliminate shipments completely from certain sections, doing so possibly to the disadvantage both of the growers and of the railroads at least during the transition period. Such changes probably result in the establishment of a type of agriculture which provides for local consumption of such feeds, and may be in the interest of better farming in the long run. Carriers may not have profited by the elimination of such traffic even though ordinary methods of computing costs of hauling may have indicated it was being hauled at a loss.

## Elements in a Freight Rate Policy for South Dakota

The preceding pages have indicated the nature of the effects growing out of changes in the freight rates charged for hauling the products of farms. It is easily seen that these are extremely complex and that no analysis can follow through with any degree of accuracy the minor results of such changes. Nevertheless, the major elements of the situation stand out fairly clearly. For any agricultural product grown in South Dakota, the supply change growing out of a reduced or increased price which results from a rate change on South Dakota products only is probably insufficient to affect noticeably the price in the market centers. This being the case, any decrease in a rate from South Dakota is likely to result, in the first instance, in an increase in the return to the operators of the farms growing the product concerned. Likewise, an increase in the rate will usually come directly out of the return to the grower. It may or may not continue to rest at this point. If large enough to be noticeable it is likely to affect the rentals and prices offered for land and thus to appear eventually as a changed return to those who own land in the areas affected either at the time of the change or shortly thereafter. A general percentage change in rates, on the other hand, is likely to affect volumes and prices sufficiently to cause some of the effects of the change to appear in the prices paid by consumers. Such changes, however, involve such far reaching readjustments that their results are very difficult to predict, and

many undeserved increases and decreases in income are likely to result both for producers and for market agencies. In general, however, a percentage increase in all rates may be construed as favorable to producing areas lying close to the consuming sections and unfavorable to the outlying sections. General rate decreases, on the other hand, tend to stimulate the outlying sections and may depress slightly the areas near the consuming centers. This is especially true for such products as hay, potatoes, milk, and corn.

In the light of these facts what policies will best foster the interests of such a state as South Dakota? The Interstate Commerce Commission must, as we have seen, decide on the relative charges on shipments from different areas. Supposedly, this will be done in an effort to provide an adequate revenue for the carriers by contributions from various classes of traffic so adjusted that production will be carried on where it can be done most effectively, the effort necessary in getting the products to market being considered. Its aim is, in other words, to decide in the interests of the people of the nation as a whole. Certain limits to the Commission's action are set up by law, but these mark only the fences along the outside of the highway, outside of which it may not go. Within these limits is a wide range in which it must decide. In practice, its decisions come to be the result of a balance between many conflicting interests. If the efforts, through arguments, evidence, and other activities, of the representatives of the citizens of a given state are to have much effect they must be exerted continuously and along consistent lines over a long period of time. Changes in rate relationships are usually made reluctantly and only after carefully developed, well substantiated evidence of the need is presented. This makes it desirable that the various interests be clearly identified and that the program be so planned as not to conflict more than is necessary with the interests of other groups.

The shipper's sole interest does not lie in low rates. Even more important to him is the maintenance of efficient, dependable, and reasonably frequent service. Serious delays or improper care in transit may easily cause losses through shrinkage in livestock, changes in price, damage of other sorts, etc., which will more than offset any moderate difference in rates. So large a part of the income of railroads is paid out in wages, in payments for supplies, and in interest on bonds that the margin in rates between what must be paid to keep the road running at all and rates which will maintain it in prosperous condition may be rather small. It is not in the interest of the shippers to induce the commission to deny rates which are capable of supporting adequate service if other conditions are as they should be.<sup>28</sup> Unfortunately a system of rates capable of accomplishing this result does not always accomplish it. A carrier may have an unaggressive and wasteful management which does not take advantage of opportunities for more economical and efficient operation. Income may be diverted through excessive payments to construction companies, unwise or improper payments for subsidiary facilities and activities taken over, or unwarranted duplication of facilities and services. An undue amount may be going to strongly organized railroad labor or management groups in view

<sup>28</sup> Recognition should also be given to the fact that the railroads have been important creators of land values. Rate increases tend to depress land values in outlying areas. Yet land in many of these areas would have no value if the railroads were not there so the question revolves around what shall be a fair division of the incomes created jointly by the railroads and by the investments and work of the settlers.

of the incomes attainable by farmers and other groups in the wage and salary earning elements of the nation's population. Lastly, an excessive return may be paid on railroad stocks. This last, however, is a relatively unusual case in the period since 1900. All of these possible dissipations of an adequate income except that of rates of return to railroad labor are held under rather close supervision by the Interstate Commerce Commission in recent years. Identification of any such wastage and clear presentation of it to the Commission is usually sufficient to bring it under close scrutiny by that body. Such identification and presentation may involve, however, a vast amount of highly technical and painstaking study.

The interests of railroad labor and of shippers are likely to come into rather direct conflict in times of quickly changing price levels. The payments for labor are such a large part of the expenses of the carriers that no very substantial increase in wages can be made without passing the cost on to the users of the road. Neither can any very substantial decrease be made in the rates on shipments without forcing a reduction in wages of railroad labor except as very important operating economies are introduced. In the last two decades some very important economies of this kind have been made through increasing enormously the size of trains handled, the size of cars, the terminal facilities, etc. These economies have made possible the rather important wage increases without corresponding increases in rates, and even, in some cases, with decreases in rates. Railroad labor is strongly organized, ably led, and strategically placed. Railroad management will usually find it easier to exert pressure for increased rates or against rate reductions than to exert such pressure for wage reductions, against wage increases, or for modification of economically undesirable working rules and regulations. Since railroad labor is indirectly employed by the shippers, it may at times be necessary for them to stand shoulder to shoulder with railroad management in forcing wage reductions or in opposing wage increases or to take the consequences in freight rates which are made necessary by a given level of wages. Inequalities in this respect are most likely to grow out of situations where the general level of prices, wages, and living costs has declined considerably after a period when these have been high enough to force upward adjustments of wages. The farmer's interest is, of course, similarly affected by indirect costs placed on his shoulders by wage rates in various other lines of activity.

A certain amount of conflict of interest between carriers and farmers, especially in sparsely settled areas, may develop out of the carriers' need for volume of traffic, though in general carriers seek to aid in constructive development of such territory. A livestock type of farming may, for example, be the one best adapted to the area, but this may be a poor revenue producer for the railroad on account of its concentrated nature. The railroad company may, therefore, prefer to encourage the growing and shipping of grain. The carrier may also wish to develop settlement in the area at a more rapid rate than is in the interest of either the farmers going onto these lands or of other farmers producing the same products. There is need in this situation for carefully planned procedure in development and utilization of the land which will take into account both the public and the carrier interests.

The preceding discussion has dealt with the relation of all the shippers to the railroads, and has ignored the fact that there are very important

conflicts of interest between the various shippers using a given railroad. Granted that the shippers all want adequate service maintained, a question still remains as to how the burden of paying for the total service of the carrier shall be divided between different types of commodity and between the shippers in different localities served by the carrier. The earlier discussion has indicated that the relationships between these charges also must be determined somewhat arbitrarily. If the shipper of grain can force the railroad to derive a greater part of its income from hauling livestock, lumber, coal, iron ore, or manufactured goods, he may profit thereby and service may still be adequately maintained. However, since he is likely to have to bear some of these charges on other products, either in lowered price for such of them as he ships or in a larger addition to the market center price in the case of those shipped in, a more important difference lies in the relative rates charged different areas served by the same railroad. For example, if rates charged by the Northwestern or Milwaukee on hauls between points in Minnesota or Wisconsin and Chicago are high, not as much will need to be collected from shippers to or from South Dakota. Much of the difference in levels of rates is at present based upon differences in "traffic density." Traffic density is measured by computing the number of tons of freight hauled over a given mile of track in a given period of time. Ordinarily the heavier the traffic is the lower the rate will be. This distribution is based on the theory that if the overhead of maintaining a given mile of line can be spread over many tons of freight not so much of it need be charged against any given ton. Naturally, with this line of reasoning a much better case can be made for low rates on those hauls from points near the market centers than for the ones farther out since all of the shipments from the outlying sections must pass over these more central parts of the line. Outlying sections might, however, logically urge a greater emphasis on the volume of originating freight per mile of line. The heavy shipments over the lines near Chicago would not exist were it not for the portions of the line in outlying sections where traffic density must of necessity be light. If income is credited largely on the basis of all freight moving over given sections of line and expenses are computed on a basis of average costs over the whole line so far as given services are concerned it can readily be seen that a bad showing will be made for the outlying agricultural sections. Probably a more appropriate basis of computation is to be found in estimating the amount that such an outlying area adds to the expenses the carrier would have if it did not possess these sections of line and to set off against this the amounts added by freight shipped into and out of the area concerned to the income the carrier would otherwise have. There are certain elements of general overhead expense that would not be taken care of if this reasoning were applied to all sections of the line. These elements of expense (salaries of general officers, etc.) are not, however, as important an element relatively in this case as is the general overhead in computing relative rates on different commodities taking the same haul. The basis of reasoning about costs which has just been indicated would be more in accord with the actual basis on which extensions of line have been made than is the one now in common use, and would have the advantage of tending to throw more of the burden onto the sections nearer the market centers where freight rates are a less important element in prices and where the lands are, in most cases, better able to stand the small reductions in income which



might result. Such modification of reasoning will, however, require long and persistent effort if it is to be developed; as the philosophy based on rate relationships in terms of traffic density is long established and data for its application can be much more easily and definitely obtained.

It is evident from the foregoing statements that the conclusions as to the fairness of given rates depend very much on the method of bookkeeping used. Very complex technical problems are involved, and, except as he is represented by skilled counsel in rate hearings, the shipper is in much the same position as a litigant in court attempting to handle his own case against a battery of high-powered attorneys on the opposing side. For effective handling of the interests of any given area, it is necessary that competent experts determine what seems a proper set-up of rate relationships for this and competing areas and work consistently and unremittingly in the directions indicated by such a set-up.

The question of South Dakota's interest in the development of industrial and distributive activities has been touched on only briefly in an earlier section. In general a greater diversity of occupational activity would seem to be conducive to greater stability in business conditions and possibly to greater prosperity, though this last cannot be taken for granted. Careful analysis of each situation is needed. Greater diversity and less specialization represent a gain only if there are some of the state's resources which can be used in providing certain products or services at less cost than they involve if had from elsewhere; that is, if they mean a more effective use of the state's resources. True economy of production involves producing each product or performing each effort where that can be done with the smallest outlay of human effort and other resources, transportation included. Uneconomic rate structures, tariff barriers, and institutional developments tend to prevent, in many cases, such economic production and it is only by very careful study of each industry and activity by people thoroughly familiar with the elements of cost theory that it is possible to indicate with any degree of certainty what rate changes and other developments would best foster industrial and commercial development in South Dakota. The packing industry based on important South Dakota products has, for example, shown considerable development under present rate relationships. Yet if the cost of shipping pork products and dressed beef were twice as high as it is, freight on live animals remaining the same, it would almost undoubtedly be more profitable to conduct the packing industry at points farther east. A higher rate on cream in proportion to that on butter might hold more of the manufacture of butter in the state. Different relative rates on wheat and flour might encourage the revival of some of the flour mills in the state. In general, such industries as are suited to the state will be encouraged (if their raw materials are produced within the state) by rates on the raw materials that are high in proportion to the rates on finished products. Where the raw materials come from outside the state, South Dakota manufacture for South Dakota consumption will be encouraged by relatively low rates on raw materials and relatively high rates on finished goods. Such adjustments should be made, however, granting they could be made, only after careful study and consideration; as a high rate on South Dakota produced raw materials if not accompanied by a development of its manufacture would only serve to penalize the producers of such raw materials. The possibilities of encouraging industrial development by means of rates

is rather limited so far as South Dakota is concerned. Rate advantages can only partially offset such advantages as those which come from the possibility of larger size of plant and from the larger scale organization of the industry as a whole. It is scarcely conceivable, for example, that any probable adjustment of rates could pull to South Dakota from Minneapolis any of the milling activities except that which might be involved in using chiefly local wheat and supplying local demand. Milling is an industry that requires large plants and access to many kinds of wheat and apparently has gained more from the economies affected by these than such rate advantages as local mills in South Dakota possessed have been adequate to offset.

In general the pull of industries toward given locations is exerted by (1) the presence of raw materials for manufacture, (2) nearness to a large body of consumers, (3) availability of experienced and cheap labor, (4) the possibilities of large scale operation and extensive organization of the industry as a whole. For products which represent a great diminution in weight from that of the raw materials of which they are made the tendency is for them to be manufactured near the location of the raw materials. Thus, nearly all forest products are manufactured in the forest areas, and ores tend to be smelted near the mines if coal is available. On the other hand, if products involve the addition or use of some product which is available nearly everywhere, these tend to be manufactured near the areas of heavy consumption. Products which do not involve much change in weight may be manufactured about as cheaply one place as another. Livestock products, flour, and linseed oil come in this class. The pull exerted by a necessary supply of skilled labor and by the early development of the industry is a strong one. This is clearly evidenced by such localizations as those of the watch industry in Waltham, Mass., and Elgin, Ill., and of the hat industry in Danbury, Connecticut. Each of these factors exerts a strong influence on the localization of manufacture which may offset or strengthen advantages due to rate differentials.

It is evident from the foregoing that South Dakota can look to industrial development only in certain rather definite lines which will apparently be based largely on the manufacture of the raw materials, chiefly those coming from her farms, and on certain specialized products for supplying her own population. It is not to the state's advantage to induce development through large concessions in factory sites, bonuses, etc., since industries which choose their locations on these bases are likely to be promotional in type, to have only temporary advantages, and thus ultimately to prove liabilities to their communities instead of assets. Tax policies of the state as related to industrial development should, however, be given some consideration. The fundamentally sound development will be in those industries where the total of costs including raw materials, labor, freight rates, taxes, etc., are low relative to those of other areas. Money spent in careful appraisal of these aspects of the situation both as to manufacturing and agricultural development will be far more effective than any amount of sunshiny publicity based upon wishes rather than facts. Capably managed industries select locations on the basis of comparative advantage not on the volume of publicity sent out. Industries not capably managed are not a desirable asset and often are of a promotional type the main advantage of which is the enrichment of the promoters who have ordinarily left the scene by the time the business fails. Agricultural

development likewise will be stronger, more permanent, and a better asset both to the state and to the individual farmers if it is based on a frank, serious study of the types of agriculture in which the state's comparative advantage is greatest rather than on a highly propagandized effort to introduce types of farming which have proved well adapted elsewhere. Certain parts of South Dakota have excellent advantages for the production of beef cattle and sheep on relatively large units, say from two or three sections up. It is a foolish waste of money and a grave injustice to unadapted settlers to propagandize for the development of small farms for intensive production in such areas. The aim here as in manufacturing should be to facilitate the type of production in which the area has the greatest advantage and to seek the type of farmer who can best exploit those possibilities.

In the development of commercial activity within the state, the possibilities are somewhat better. For many of the distributive functions, large scale operation provides smaller advantages than in the case of industrial plants. For example, if a Minneapolis wholesale house has low rates on l. c. l. shipments, such that it can ship into eastern South Dakota and lay its commodities down as cheaply as wholesale houses in South Dakota can do, it can hold much of the business which would otherwise be transacted in South Dakota. On the other hand, if carload rates are low in proportion to l. c. l. rates this will encourage wholesaling through South Dakota houses. Here again specific situations should be carefully studied and those developments which seem to be desirable should be made the object of a continuous and consistent effort. Some of the transfer, storage, and processing activities, especially for corn and other grains going to western consuming areas, which are now performed in Minneapolis, Sioux City and Omaha, might eventually be brought into the state by certain adjustments in rates.

### **The Means of Protecting the State's Interests in Rate Matters**

The preceding discussion has indicated the very complicated and technical nature of the problems involved in rate adjustments and controversies. The Interstate Commerce Commission has built up a very carefully organized arrangement whereby its examiners and often the commissioners themselves hold hearings on specific proposals at which all parties of interest may be heard. At these hearings the carriers and the market organizations of the different cities are ably represented by highly trained rate specialists and attorneys. The shippers have ordinarily found it much more difficult to provide for suitable representation of their interests. The ordinary shipper or farm organization representative is likely to be hopelessly at sea in the complex array of rates, rate structures, rate blankets, precedents, etc., which he hears discussed in such hearings, and his interests are likely to suffer unless well represented by capable specialists. As a result of this situation and of the fact that most of the rates involve interstate hauls and, therefore, cannot be determined by the state railroad commissions it has become customary for the specialists of the state commissions to represent in Interstate Commerce Commission hearings the interests of the shippers of their states. In general

this arrangement has much to recommend it. It provides a possibility for the development of a definite and continuous policy. It provides for skilled technical representation which most shippers could not afford and often would not appreciate the need for. Orderly and effective presentation of the interests of the various groups will best be facilitated if individual shippers, farm organizations, and other local agencies concerned will set up appropriate committees to counsel with their state railroad commission on policies to be advocated, to furnish needed special information, and to offer specialized testimony if this is needed. Very general testimony is usually not significant and serves merely to cumber the record. On the other hand, specialized testimony based on demonstrable facts and with a clear analysis of relationships involved and of the probable effects of given changes is extremely helpful and is usually welcomed by the representatives of the Interstate Commerce Commission. To acquaint the reader with the state railroad commission and its activities a brief history of its development and work is included as an appendix.

## Appendix

### History of the Origin and Organization of the South Dakota Board of Railroad Commissioners

The Board of Railroad Commissioners was established in 1885 by the Territorial Legislature. (Chapter 126, General Laws of 1885.) The duties and powers of the Board as originally created had reference only to service and facilities of rail carriers. At the time of the division of the territory and its admission into the Union the states of South Dakota and North Dakota each continued the Railroad Commission.

The first session of the state legislature in 1889 passed Chapter 110 amending the 1885 law establishing in effect the Board of Railroad Commissioners of the state of South Dakota and largely increasing the powers and duties of such Board. The Board consisted of three members each appointed for a term of two years or at the pleasure of the Governor. In 1897 Chapter 111 was enacted making the Board of Railroad Commissioners an elective office and the term of office six years, one commissioner to be elected each two years, the evident purpose of the legislature being to perpetuate experienced members upon the Board and to make the Board of Railroad Commissioners responsible directly to the people. By the enactment of Chapter 110 of the Session Laws of 1897 the powers and duties of the Board were increased to include the establishment of railroad rates. Up to that time the said powers and duties of the Board were restricted to those of a fact-finding body with authority to publish its findings. It did not have authority to establish or promulgate rates.

In 1907 there was created by legislative enactment a telephone commission with limited jurisdiction over telephone and telegraph companies, composed of the State Treasurer, State Auditor, and a Telephone Commissioner, said Commissioner to be appointed by the Governor for a period of two years. In the session of 1909 the legislature repealed the 1907 law and abolished the telephone commission and enacted Chapter 289 under which the rates and service of telephone and telegraph companies were placed under the jurisdiction of the Board of Railroad Commissioners under a comprehensive regulatory law which with certain changes by succeeding legislatures is now the law relating to rates and service of telephone and telegraph companies.

In 1890 the legislature placed the regulation of grain warehouses under the jurisdiction of the Board. (Chapter 99 of Session Laws of 1890.) That law with amendments subsequently enacted is still in force.

In 1925 the legislature enacted Chapter 300 under which the property storage warehouses were placed under the supervision of the Board of Railroad Commissioners. Previous to such enactment this supervision was exercised by the Secretary of State. Under Chapter 124 of the Session Laws of 1923, the supervision and control of motor carriers was also placed under the jurisdiction of the Board with more or less limited powers and duties. In 1925 the legislature enacted Chapter 224 of the Ses-

sion Laws of 1925, a very comprehensive Motor Carrier Act under which supervision or regulation of motor carriers is now conducted.

No carrier or utility whose business is under the supervision and control of the Board may increase its rates without the written consent of the Board. All existing rates of such carriers or utilities are subject to attack upon complaint of any interested party or upon motion of the Board. Where the question of such rates is raised the duty rests upon the Board to conduct hearings and investigation, develop all the facts and upon the record made, insofar as intrastate operations are concerned, enter its findings and make its order with respect thereto. Such order of the Board is subject to appeal to the Supreme Court of the state direct.

With reference to the matter of rates applicable to interstate traffic, the Board by law is authorized and required to develop the facts and present such facts to the Interstate Commerce Commission and the courts. The Board has authority to institute proceedings before the Interstate Commerce Commission upon its own motion, either with or without complaint from shippers or citizens of the state.

The Board is composed of three commissioners and the secretary, assistant secretary, rate expert, assistant rate expert, engineer, accountant, reporter, clerk and stenographer, three field men and six stenographers. The entire organization is built up to coordinate and function as a unit. The commissioners manage the business, outline policies and supervise every function, hold hearings, decide cases and, in fact, do whatever is necessary to bring about an orderly dispatch of the duties imposed by statute. They also appear before the Interstate Commerce Commission as authorized under state law and sit with the Interstate Commerce Commission in all cooperative cases involving rates.

The secretary's and assistant secretary's duties appertain to the usual duties of such offices. The rate man and his assistant, as is also true of the engineer and accountant, are very important and indispensable cogs if the machine is to function. In all rate cases, either before the Board or before the Interstate Commerce Commission, evidence must be developed and presented by men qualified in their respective lines, otherwise their testimony will have little weight either before the Interstate Commerce Commission or the courts. In fact, the work is so technical that only men of exceptional training and experience are in a position to secure results.

The reporter takes all evidence in hearings before the Board on railroad, telephone, telegraph, motor carrier and all other matters going to hearing before the Board, and transcribes such evidence and performs such other duties as may from time to time be requested of him.

Three field men are employed by the Board, two of whom at the present time are devoting all of their energies to the supervision and policing of motor carriers and the third man to the inspecting of warehouses, for which work he was temporarily employed.

Intrastate traffic may be defined as traffic wholly within the state, or, in other words, traffic between points located within the state, the traffic not moving out of or into the state. This definition will apply not only to railroad traffic but to motor traffic and transmission lines such as telephone and telegraph as well.

Interstate traffic includes all traffic moving from one state to another, or to one state from another, or through a state from one state to a state

beyond, and applies likewise to all traffic whether rail, motor or transmission. The Interstate Commerce Commission is vested by law with authority to fix and determine rates applicable to interstate traffic and to regulate service appertaining to such traffic. A state commission is authorized by law to fix and determine rates applicable to intrastate traffic and to regulate all matters of service connected therewith. The only authority which the Interstate Commerce Commission can exercise over intrastate rates is in a case where intrastate rates have been arbitrarily fixed so low as to be an undue burden on interstate commerce. In such instances the Interstate Commerce Commission has authority to require the carriers to equalize the interstate and intrastate rates to such an extent as will remove the discrimination against or undue burden upon interstate commerce. The Interstate Commerce Commission has no authority or supervision whatever over intrastate rates, except as just indicated. The regulation of intrastate rates rests entirely with the state commission.