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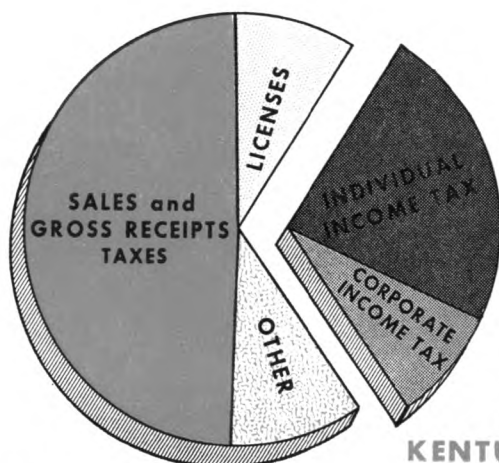
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SOURCE OF STATE TAX COLLECTIONS IN 1958

OHIO

Sales and gross receipts taxes account for most of the total tax collections in Ohio.



Taxes on individual and corporate incomes are a significant source of revenue in Kentucky.

KENTUCKY

All state revenue = 100%

Based on preliminary figures for fiscal year 1958

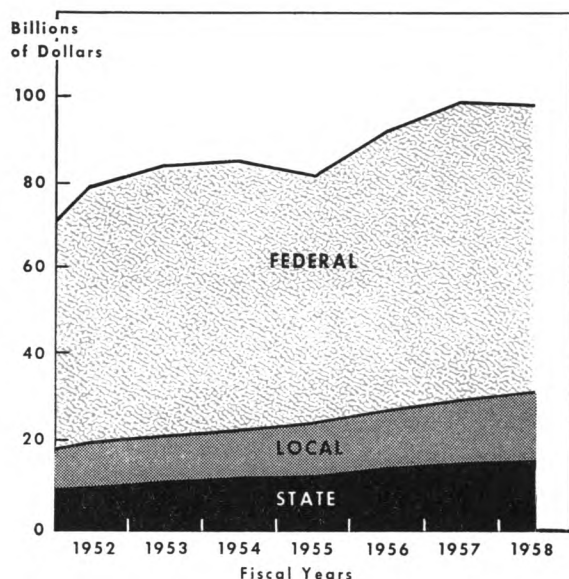
Tax Revenues of State Governments

(Fourth District)

TOTAL combined tax receipts of state governments have risen continuously for the past quarter century. State tax revenues represented one third of all taxes collected by the Federal, state, and local governments in 1933. By 1958, however, the comparable proportion had decreased to 15 percent because of the greater acceleration in Federal tax collections.

While state tax collections are at present a relatively smaller percentage of all taxes collected in the United States than in prewar years, they have marched ahead steadily, in absolute terms, during the postwar period.

FEDERAL, STATE, AND LOCAL TAX REVENUE
1952-1958



Recently the growth of state tax collections has been particularly rapid, having increased almost one third since 1955.

As seen on the accompanying chart, total state tax collections did not suffer setbacks in the recessions of 1953-54 or 1957-58. On the other hand, unlike the Federal Government revenues, state tax revenues did not experience a rapid upsurge during the period between the dips in business activity.

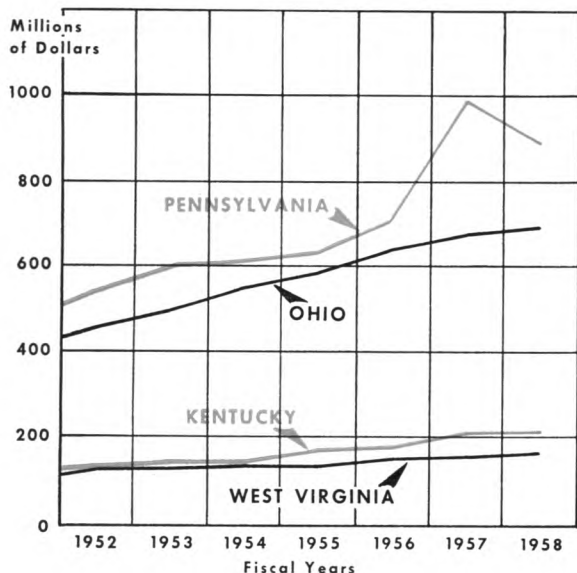
Two factors largely account for the steady, noncyclical growth of state revenues: (1) A considerable part (59 percent) of state revenues is raised from sales and gross receipts taxes that generally yield a fairly steady flow even during mild recessions. (2) While taxes on net income of individuals and corporations comprise the main tax source of the Federal Government, yielding approximately 80 percent of the total revenues in fiscal 1958, only thirty-three of the state governments levy income taxes. In those states the rates are considerably lower than Federal income tax rates. The forty-eight states combined derived only 17 percent of their total tax revenues from income taxation in fiscal 1958.⁽¹⁾

State Taxes — Fourth District

What has been said up to this point about tax collections for all forty-eight states is generally true for Fourth District States. The Fourth District is made up of the entire State of Ohio, western Pennsylvania, eastern Kentucky, and West Virginia's panhandle. The

(1) The fiscal year for all but four states ends June 30. Those four states and their closing dates are: New York, March 31; Pennsylvania, May 31; Texas, August 31; and Alabama, September 30.

STATE TAX COLLECTIONS 1952-1958



accompanying chart shows a sustained growth in tax receipts, even through the recessionary periods of 1954 and 1958. The only year-to-year decline for a Fourth District State was in the State of Pennsylvania during its past fiscal year. Much of the \$97-million decline in revenue for the fiscal year which ended May 31, 1958, can be attributed to smaller tax receipts from corporations operating in Pennsylvania. While the recession may have been partly responsible for this decline, the major reason was an adjustment of corporate tax payment schedules.

Major Sources of Tax Revenue in 1958

In all forty-eight states, approximately 70 percent of total state revenue comes from taxes.⁽²⁾ There are sources of tax revenue which are utilized by all the states, such as sales and gross receipts taxes and licenses. The role which each particular tax plays

(2) Intergovernmental revenue from the Federal Government accounts for almost 20 percent of state revenue, while revenue from local governments and miscellaneous charges accounts for the remaining non-tax revenue of the states.

varies from state to state. In addition, some states rely heavily on taxes which are not common to all the states.

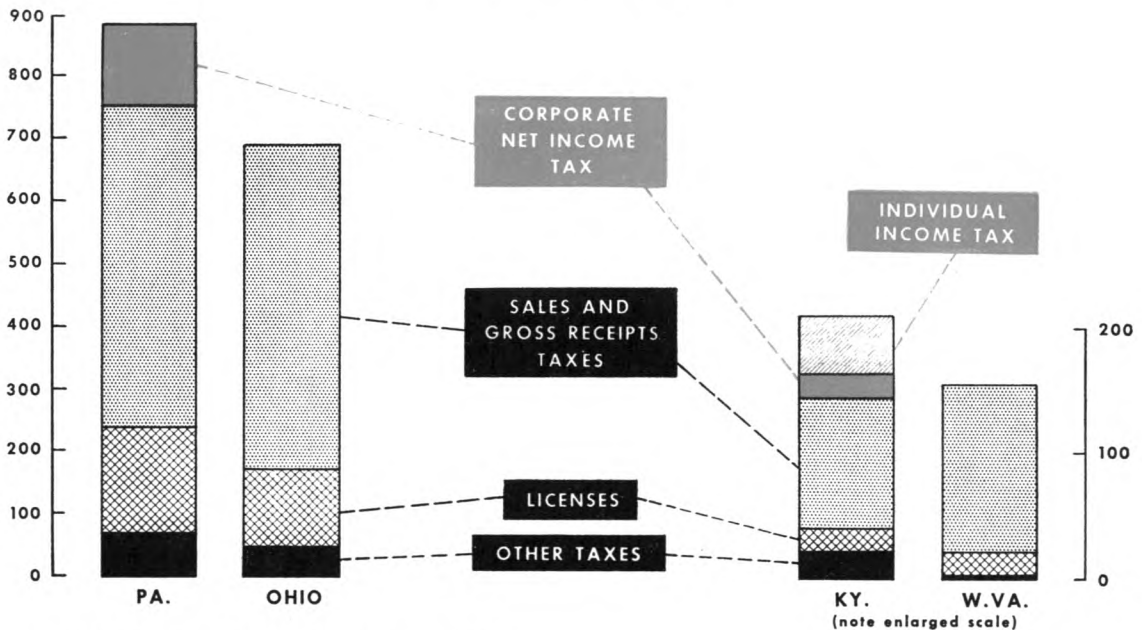
The variation in the importance of taxes among states is evident from an examination of the taxes of the four states which are in the Fourth Federal Reserve District. The most important taxes in the four states are those on sales and gross receipts. West Virginia receives 85 percent of its tax receipts from this source, while Kentucky receives less than 50 percent from such taxes. (See chart on page 4.) Kentucky's revenue from this source is comparatively low because it does not have the "general" sales tax which is common to the other three states.

In 1958 the general type of sales or gross receipts tax, which is applicable to many goods and services, produced about one quarter, one third, and one half of total tax revenue collected in Pennsylvania, Ohio, and West Virginia, respectively. Both Pennsylvania and Ohio have a 3 percent sales and use tax. West Virginia has both a 2 percent general consumer sales tax and a gross receipts tax with rates varying from two tenths of 1 percent to 8 percent, according to type of business.

The sales or gross receipts taxes other than the general type are those on specific goods or services such as gasoline, tobacco products, insurance, and amusements. The most important of these selective taxes is that on motor fuels, which produces approximately 20 percent of tax revenue in Ohio, Pennsylvania, and West Virginia. The income from motor fuel sales in Kentucky is almost 30 percent of total tax revenue. However, the rate in that state is 7 cents a gallon, compared with 5 and 6 cents in the other states.

License tax collections, at least half of which are on motor vehicles, produced 10 to 20 percent of total tax revenue in the Fourth District states in 1958. Pennsylvania's license receipts were the largest of the four states, due in part to a relatively higher percentage of revenue from corporation licenses; the latter accounted for 7½ percent of total tax receipts in Pennsylvania.

**STATE TAX COLLECTIONS IN 1958,
BY MAJOR SOURCE**
(in millions of dollars)



Aside from such taxes, which are generally used by most states, Kentucky and Pennsylvania rely on income taxes for a large share of their tax revenue. Kentucky has a graduated individual income tax with rates up to 6 percent on net income over \$8,000, as well as a corporate net income tax of 5 percent on corporate income under \$25,000, and a 7 percent tax on incomes over \$25,000. As can be seen on the cover chart, Kentucky received almost one third of its tax revenue from these two types of income tax. Pennsylvania has a 6 percent corporate net income tax which provided 15 percent of the state's total tax revenue in 1958.

There are still other, and less common, taxes levied by the Fourth District States. For example, Pennsylvania and Kentucky are two of the fourteen states which have document and stock transfer taxes, and West Virginia is one of nine states employing a poll tax.

Such taxes, however, are relatively insignificant in the general tax revenue picture of the states.

Per Capita State Tax Collections

There is considerable range among the states in per capita tax collections. Per capita amounts of state taxes in fiscal 1958 ranged from over \$125 for three states (Nevada, New Mexico, and Washington) down to less than \$60 for two states (Nebraska and New Jersey). For all forty-eight states the per capita tax collection was \$88. All four states in the Fourth District were below the national average, ranging from \$81 for West Virginia down to \$68 for Kentucky.

Caution must be used in interpreting any comparison of per capita taxes in individual state governments. There are marked differences among states in the scope of public serv-

ices, in economic resources, and in the distribution of responsibility between any given state and its local governments for performing and financing particular public functions. Some state governments directly administer certain activities which elsewhere are undertaken by local governments, with or without state aid.

The proportion of total state-local tax revenue which is collected by state-imposed taxes differs from one state to another. In terms of 1953 tax revenue data, state taxes represented only 49 percent of the total state and local tax burden in Pennsylvania. For West Virginia the comparable proportion was 72 percent. Per capita tax collections by the two state governments were virtually the same in 1958. Local taxes in West Virginia are relatively lighter than in Pennsylvania. It should be emphasized that this is not a measure of relative efficiency of the various state and local governments since identical services are not provided in the different states and the quality of such services may vary.

Prospects for the Future

Looking to the years immediately ahead, it seems certain that future population growth and shifts will continue to push state outlays steadily upward. In order to maintain the

POPULATION AND PER CAPITA TAXES

(Fourth District States)

STATE	Estimated Population July 1, 1957	1958 State Taxes Per Capita
48 States	169,502,000	\$87.93
Kentucky	3,040,000	68.22
Ohio	9,200,000	75.33
Pennsylvania . . .	11,043,000	80.43
West Virginia . . .	1,976,000	81.35

current rate of per capita outlays, most state governments will have to expand their tax collections. For the most part, state governments have relatively little leeway to increase revenues sharply, since they possess neither the extensive taxing authority nor the broad borrowing capacity of the Federal Government. While neither business nor individuals are likely to emigrate to other countries as a result of high Federal taxes, they can and do consider state taxes in their choice of residence. Therefore, the prospect is not for sharply accelerated state revenues, but rather for a fairly steady increase in state tax collections.

Airplanes In Agriculture

THE AIRPLANE has become an integral part of American agriculture, taking its place alongside other tools of production such as the plow, the corn picker, the cotton picker and the combine.

Nevertheless, many farmers and other businessmen are as yet unaware of the present importance and potential of airplanes in agriculture. The airplane annually assists the production of an enormous variety of agricultural commodities, ranging from cotton to Christmas trees. In recent years, a conservative estimate indicates that about 30 million acres, or the equivalent of one out of every twelve acres of land under cultivation, have been subject each year to some form of airplane treatment such as seeding, fertilizing, dusting or spraying.

Aerial farming is not limited to the United States alone. Airplanes were used in Yugoslavia last year to treat 150,000 acres of woodland in an effort to control the gypsy moth. An additional 8,000 acres of sugar beets in that European country were treated twice from the air with a fungicide to control an outbreak of *Cercospora* disease. Airplanes are also used in the agriculture of such widely scattered countries as Guatemala, Mexico, Japan and the Netherlands. (Over 80 percent of the flying in the latter country is for agricultural purposes.) Although most of the aerial application work in the countries mentioned centers around the control of insects and diseases, the airplane is used rather fre-

quently in countries where rice is grown, such as Japan, as a method of seeding.

Development and Growth of Aerial Application

Farming from the sky is not new. The first use of the airplane in agriculture appears to date back to August 1919, when the United States Department of Agriculture aerially dispersed an insecticide from an open-cockpit biplane to combat an outbreak of the *Catalpa Sphinx* in a grove of catalpa trees located near Dayton, Ohio. Soon afterwards, dust applications were made in the United States and Canada against the hemlock looper, spruce budworm, and gypsy moth, and in Europe against the nun moth, pine looper, and other pests.

Results of the early applications were varied. The insecticide dusts killed most of the different insects, but the method of application had several shortcomings. The dust was frequently carried away from an infested area by air currents after release from the plane; the dust particles did not stick to the tree foliage, being quickly removed by a strong wind or a rain. Furthermore, with any of the insecticides known at that time, the quantity of dust required made treating costs high—around \$7 per acre.

As a result of these early experiences, the aerial method of combatting crop pests made very little progress in the nation as a whole

until after World War II. However, experimentation during the interim period was continuous, especially in the South. An outbreak of cotton leafworms in Texas in 1926, for example, stimulated an interest in the airplane as a means of protecting the southern cotton grower against losses in income caused by the devastating effects of insects. An attempt, largely experimental in nature, was made in that year to treat 3,000 acres of infested cotton. Results were successful, and two years later airplanes were treating over 50,000 acres to control the leafworm.

The most significant advances in agricultural aviation were not accomplished until the discovery in 1941 of a highly potent insecticide called DDT. It has been said that DDT revolutionized the field of aerial application and permanently launched the airplane over the farms of this nation.

Insect control has been, and still remains, the primary use of airplanes in agriculture, although it is far from the only one. The importance of insect control to the farmer can readily be seen when it is realized that tobacco hornworm damage cost growers \$84 million in 1944, losses from corn borer damage averaged \$148 million annually between 1948 and 1951, boll weevil destruction of cotton costs growers \$500 million annually, and that, on the average, losses caused by all insects add up to a staggering \$4 billion each year despite the control measures now available.

Even though the discovery of DDT was hailed as the one innovation that permanently placed the airplane in agriculture, many problems had to be solved before the aerial application business became a true success. Mistrust and doubtfulness of the aerial applicator's ability to gain adequate dispersion of dry and liquid materials was the primary obstacle to the growth of this business.

Surmounting Some Obstacles

After World War II, bi-wing training aircraft were readily available as were a considerable number of pilots with a desire to use their skills as a means of livelihood upon re-

lease from the government's payroll. Many of these men felt that there was a great future for them if they could equip a government surplus plane with the necessary apparatus to apply dusts and sprays to growing crops. However, many of these pilots did not understand the principles of air flow around an airborne object, or the paths followed by dust particles or droplets of liquid when released from flying aircraft. As a result, the dispersal equipment designed by pilots produced many varied and inefficient patterns of coverage. The word was spread that aerial application was not an effective means of pest control, and applicators found their services very difficult to sell.

AERIAL SPRAYING OF FIELD CORN



There were many individuals and groups of people, however, who felt that effective and efficient distribution equipment could be developed. In 1951, the Ohio Agricultural Experiment Station and the Ohio Aviation Board decided to sponsor the experimental development of aerial application equipment at the Ohio State University. About the same time the Texas Agricultural and Mechanical College secured a grant from the Civil Aeronautics Administration to conduct similar experiments at the Personal Aircraft Research Center located at College Station, Texas.

Both institutions soon experimentally developed new types of distribution equipment which were readily adopted by industry. A prominent producer of light aircraft secured

the right to improve and use a spreading device developed at the Ohio State University. In the meantime, a few equipment companies began to manufacture apparatus specially designed for the popular war surplus Stearman bi-wing plane.

With improved distribution devices, aerial applicators were capable of giving much better coverage and more efficient control of pests. By 1953, a total of 4,200 aircraft, approximately three times the size of the United States airline fleet at that time, were approved specifically for agricultural flying, and during that year they were flown 672 thousand hours. A critical shortage of experienced agricultural pilots developed in the next two years as the demand for aerial application services continued to increase.

To help alleviate the shortage of pilots, Texas Agricultural and Mechanical College teamed up with the Civil Aeronautics Administration and the Texas Aerial Applicators Association in 1955 to offer instruction in the fundamentals of agricultural flying to pilots who had commercial licenses and had logged a minimum solo flight time of 500 hours. A similar course of instruction was inaugurated at the Ohio State University in 1956.

During 1957, the time devoted to aerial application activities by agricultural pilots climbed to 850 thousand hours. This was the amount of flying time required to treat over 58½ million acres with 654 million pounds of dry matter and 93 million gallons of liquid. (The figure of 58½ million acres involves double counting of some acreages which were treated more than once during the year.) The rapid growth of this industry in recent years is concrete evidence of the wide acceptance of the airplane as an important tool in the agricultural production process.

Uses of Airplanes in Agriculture

The major uses of the airplane in agriculture may be grouped into five rather broad classifications: (1) insect and plant disease control, (2) weed and brush control, (3) fertilization, (4) defoliation, and (5) seeding.

In 1957, nearly three fourths of all agricultural flying involved the control of insects and plant diseases. The quantity of materials dispensed in these two control activities amounted to 228 million pounds of dry matter and over 65 million gallons of liquid. All of these materials were applied to a total land area of nearly 45 million acres.

It should be noted that a much larger proportion of the materials dispensed from airplanes for the control of insects and plant diseases was in the form of a dust rather than a spray. However, the proportion of total acreage treated with sprays relative to dusts has been increasing and will probably gain in popularity, for spraying can be accomplished safely at greater wind velocities than dusting. Moreover, sprays can be applied after the morning dew has vanished.

Weed and brush control accounts for the second largest proportion of total flying time. Pilots spent nearly 119 thousand hours spraying and dusting 7.5 million acres with herbicides to kill unwanted and unneeded growths of weeds and brush.

The largest share of herbicides applied aerially is in the form of sprays. This probably stems directly from the plant control revolution started by the announcement of the herbicidal properties of 2-4-D and related substances. Even though weed control has been the main target for the aerial application of hormone plant killers, the use of these substances to control the growth of brush is destined to increase rapidly; there are brush problems from the Atlantic Seaboard to the Pacific, including the formerly forested areas, the prairies, the plains, and even the deserts. One example of the use of aerially dispersed herbicides that has been increasing in popularity is the control of brush growth under large expanses of power lines.

Application of fertilizer to growing crops is another use that farmers have made of the airplane in recent years. The accompanying table shows that last year roughly 75 thousand hours were flown by agricultural pilots to apply 322 million pounds of dry fertilizers and 1,791 thousand gallons of liquid ferti-

AERIAL APPLICATION ACTIVITIES IN 1957

TYPE OF ACTIVITY	Flying Time (hours)	Dry Materials Dispensed (1,000 lbs.)	Liquid Materials Dispensed (1,000 gal.)	Acres Treated (1,000 Acres)
Insect and plant disease control ⁽¹⁾ . .	560,740	228,477	65,470	44,510
Weed and brush control	118,720	184	14,406	7,489
Fertilization	74,730	322,228	1,791	2,879
Defoliation	48,170	12,968	11,415	2,094
Seeding	39,690	90,657	..	1,588
Other	8,630
TOTAL	850,680	654,514	93,082	58,560 ⁽²⁾

⁽¹⁾Excludes insect control in residential areas.

⁽²⁾Includes acreages treated more than one time.

Source: Civil Aeronautics Administration, October 1958.

lizers to nearly 3 million acres of cropland. The fertilizer phase of the aerial application business is a relatively new activity that grew rapidly when high analysis fertilizers became available commercially in pelleted and liquid forms.

Airplanes are also used to treat crops with preharvest chemicals that regulate either the abscission or desiccation process of plants. Although preharvest chemicals have been used for a number of years, only recently have they been used to any large degree. Defoliation chemicals that cause plants to drop their leaves prematurely are used most extensively by cotton growers as they greatly facilitate mechanical picking and reduce the amount of leaf-fiber content in the harvested crop. Additional reasons for the use of these chemicals by cotton growers are that defoliants accelerate the opening of bolls, and reduce insect damage to open cotton.

Defoliants combined with desiccants are also becoming increasingly popular among producers of soybeans. The chief purpose of the preharvest treatment of soybean acreages is to kill weeds prior to frost in order to permit use of the combine when soybeans are normally mature. Preharvest conditioners are

also used on legumes such as alfalfa, sweet clover, ladino clover, alsike and vetches to enable direct use of the combine.

Aircraft have also been found useful for sowing seeds. Over one and one-half million acres were seeded from the air in 1957. Some of the crops planted from airplanes are rice, oats, grasses, and cover crops, such as legumes and rye.

Other uses of the airplane that illustrate its versatility are frost prevention, mosquito control, thinning of fruit blossoms, prevention of fruit drop, strip mine reclamation, highway de-icing, and field mouse control. Certainly the airplane has found a place in the production process on many of the nation's farms.

Advantages of Aerial Application

Timeliness is probably the major advantage of using the airplane. Planes can continue dispensing insecticide, fertilizer, or seed even though it may be too wet for ground equipment. Thus, the farmer who contracts with an aerial applicator can have his wheat and meadows top dressed, his oats planted, or his legumes broadcast any time he desires. Timeliness afforded by aerial application may in-

crease yields considerably over and above what the yields would be if fertilization and seeding operations are delayed until the land becomes firm enough to permit the use of ground equipment.

A second advantage is the speed at which a large number of acres can be treated. An outbreak of corn borer, cutworms, or armyworms in an area can be treated rapidly. Hundreds of acres can be covered in a few days by one or two applicators, whereas a relatively large fleet of ground sprayers would be required to accomplish the same objective. One Corn Belt farmer puts it this way: "You don't know you need armyworm control until the rascals are thick and then you need it right away, no time to mount or adjust ground equipment, you want to get the stuff on that afternoon." Contracts covering thousands of acres are frequently let to aerial applicators in an effort to gain quick control over outbreaks of insects such as the grasshopper and spruce budworm. Farmers in Texas, Oklahoma, and Colorado, in cooperation with the state and federal governments, contracted with aerial applicators to have more than a million acres—mainly ranchland—treated for an outbreak of grasshoppers.

Thirdly, airplanes can apply sprays or dusts to standing crops when it would be impractical to attempt using ground equipment. For example, considerable wheel damage would occur if ground equipment were moved through a mature field of soybeans, and it would be practically impossible to move this equipment through shoulder-high corn.

A fourth advantage of aerial application is the ease of overcoming vertical obstacles that prevent the use of ground equipment. Airplanes can be used to treat power company rights-of-way and woodlands that are inaccessible to ground equipment. Furthermore, cover crops and legumes can be seeded easily even though harvest of the companion crop has not occurred. For example, rye can be seeded in standing corn, and legumes can be seeded in standing wheat.

Fifth, for some jobs the airplane is a more economical method of applying insecticides, herbicides, and fertilizers.

The disadvantages of aerial application stem primarily from the problems encountered in obtaining an even distribution of materials, the comparatively light payload of the airplane, and the very large costs of using planes on small acreages.

Financial Structure of the Aerial Application Business

The National Aviation Trade Association estimated on the basis of a survey⁽¹⁾ that the aerial application enterprises grossed a total of \$90 million in 1956 on a total investment of \$75 million.

The results of the survey conducted by the NATA also indicate that the amount of capital invested in the average aerial application concern was around \$48,000, and gross returns averaged approximately \$58,400 for the 1956 year. The amount of revenue flying time averaged 761 hours, covering a period of 5.2 months of active operation during which time the average aerial application firm, employing 9.2 people either part or full time, treated a total of 57,000 acres.

A closer look at the capital invested in the various enterprises included in the survey shows that these average figures were heavily weighted by the larger concerns, for 43 percent of the applicators replying had a capital investment of under \$20,000. At the upper extreme there was one firm with an investment of \$500,000 and a considerable number of firms that reported a total investment ranging between \$150,000 and \$200,000.

The capital investment in an aerial application enterprise typical of those located within the Fourth Federal Reserve District is around \$15,000, and the average gross return is about \$10,000.

These averages are considerably lower than for the United States at large. One of the reasons for the difference is that the typical applicator in the Fourth District owns only

(1) The survey, upon which the National Aviation Trade Association based its estimates, included 30 states where aerial applicators are most active. A summary of this report may be found in *Aviation Week*, September 30, 1957.

two planes, whereas it is not uncommon to find an applicator firm in the South and West with a fleet of 25 or more aircraft equipped for agricultural flying. Even though the use of airplanes in agriculture originated in the Fourth District, the aerial application business here is still in its infancy, for it is only in the past six or seven years that the airplane's services have been used to any marked degree.

Aerial applicators may be found flying low over Fourth District croplands from March to October. Operations begin with seeding of legumes and the application of fertilizer to wheatlands. In April and May, operators concentrate their activities on sowing oats, top-dressing meadows and controlling the pine sawfly on Christmas tree acreages. From June to August, applicators work on weeds and various types of aphids, and apply manganese to soybeans growing on manganese-deficient Lakebed soils. During August the services of the aerial applicator are used to control the growth of brush along power company rights-

of-way and to broadcast rye in standing corn; tobacco growers in the southern portion of the District call upon the aerial applicator to control hornworms. Finally, in September and October the airplane is hired to seed wheat and treat soybeans with a defoliant.

The farmer's cost of hiring the services of an aerial applicator is dependent upon the operation performed, but will average about \$1.25 per acre in the Fourth District. Aerial applicators, in general, do not like to contract for an operation when it would entail treating a field smaller than ten acres. Applicators themselves are quick to inform an inquiring farmer that treating a plot of land smaller than ten acres is costly and that coverage is likely to be inadequate.

Future growth in the use of aerial application in commercial agriculture appears to be contingent upon continued improvement of equipment and materials, and a program to acquaint producers of agricultural products with the cost and return relationships that are associated with aerial application.

Around the Fourth District—

BANK DEBITS IN SEPTEMBER (12 Medium-size Cities, Fourth District)

		Sept. '58 % change from yr. ago	Jan.-Sept. '58 % change from yr. ago
Middletown	Ohio	+28%	-0-
Lexington	Ky.	+10	+ 1
Mansfield	Ohio	+ 7	- 5
Hamilton	Ohio	+ 6	- 2
Covington-Newport	Ky.	+ 6	- 2
Lorain	Ohio	+ 2	- 7
Zanesville	Ohio	+ 1	- 5
Springfield	Ohio	-0-	- 8
Lima	Ohio	- 1	- 6
New Castle	Pa.	- 4	- 8
Wheeling	W. Va.	- 4	-11
Warren	Ohio	- 7	-16
FOURTH DISTRICT		+ 1	- 7

* * * *

Commercial and industrial loans outstanding at weekly reporting banks of the Fourth District rose \$9 million between mid-year and the week ended October 22. That is in contrast to an \$88 million reduction during the comparable period last year.

* * * *

Savings deposits of individuals at reporting commercial banks of the Fourth District rose during September for the smallest month-to-month gain since November 1957. However, the growth during the first nine months of the year was nearly double that experienced during the comparable period of last year.

* * * *

Sales during September by Fourth District *department stores* were 4% below a year ago on a daily average basis. Sales in September were also below the high August level, after adjustment for seasonal variation. Early estimates for October, however, indicate an improvement for that month.

* * * *

The number of one- and two-family *dwelling permits* issued during September in Cuyahoga County (including Cleveland) represented the second largest monthly total for 1958 and a three-year high for the month.

(The above items are based on various series of District or local data, which are assembled by this bank and distributed upon request in the form of mimeographed releases.)