REPORT

of the

Commission on Industrial and Agricultural Education

Made Pursuant to the Provisions of Chapter 152, Laws of 1911

Indianapolis, Indiana
December, 1912

MEMBERS OF THE COMMISSION

WILL A. YARLING, Chairman
JOHN G. BROWN
FRANK DUFFY
THOMAS F. FITZGIBBON
JOHN L. KETCHAM
FRANK D. MCELROY
ULYSSES G. WEATHERLY
JOHN A. LAPP, Secretary

Summary of Findings and Recommendations

THE WORK OF THE COMMISSION

This commission was created by act of the General Assembly, approved March 4, 1911, to investigate the needs of education in the different industries of Indiana and how far the needs are met by existing institutions and what new form of educational effort may be advisable to meet those needs.[1]

Pursuant to this act Governor Thos. R. Marshall appointed as members of the commission the following:

John G. Brown, Monon
Frank Duffy, Indianapolis
Thos. F. Fitzgibbon, Columbus
John L. Ketcham, Indianapolis
Frank D. McElroy, Hammond
Ulysses G. Weatherly, Bloomington
Will A. Yarling, Shelbyville

The commission met at Indianapolis June 15th and organized by electing Will A. Yarling as chairman and John A. Lapp, of Indianapolis, secretary.

At the request of the commission made by resolution October 15, 1911, President W. E. Stone of Purdue University appointed an advisory committee on agricultural education, consisting of Prof. G. I. Christie, J. H. Skinner and Geo. L. Roberts. Members of this committee accompanied the commission and gave most valuable assistance.

(Laws 1911, p. 407.)

[1] "Section 1. Be it enacted by the General Assembly of the State of Indiana, That the Governor shall within thirty days after this act takes effect appoint a suitable commission of seven persons, either from within or without the public service of Indiana, representing the manufacturing, labor, agricultural and educational interests of the state, to be known as the Commission on Industrial and Agricultural Education.

"Sec. 2. The members of the commission shall serve without compensation, but shall be allowed their necessary traveling and hotel expenses while attending to the business of the commission, to be paid on warrant approved by the chairman of the commission. The commission shall organize within thirty days after their appointment by electing a chairman. The commission may appoint a secretary either from within or without the public service of Indiana and allow such compensation, or if appointed within the public service such additional compensation as the commission shall determine. All necessary expenses of the secretary in connection with the business of the commission shall be allowed and paid in the same manner as prescribed for the payment of expenses of the commission.

"Sec. 3. The commission shall investigate the needs of education in the different industries of Indiana, and how far the needs are met by existing institutions, and shall consider what new forms of educational effort may be advisable and shall make such investigation as may be practicable through printed reports and the testimony of experts as to similar educational work done by other states, by the United States Government and by foreign governments. The commission shall hold hearings in at least five different communities of the state and invite the testimony of interested parties and experts, and shall make a report to the governor for transmission to the legislature not later than January 1, 1913.

"Sec. 4. The sum of one thousand dollars ($1,000) annually for two years is hereby appropriated for the purposes of carrying out the provisions of this act. The report of the commission, not exceeding 200 pages, shall be printed by the commissioners of Public Printing, Binding and Stationery."

Meetings were held during October and November in determining the plan and scope of the investigation.

The commission during the year held hearings and made investigations in Lafayette, Hammond, Gary, Laporte, South Bend, Evansville, Terre Haute, Anderson, Muncie, Marion, Fort Wayne, Indianapolis, Richmond, Bloomington and Shelbyville and Round Grove Township, White County.

The opinions of all classes of citizens were invited and many educators, farmers, business men, labor leaders, manufacturers, social workers and others appeared before the commission.

Extensive correspondence was also had with several hundred citizens, both within and without the state, and a careful study was made of the experience of this and other states and of foreign countries in solving the problems which confronted the commission.

Authorities connected with the National Society for the Promotion of Industrial Education and other organizations were consulted and much advice and practical service were received, especially from Mr. C. A. Prosser, secretary of the National Society; Prof. W. W. Black of Indiana University, and Prof. Frank L. Leavitt of the University of Chicago.

After careful deliberation the following specific findings and recommendations for legislation are made. The discussion bearing out the recommendations will be found in the pages which follow. Legislative bills embodying these recommendations are included as appendices.

FINDINGS

1. Indiana has been rapidly transformed from a distinctly agricultural state to one equally engaged in and dependent on manufacturing and agriculture, the products of the soil in 1909 being $183,000,000 for the major crops, and the products of the manufactures $579,075,000, which represented $244,700,000 added by manufacture.

2. The tendency away from the farm to the cities is evident in Indiana. From 1900 to 1910 the city population increased 30.5 per cent and the rural population decreased 5.5 per cent. There were, in 1910, 1,143,835 people living in cities and towns and 1,557,041 in the rural districts. The tendency away from the farm is marked and the observations and investigations of the commission showed that this was due in a large part to the lack of adequate educational facilities for practical education in the country.

3. The larger part of the boys and girls leave school before the completion of the elementary course, unprepared in anything which will aid them in their immediate problem of earning a living with their hands. From statistics available in other states it is safe to estimate that there are fully 25,000 boys and girls in this state between fourteen and sixteen who have not secured adequate preparation for life work in the schools and who are now working in "dead end" or "blind alley" jobs, or, in other words, jobs which hold no promise of future competence or advancement. The investigations in Massachusetts and New York City show that not more than one out of five of the pupils leaving school

at fourteen do so because it is necessary to help make a living. The conditions are doubtless even better in Indiana. The remainder, four out of five, leave school for a variety of reasons, chief among which is the feeling among pupils and parents that the schools do not offer the kind of instruction which they need for the work they expect to do and which would justify them in foregoing wage earning for a time in order to get it.

4. Specialization of industry has broken down, in large part, the apprenticeship system by which the young were formerly educated for industrial work. Large masses of workers have become mere automatons who know single machine processes and whose "way out" is limited by their lack of opportunity for education in their field of industrial work.

5. (1) Lack of knowledge on the part of the machine workers of the other processes leaves them in ignorance of the relation of their work to that of others or the whole process. This, together with their lack of general intelligence makes the task of supervising and directing them increasingly difficult.

(2) The change from the journeyman to the machine worker has made it more and more difficult to get foremen who have either a mastery or a proper understanding of all the work they must direct, while at the same time the growth of the special machine has made complete knowledge more necessary.

6. (1) The advance of general knowledge, growth of science, and progress in invention has brought a vast body of information in science, drawing, mathematics, art and technique necessary to the highest efficiency of the worker and useful in proportion as he can get it as a tool in trade. This cannot be gotten by the wage-earners, in the industry itself. At its best apprenticeship gives this helpful information by the rule of thumb—all the master knew, at odd moments. The school is necessary now to equip workers with this training.

(2) The shop has never been very successful as a school master. The principal part of education to be gained in a shop is skill in processes. The schools must supplement the shop and the two must co-operate to prepare the worker properly. But the actual training by the school must be given by teachers who have had success and experience as well as adequate knowledge.

7. There has been practically a stationary average production per acre of the principal crops in Indiana as well as throughout the country during the last forty years. The yield is far behind the best practice in this state and other states and only about half the yield of European countries on land cropped for a thousand years. At the same time, land values are rapidly increasing and prices are soaring, making the problem of the cost of living an acute one.

8. The courses of study in our elementary and high schools are directed largely toward a preparation for college, to which only a meagre percentage ever go. The "way from the kindergarten straight through the college," has been smoothed out to the disadvantage of the way which the vast majority, fully 90 per cent, take, straight into industrial work.

9. The commission found the vocational needs only meagrely supplied in Indiana by general courses in manual training, domestic science and agriculture. The work given is largely preliminary and not definitely vocational. No attempt at part time schooling in the public day schools was found by the commission and little effort to supply the vocational needs of the workers in continuation courses and evening schools.

a. Manual training has been introduced in many cities and towns, but in no place outside of the Technical Institute at Indianapolis, and there only meagrely as yet is there any attempt to train for wage-earning occupations. Evening schools are maintained in very few cities, but in only three or four is there any serious attempt to make them practical continuation schools for industrial workers. No attempt at part time schooling in the public day schools was found by the commission.

b. A large number of schools have begun courses in agriculture. These are, however, not definitely vocational. In some cases the work has been accompanied by demonstration plats and some cooperative work between the schools and the farm has been accomplished. The beginnings have been too recent, however, to measure the results.

c. Domestic science has been quite generally introduced in the city schools and in many town schools, but the amount of time given to it is not adequate for definite results. In a few cases it is compulsory, but in the main it fails to reach the vast body of girls who leave the schools at fourteen.

10. The work of Purdue University, especially at the agricultural extension department, has had a tremendous effect in stimulating interest in agricultural education in the schools and also practical education among the farmers. They have created the necessary nucleus of trained men to make a beginning in carrying out the further work. With limited resources the groundwork has thus been laid for a comprehensive plan of agricultural education for which the time is now ripe.

11. The commission found no organized efforts in Indiana to put pupils in touch with the opportunities for life work. The pupils are in the main left to go it alone in choosing a vocation except where enterprising teachers have been able to give personal advice.

In other states promising beginnings have been made in vocational guidance, particularly in New York City and Boston. The commission believes that every city or town should survey the vocational opportunities within its borders and place the information, together with all information available on vocational work, within reach of the pupil at the proper age.

12. The investigations of the commission disclosed that the people are not only ready but anxious for the enlargement of the school work, so as to include the best possible preparation for life work for all people whether they earn their living with their heads or their hands. Farmers, employes, employers, labor leaders, educators and social workers who appeared before the commission advocated strongly that definite, whole-hearted plans be made. The problem which confronted them was not that it should or should not be done, but how it could be done effectively.

13. The State Board of Education has partially opened the way for high schools to introduce vocational subjects and at the same time conform to the requirements for college entrance. The colleges are recognizing the change made in the high school curriculum and are giving credits for such work. Some chance is thus given to the students to pursue industrial subjects without fear that if they later decide to go to college they would lack the qualifications for entrance.

14. The commission found some townships of the state without educational facilities beyond the elementary work in the country schools. In some cases it was found to be due to the lack of funds, but some such townships were found which are amply able to provide such facilities.

15. The largest problem in carrying out industrial and agricultural education was found to be in the lack of teachers trained to do the work. If the vocational subjects are to find and hold the place that is due them in the common schools of the state, the teachers must be educated to handle them more effectively than they have been able to handle such subjects in the past.

The beginnings of such preparation have been made. It has been demonstrated that teachers can be supplied on a small scale and the commission believes that adequate provisions will soon furnish adequately equipped teachers for a state-wide system of vocational education.

16. The commission found that its work need not be experimental, for the reason that already other states and cities in this country and most European countries have developed a body of experience in vocational education. Since the famous Douglas commission investigated the subject in Massachusetts in 1905 such states as Wisconsin, New Jersey, Maine, Maryland, Michigan, Illinois, as well as Massachusetts, have authorized and carried out investigations. Private individuals, public officials and organizations have gone deeply into the subject and the body of instructive literature is large and increasing rapidly.

The states of New York, Massachusetts, Wisconsin, Ohio, Connecticut and New Jersey have enacted advanced legislation and the matter is being discussed from coast to coast.

RECOMMENDATIONS

I. That school authorities in cities, towns and townships be given power to establish and maintain such vocational schools and departments for industrial, domestic science and agricultural education as their local situation may warrant, and levy a tax to support the same.

II. That state aid equal in amount to two-thirds the sum expended in instruction in vocational and technical subjects and such other related subjects as are necessary to complete well rounded courses in industrial, domestic science and agricultural schools or departments as are approved by the State Board of Education, be given to the cities, towns and townships supporting such vocational schools or departments. Such aid to be granted only for vocational work for pupils above fourteen, and the

maintain industrial, domestic science and agricultural instruction be under the supervision of the State Board of Education in an advisory way as to such instruction.

XVII. That facilities be provided for vocational guidance; by a survey of the vocational possibilities of the community; by a central bureau of information and investigation; and by concerted action by teachers to guide youths to the wise choice of a vocation.

INDUSTRY AND ITS EDUCATIONAL NEEDS

To the most casual observer it is obvious that the conditions of industry and the nature of employment are constantly changing. With each year come new advances in the mechanic arts. Occupations and trades are becoming more and more specialized and the division of labor more complete and minute. The machine displaces the hand process and more complicated machines displace those of a simpler kind. The process of manufacture is divided and sub-divided into an ever-increasing series of minute operations. The old hand trades are rapidly disappearing in many industries. A series of new trades has arisen and there have come to be thousands of new occupations which consist in single simple operations.

To show the extent of this specialization let us take the single example of the machinist's trade. Formerly the machinist was an all-round man in the shop, capable of handling or of building, for that matter, any of the machinery necessary to the shop. He was capable of producing a single commodity by performing all the operations necessary to its completion from the raw material. Under the new shop conditions he may be capable of performing only a single operation, and that often a slight one in the whole process. Now he is not a machinist in the old sense but, as defined by the International Association of Machinists in 1905 machinists may be 1, general hands; 2, erecting hands; 3, floor hands; 4, vise hands; 5, assemblers; 6, adjusters and repairers of metal working parts of all classes of machinery; 7, men operating all classes of lathes; 8, men operating all classes of planers; 9, milling machine men; 10, men operating all classes of shapers; 11, men operating all classes of slotters; 12, men operating all classes of boring mills; 13, men operating all classes of gear cutters; 14, tool grinders; 15, men operating Jones & Lamson, Gisholt and American turret lathes; 16, drill press hands; 17, screw machine hands; 18, men operating all machines of similar character as heretofore mentioned; 19, tool makers; 20, die sinkers; 21, jig workers; 22, mold makers in glass factories or elsewhere; 23, all men engaged in the manufacture of metal model novelties, where skilled hand labor or machines are used; 24, all surgical instrument makers; 25, all metal pattern makers employed in machine shops.

The use of automatic and semi-automatic machines has rendered it possible for partially skilled workers or of workers skilled only in a single mechanical process to do the work which was formerly done by skilled machinists.

The breaking up of the trade into many single skilled occupations which are largely mechanical has partly broken down the clear distinction between the unskilled worker and the skilled worker.

The carpentry trade and the trade of cabinetmaker have likewise been separated into many separate and distinct trades. The house carpenters are largely engaged in fitting together the product of the planing mill and shop. When he does build parts it is limited to single kinds. Thus a house carpenter unless he has been broadly trained cannot make doors, sashes, frames, blinds, etc., with equal facility. He works usually on one kind. The cabinetmaker likewise works on single parts. One makes a table top, another the legs, another a wardrobe, chiffonier, etc. Practically the only carpenters who are all-round skilled workers are the ones who make repairs. Such workers must confront every phase of their craft. In nearly every line of work the introduction of machinery has reduced the proportion of skilled men.

The furniture industry for example, according to the U. S. Industrial Commission, employs only about five skilled men out of seventy-five. The rest are simply feeders.

These are merely examples of the subdivisions of industry which may be found in a pronounced degree in many industries.

A few hand trades on the other hand still require all-round skilled workers. Such trades as building, plumbing, stone-cutting, masonry, etc., where the work has not been specialized to any great extent by the introduction of machinery, still have a high grade of all-round skill.

One of the results of this specialization and disintegration of trades has been the cheapening of certain products. The division of labor has made it possible to manufacture at a less cost, and consequently there has been an enlarged use of the product. This has been accompanied, however, by two distinct losses. The general level of skill has been lowered by over-specialization and the high grade of skilled hand products has been sacrificed. There is a danger that this may permanently sacrifice the nation's products to mediocrity. We may be able to capture the markets of the world for cheap machine-made products, but if that is done at the sacrifice of the higher skill of our workers and the finer products of industry, we are the losers in national efficiency and, in the long run, in dollars and cents.

We are by this over-specialization on machine made goods, putting less of labor value into goods than our competitors with their better trained skilled workers. We export largely, but our exports are mostly raw or half-worked materials. As a bulletin of the National Manufacturers Association puts it:

"We have been exporting annually $100,000,000 worth of copper in pig and bars rather than $20,000,000 worth of copper worked up into dynamos and fine hardware to be exported at $150,000,000 after the European fashion. We have shipped steel billets rather than linotype machines. We export cotton at fourteen cents a pound with scarcely any labor in it; we buy it back from the thrifty Swiss in fine handkerchiefs at forty dollars a pound, all labor. We have gone about as far as we can in exporting crude materials to be made into finished products by the better educated laborers of competing countries."

It is conservatively estimated that Germany put four times as much labor value into her manufactured products as the United States. This is the direct result of the industrial training of the workers of Germany. For the country as a whole, if the amount of labor value were equal to that of Germany, we would be producing from the raw material not twenty billion but eighty billion dollars worth of manufactured products.

The extent and character of the manufacturing business in Indiana is shown by the last federal census. In 1909 there were 7,969 establishments employing 186,984 wage-earners; 23,605 salaried employes and having 7,674 proprietors or firm members. These industries represent 91 different kinds of manufacture grouped according to products. The investment represented $508,717,000 capital, the salaries paid amounted to $26,305,000 and wages, $95,510,000.

The total output of all manufacturing industries was in 1909, $579,075,000, of which $334,375,000 was represented by material used in manufacture and $244,700,000 added by manufacture or labor value.

The second group of skilled trades and occupations to be considered are the hand trades, including plumbers, gasfitters, steamfitters, tailors, engineers, masons, etc., whose work is not highly specialized and in which machinery has not been substituted and in the nature of the case cannot be substituted for their labor.

These are found both within and without the manufacturing establishments. Large numbers of them are all-round workmen who are trained in the mysteries of the trade and are able to handle any part of it. With this class of trade workers the apprenticeship system offers good opportunities for education when coupled with systematic training in the theory and the related subjects connected with the trade.

There are many other wage-earning occupations more or less skilled in which thousands of our people are employed and which offer opportunities for training for general and special efficiency. The railroads and other public utilities, with their thousands of employes, offer an opportunity for supplementary training. The department stores and other like establishments where girls are employed offer an opportunity for training both for the work of the store and for the duties of home making.

These are suggestive of the possible scope of industrial education in Indiana. No occupation should be ignored in the effort to give universal education.

The commission has been unable to make a study of the peculiar needs, educationally, of each class of trades, manufacturing industries and other wage-earning occupations. Such a study should be made by each locality with reference to the extension of its school facilities. An intensive study of the wage-earning occupations by the school authorities will show the possibilities of training in each and also the possibility of grouping similar kinds of work in different industries.

A study has been made by the Natonal Educational Association, and their report on the place of industries in public education gives a general statement of some of the possibilities for the schools.

The following is from their report:

A. Industries based on wood and woodworking tools: Carpenters, cabinetmakers, coopers, sawmill workers, etc.

The bench work of the upper grades of the elementary school offers suggestions as to concrete work. Drawing, physics, study of woods, the crafts studies, some phases of economic history, principles of forestry, etc., for supplementary studies. Some forms of woodworking are localized, like furniture making (which the new school in Rochester recognizes); but each large city requires a constant supply of carpenters. Trade schools for carpentry already exist (Baron de Hirsch, New York; Williamson school, Philadelphia, etc.). An important part of such a course would be the analysis and operation of such woodworking machinery which involves the main principles of machine action. This field of intermediate work offers peculiar facilities for producing usable and even salable products; in certain industrial centers the part-time system might be developed, especially in connection with furniture making.

B. Industries involving primarily work with iron and steel: Blacksmiths, iron and steel workers (in mills), machinists, plumbers and gasfitters, etc.

Here trade-school work and the shopwork of technical high schools offer suggestions. Much of this work leads to well-defined trades. The intermediate school might confine itself to preparing for successful apprenticeship. Drawing, certain phases of applied chemistry, applied physics, analysis of machine tools, study of the contemporary aspects of the production and consumption of iron and steel—all these offer rich opportunities for development of supplemental courses. Perhaps this field does not offer abundant opportunities for productive, i. e., usable or salable work; but its possibilities have not been fully tried.

C. Bookbinding and pasting trades: Bookbinders (men and women) boxmakers and, possibly, some of papermakers.

This is a limited and usually localized group of industries. Preparatory vocational work would necessitate specialized practice, and specialized technical work. A good field for making of complete products. Some experience in this field has been had under manual-training conditions. The work is well adapted to girls.

D. Printers' trades:

These offer peculiar opportunities for preparatory vocational training. Successful examples found in reform schools, and in the volunteer work of some public schools. Technical studies and general vocational studies could easily be evolved, as the field is rich in material. Largely localized.

E. Industries involving leather and leather-working tools: Boot and shoe makers, harness and saddlery, tanners, trunks, etc.

A great variety of trades rests on these materials, many of which are localized. Unskilled labor is said to play a considerable part, but one aim of industrial or vocational education here discussed is to give the laborer in fields not requiring skill some appreciation of social significance of his work, and capacity for change from one minute division to

another. Obviously opportunities for concrete expression here are abundant; and usable and salable products might, within certain limits, be produced. Technical work would involve special aspects of chemistry, physics, experimentation with materials, and possibly drawing. Mathematics might or might not figure. Analysis of machines, certainly a large part. Schools of this kind exist in England, but on advanced or technical scale. General vocational work could easily be devised.

F. Textile work on factory scale: Cotton mills, hosiery mills, silk mills, woolen mills, etc.

A great variety of trades, in which it may prove difficult to find basal courses, since the statistics include under these mill-workers, dyers, spinners, etc., who work with quite different materials. The problem here is complicated by doubt as to whether the mill itself is not, in many cases, the only school that can give operative skill. The Public Industrial School at Columbus, Georgia, is giving work in this field, but for foremen rather than rank and file. It is evident that if it should prove worth while, it is not impossible to provide the concrete work here, beginning even with hand processes, as in woodwork. Technical work could involve analysis of machinery, study of textiles, possibly some physics, drawing, mathematics, and chemistry, doubtful except for specialized workers. General vocational studies—of markets, sources of supply of raw materials, economics of consumption, etc., easy to develop.

G. Clothing trades: Dressmakers, millinery, seamstresses, tailors and tailoresses and shirts, collars, etc.

In this field we have much experience to draw upon, notably that of the Manhattan Trade School for Girls and the Boston Trade School for Girls. Opportunities for concrete work of a satisfactory type (usable, even salable) abundant. Related technical work in art, drawing, analysis of tools and machines, and possibly in the properties of the peculiar materials employed fairly numerous. Some mathematics of a practical nature can be developed. A rich field for general vocational studies like economics of consumption, the history of textiles and their uses, geography of markets and sources of supply, social conditions of workers, etc.

H. Engineers and firemen:

The evening schools and the new school at New Bedford seem to offer suggestions as to practical courses for the type of boy here under consideration. Concrete work could be found in machine work and engine running, technical work in mechanics, heat, engine, machine construction, drawing, etc. Many sources of general vocational work.

The following groups are important in numbers of wage-earners and value of product but represent less evident possibilities of approach for the intermediate industrial school.

I. Industries involving primarily work with stone: Masons, roofers and slaters, marble and stonecutters, plasterers.

In the formation of intermediate school work in this group of industries, we have little experience to fall back upon. Apprenticeship still survives here in considerable measure. Some of the concrete work would be similar to that found in iron and steel; theoretically it would

appear easy to provide other forms of concrete work with building stones, marble, etc. The technical studies would involve modified forms of drawing, art, mechanics and mathematics; and general vocational studies based on specialized phases of geography, geology, history, economics would be easily supplied if the school of this type were called into existence. Many of these industries being localized, the establishment of such schools would be a simple proposition.

J. The clay and glass industries, where furnace heat is also a factor: Brick and tile makers, glass-workers, potters.

These industries are usually much localized. Some of them now employ child labor extensively, suggesting the possibilities of some "half-time" connections. They require, in so far as they utilize skilled labor, specialized forms of art instruction, and, as further technical studies, could develop a specialized chemistry and physics. Schools in these callings are yet rare, except on remote artistic levels.

K. Industries concerned with paint, paper, plaster, etc.: Painters, glaziers, varnishers, paperhangers.

A variety of trades having apparently a large common basis. Concrete work should be easy to provide, as suggested by trade schools now in existence. Drawing, mathematics, science, etc., of a specialized kind. Largely localized so that each large city could afford to maintain such a school, if it appears that apprenticeship is ineffective.

L. Food making or preparing industries, but not household arts: Butchers, bakers, confectioners and miscellaneous food-preparers on factory scale.

A field in which little is done in America in preparatory industrial training, but numerous examples in Germany. It would appear that opportunities for concrete work should be abundant and a field of technical work in biology, chemistry, physics, quite unlimited. Possibly one of the few industrial fields not requiring art or drawing as a vocational study. Abundant general studies from the economics of consumption. Much of the theoretic material could be derived from best schools in household arts. Since confectionery making, for example, is now a juvenile industry, half-time co-operation might be feasible.

M. Workers with tobacco: This is largely an unexplored, but socially important, field of production.

N. Miners and quarrymen:

This is an immense and important field of industry. It may offer good opportunities for preliminary training but it has so far received little consideration. Possibly half-time work might suffice to give part of the concrete work. A certain amount of concrete work with wood and steel would be of some service. Opportunities for technical work in science and mathematics abundant, and also probably in analysis of machines, studies of gas, explosives, etc.

Other divisions might be made. For example, metal-working on a small scale or with materials other than iron and steel, furnishes certain fairly localized trades, for which special preparation might be necessary.

Schools for jewelers and watchmakers may furnish some hints, as also evening classes for tin and sheet metal work. This work is being taken increasingly by girls. Let it be repeated that the above classification is merely tentative, with a view to finding a few simple groups of callings for each of which suitable basal preparation could be given.

METHODS OF TRAINING

There are three systems of organized training for the industries in use. First, the apprenticeship system; second, trade schools; third, industrial schools.

Apprenticeship.—The apprenticeship system flourished in the days when the hand trades were the principal industrial pursuits. Under it the boy was indentured in a given trade for a certain time with the understanding that he was to be taught the "Art and Mystery" of the trade by the master.

In the hand trades this is a successful method of education in the practical side of the trade. When safeguarded, as it has been in most states by laws which prevent the exploitation of apprentices as cheap labor, and requires an educational return, it provides a well rounded training. Laws have been enacted in most of the states, requiring that certain educational opportunities be given to the apprentice. In Indiana by the apprenticeship law passed in 1852, the master is bound by the agreement to cause the apprentice to be taught reading, writing and the rules of arithmetic to the double rule of three inclusive if practicable. This should, of course, be modified to meet the present needs.

Nearly all investigators and writers conclude that the apprenticeship system is dead as a modern means of trade education. To be sure it exists in some factories and a new and effective form of apprenticeship combined with industrial and trade schools, such as that in the General Electric Company, Lynn, Mass., the International Harvester Company, Chicago, and the New York Central Lines, give promise of the revival of the system in an effective form.

The apprenticeship system began to decline when the industrial revolution substituted machinery for hand labor. The need of apprentices has not been felt in such powerful degree as it had been previously, but the complicated developments in machinery have brought to the front the pressing need of skilled labor for supervising in all branches of labor and of the necessity of providing industrial education to supply it. Not merely does the need for skilled labor demand industrial education, but the condition of the automatic workers renders it desirable that a way out be provided for them to the skilled and specialized trades.

Of the apprenticeship system Carroll D. Wright said: "The advocates of industrial education do not fully appreciate the advantage to be gained through some adherence to or the perpetuation of the virtues of the old system. This old system, as intimated, has largely become obsolete. Its essence remains, but it is unwarrantable to argue that the apprenticeship system answers the whole demand for industrial education. It does not, but it may do so to a large degree. It is also thought needless to argue that the industrial schools furnish everything

in the way of vocational equipment that can be gained by a thorough apprenticeship system. What is needed in regard to this system is some co-ordination that shall secure nearly all that can be gained from the apprenticeship system and much that can be gained from modern schools for trade and industrial education generally.

"Herein lies the problem, for it is generally conceded by educators who are interested in industrial education that the industrial school per se does not and cannot result in turning out a full-fledged, skilled mechanic ready to take up his trade. It is also recognized that the apprenticeship system on the whole, especially as it was conducted formerly, possesses many features that are unjust and uneconomic, and some features that may be called unmoral. That is, the ethical side of the apprenticeship system of the olden times is not a satisfactory one. Under it the apprentice found that he was doing quite as good work after a while as the journeyman ahead of him, but must be tied to an apprentice's wages a term of years. This was an unmoral situation in itself and helped to demoralize the apprentice. He became, when he graduated, a man who would slight his work because he had been unjustly treated economically. At least this was the case in many instances, and this tended to make a bad workman as well as a man given to loafing.

"Now the modern idea is to perfect him in the theory and, to a large extent, the practice of his trade in the shortest possible time commensurate with efficiency and adequate skill. If he could serve as an apprentice for such time as might be absolutely required to perfect himself as a journeyman, and at the same time acquire the rudiments of an education, that system might be applauded.

"The apprenticeship system pure and simple would not teach the apprentices, as would the industrial school properly equipped, all the science and art of the trade in which they were enlisted. In order to become a thoroughly skilled mechanic a young man ought to understand not only the science and mathematics of his work, but something of the art itself. This knowledge of the art he would gain as an apprentice in one of our great modern manufacturing establishments, so that he would secure from his apprenticeship system and from the industrial school, or from the two combined, the very best possible equipment that would lead to the greatest efficiency. This is the need of the day and the work that is progressing."

Trade School.—The trade school is a school to provide instruction in the mysteries and technique of special trades. In this country such schools exist both as privately endowed and conducted schools and as public institutions. No less than seventy-five separate special trades are being taught in different private and public schools.

These schools supplement the trade instruction with the rudiments of an education. They are usually equipped with all the machinery and appliances necessary for the practical work of the students. The instruction supplements the practice work and gives the theory upon which the work of the trade is based.

These schools are intended to be practical in that they are preparing

for an actual occupation. They are finishing schools in the same sense that schools of medicine, law, dentistry, etc., are finishing schools for those professions. They devote considerable attention to the development of skill and speed and to giving shop experience in methods of production. They teach a pupil how to do a certain kind of work by having him do it and they teach him how to plan, estimate and independently execute a project. They are expected, therefore, to make independent workers capable of doing the thinking part as well as the actual work.

The aim of these schools is to turn out workers capable of becoming reasonably proficient in vocation after a short experience in the actual work of the trade when he leaves school.

Since the trade school prepares for a specific vocation it is necessary that the pupils be of an age when a vocation may be selected and that they be old enough to profit by the instruction. The usual age is sixteen which enables a pupil to be prepared by the time he is twenty, for entrance on a life work.

Industrial Schools.—Industrial schools differ from trade schools in that they do not teach a specific trade but rather the fundamentals of several trades, thus laying the foundation upon which the future education of the pupil rests whether he goes into the trade school or is apprenticed to a trade or whether he actually goes to work in the shop.

These schools recognize that most boys at the age of fourteen or even sixteen years are not in a position to choose wisely a specific vocation and that they need a broad industrial foundation upon which they may later determine on a specific trade. Industrial schools do, nevertheless, give much actual trade instruction. It is hard to draw an exact line between the trade school and the industrial school, but the difference is evident when the ends of the two schools are kept in mind.

The industrial school is primarily a general training school, the trade school is a specific training school. The former is to trade education about what academic education is to the professional school. It gives the fundamental knowledge upon which the trade school work is based. It serves to bridge over a dangerous gap in the school life of the boy who at fourteen finds nothing to interest him in the academic courses and leaves the school for poorly paid, unpromising work.

Fourteen is the usual age for compulsory attendance for those who are at work. Boys and girls who stop school at that age are in an unfortunate position. They are not old enough to take up a trade nor to enter a trade school. If they do not find interest in the school and see promise for themselves they drift out to join the army of nonskilled workers who live from hand to mouth in jobs which have no future outlook. The boy is often lured by the wage which, to him seems large, without foreseeing that he will find, when he becomes a man with a man's responsibilities and needs, that he is holding a boy's position with a boy's wage and no preparation for anything better. The Massachusetts Commission on Industrial Education in 1905 made a careful investigation of the vocational needs of the children from four-

teen to sixteen. They found that fully 25,000 in the state were in the position above described. They had left school and had gone to work in all sorts of unskilled, unpromising employments. They had gone into "blind alley jobs" with little prospect for the most of them ever to get on the open thoroughfare of progress because there is no adequate means for their entering upon well organized and fairly skilled trades.

Here is where elementary industrial training finds its fruitful field in awakening the vocational interests of the pupils, keeping them longer in the schools until they are prepared for promising work; and leading them to a right choice according to their vocational aptitudes and desires.

The industrial school should be carefully differentiated from manual training as usually carried on. The controlling purpose of the industrial school is vocational while that of manual training is academic. Manual training is treated as a part of cultural education and is so organized, as a part of the academic courses. Industrial education is planned to meet the educational needs of those who are of certain age and who are able to profit by the instruction, without regard to their academic standing.

TRADE TRAINING IN INDIANA

Industrial and trade schools are almost wholly unknown in Indiana. There is nothing at present which can be called trade training in the public schools, except a part of the work of the Technical Institute in Indianapolis. The New York Central Lines school at Elkhart, where apprentices are trained, and work by a few manufacturers constitute the sum total of trade training outside of the reformatory and other correctional institutions.

Industrial work in the schools is chiefly manual training, which in no way satisfies the requirements for industrial education. The Y. M. C. A. evening schools and the evening schools of three or four cities offer the only supplemental training. Industrial work in the grades such as that conducted at Gary and in some of the schools of Indianapolis, particularly School 52 in Haughville, is properly industrial but is not distinctly vocational, the object being to develop industrial intelligence as a foundation for industrial schools, trade schools or the shop.

There is very little distinctly vocational work in evening schools and none at all in an organized way of part time instruction.

In Indiana there still remains some of the old apprenticeship system, but it is wholly inadequate to meet the needs of industry. In many industries it is wholly abandoned and there is no opportunity for workers to become all-round men. This renders the task of securing foremen a difficult one and also of supervising the unskilled workers. It is highly desirable that foremen come up from the ranks rather than down from the technical college, but little opportunity is given to develop that all-round industrial knowledge which would enable them to grasp the relation of all of the work of the shop.

AGRICULTURE AND ITS EDUCATIONAL NEEDS

Indiana ranks high in the value of agricultural lands and products. The state had in 1910, 23,068,800 acres of land of which 21,299,823

acres were in farms. The amount of improved land in these farms was 16,931,252 acres. The farm land was divided into 215,485 farms having an average acreage of 98.6 acres.

The state has passed out of the class of states which are increasing their agricultural area, having less land in farm land in 1910 than in 1900 by 319,800 acres. So, too, in population, the rural population decreased 5.1 per cent. in the last ten years while the city population increased 30.5 per cent.

From the point of view of values, however, the increase is amazing. The total value of farm property was in 1910, $1,809,135,238. In 1900 it was $978,616,471, an increase for 1910 of $830,518,767 or 84.9 per cent. Of this increase in value the larger part comes from increase in the value of the land. In 1910 the land alone was worth $1,328,196,545 as against $687,633,460 in 1900, an increase of $640,563,085 or 93.2 per cent., the remaining increase being on buildings $111,977,171; implements and machinery $13,669,171; and domestic animals, poultry and bees $64,309,340.

The average value of land per acre was in 1910, $62.36 as against $31.81 in 1900, an increase of 96 per cent. in ten years.

The number of farms operated in 1910 was 215,485, of which 150,798 were operated by owners and 64,687 by tenants.

Nearly half of the farms of Indiana hire labor, and the average amount expended by each farmer annually was $170.

During the ten year period from 1900 to 1910 the expense incurred for labor increased 82.6 per cent. During the same time other farm expenses increased, making a total expenditure for labor, feed and fertilizer of $26,765,675.

The most significant figures for our inquiry concern production. All improvements in agriculture are concerned with getting more produce from a given amount of land.

The figures following show how Indiana compares in production with the country as a whole.

The ten year average yield per acre of the principal farm crops from 1900 to 1909 for the United States was as follows:

Corn	25.8	bushels
Winter wheat	14.3	bushels
Oats	29.5	bushels
Barley	25.7	bushels
Potatoes	91.4	bushels
Hay	1.44	tons

For the state of Indiana:

Corn	34.7	bushels
Winter wheat	14.2	bushels
Oats	29.0	bushels
Barley	25.4	bushels
Potatoes	79.0	bushels
Hay	1.36	tons

The average yield of crops per acre for ten year periods since 1870 was:

INDIANA

	1870-79, Bushels	1880-89, Bushels	1890-99, Bushels	1900-09, Bushels
Corn	32.6	28.9	31.3	34.7
Wheat	13	13.1	13.3	14.2
Oats	26.1	27.2	27.3	29
Barley	22.5	22.3	21.1	25.4
Rye	14.2	11.5	14.1	15.2
Potatoes	70	68	.62	84
	Tons	Tons	Tons	Tons
Hay	1.25	1.28	1.24	1.36

UNITED STATES

	1870-79, Bushels	1880-89, Bushels	1890-99, Bushels	1900-09, Bushels
Corn	27.1	24.1	24.1	25.8
Wheat	12.3	12	13.2	14.1
Oats	28.4	26.5	26.2	29.5
Barley	22.2	22	23.4	25.7
Rye	14.1	12	14	16
Potatoes	87.9	76.5	76.4	91.4
	Tons	Tons	Tons	Tons
Hay	1.23	1.20	1.28	1.44

It will be seen from these figures that in every case except corn the average yield per acre in Indiana is lower, or not materially higher, than for the United States as a whole.

The average yield of corn was 8.9 bushels higher than for the country as a whole. Purdue University, through its experimental and demonstration work, the work of corn trains, clubs, contests, etc., accounts largely for the higher yield of corn.

But even in the case of corn the yield in Indiana compares unfavorably with certain other states. Thus the average yield of corn in Massachusetts for 1900-1909 was 36.1 bushels; in Connecticut 36.8 bushels; Maine 35.4 bushels, and Vermont 34.5 bushels.

The production of leading crops in foreign countries compared with that of the United States is as follows:

Average Yield of Wheat in Countries Named, Bushels per Acre, 1900-1909:

Year	United States	Russia, European	Germany	Austria	Hungary Proper	France	United Kingdom
		(a)	(a)	(a)	(a)	(b)	(b)
1900	12.3	8.3	27.9	15.5	17.3	19.2	29.5
1901	15.0	8.1	23.5	16.7	15.1	18.5	31.9
1902	14.5	11.1	30.3	19.0	20.7	20.2	33.9

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Year	United States	Russia, European (a)	Germany (a)	Hungary Austria (a)	Hungary Proper (a)	France (b)	United Kingdom (b)
1903	12.9	10.6	29.2	17.8	19.0	22.8	31.1
1904	12.5	11.5	29.5	19.5	16.3	18.5	27.8
1905	14.5	10.0	28.5	19.6	18.7	20.9	33.9
1906	15.5	7.7	30.3	20.3	22.5	20.2	34.8
1907	14.0	8.0	29.6	18.0	14.9	23.2	35.1
1908	14.0	8.8	29.7	21.0	17.5	19.6	33.4
1909	15.8	12.5	30.5	19.9	14.1	21.9	35.0
Average (1900-1909)	14.1	9.7	28.9	18.0	17.5	20.5	33.1

(a) Bushels of 60 pounds. (b) Winchester bushels.

Average Yield of Oats in Countries Named, Bushels per Acre, 1900-1909:

Year	United States	Russia, European (a)	Germany (a)	Hungary Austria (a)	Hungary Proper (a)	France (b)	United Kingdom (b)
1900	29.6	20.0	48.0	25.2	28.9	25.7	43.5
1901	25.8	14.4	44.6	25.6	27.2	23.5	42.9
1902	34.5	21.8	50.1	27.7	33.2	29.2	48.3
1903	28.4	17.7	51.2	28.3	34.5	31.6	44.2
1904	32.1	25.7	46.2	24.3	25.6	27.2	44.2
1905	34.0	20.2	43.6	27.7	31.0	28.6	41.7
1906	31.2	15.1	55.7	34.1	34.2	27.0	43.8
1907	23.7	19.7	58.3	35.7	30.0	31.8	45.1
1908	25.0	20.1	50.2	32.0	26.8	29.6	43.5
1909	30.3	25.7	59.0	37.6	33.8	34.1	45.9
Average (1900-1909)	29.3	20.0	50.7	29.8	30.7	31.6	44.3

(a) Bushels of 32 pounds. (b) Winchester bushels.

Average Yield of Barley in Countries Named, Bushels per Acre, 1900-1909:

Year	United States	Russia, European (a)	Germany (a)	Hungary Austria (a)	Hungary Proper (a)	France (b)	United Kingdom (b)
1900	20.4	11.5	33.4	20.2	23.1	21.8	32.7
1901	25.6	11.2	33.2	22.4	20.0	21.1	32.7
1902	29.0	15.6	35.0	24.6	24.7	24.5	37.0
1903	26.4	15.5	36.3	24.8	25.1	25.2	33.4
1904	27.2	14.4	33.7	22.8	19.7	22.0	32.3
1905	26.8	14.3	33.3	24.0	24.5	23.4	35.9
1906	28.3	13.0	35.2	26.1	26.8	20.8	36.1
1907	23.8	14.2	38.2	27.3	23.1	24.4	36.8
1908	25.1	14.2	34.9	25.2	21.3	22.6	34.9
1909	24.3	17.9	39.5	28.2	25.1	26.2	38.9
Average (1900-1909)	25.8	14.3	35.3	26.3	23.4	23.6	35.0

(a) Bushels of 48 pounds. (b) Winchester bushels.

Average Yield of Rye in Countries Named, Bushels per Acre, 1900-1909:

Year	United States	Russia, European (a)	Germany (a)	Hungary Austria (a)	Hungary Proper (a)	France (b)	United Kingdom (b)
1900	15.1	12.7	22.9	13.0	15.8	16.9	25.7
1901	15.3	10.3	22.4	16.9	15.8	16.7	27.3
1902	17.0	12.5	24.6	18.2	19.1	14.3	28.1
1903	15.4	12.2	26.2	18.2	18.6	18.1	26.9
1904	15.2	13.7	26.3	19.3	17.0	16.6	26.0
1905	16.5	10.1	24.9	20.2	19.4	18.5	27.0
1906	16.7	8.8	25.1	19.9	19.8	16.3	27.6
1907	16.4	10.8	25.8	18.9	16.0	18.2	27.0
1908	16.4	11.0	28.0	22.0	17.5	16.8	29.2
1909	16.1	12.6	28.8	22.3	17.8	18.1	30.8
Average (1900-1909)	16.0	11.5	25.6	19.0	17.6	17.1	27.5

(a) Bushels of 56 pounds. (b) Winchester bushels.

Average Yield of Potatoes in Countries Named, Bushels per Acre, 1900-09:

Year	United States	Russia, European (a)	Germany (a)	Hungary Austria (a)	Hungary Proper (a)	France (b)	United Kingdom (b)
1900	80.8	104.7	187.5	149.0	131.6	126.0	140.7
1901	65.5	92.2	218.1	155.8	126.8	115.6	216.9
1902	96.0	107.5	199.4	152.4	113.3	114.1	183.7
1903	84.7	91.1	197.0	126.2	125.0	120.2	166.1
1904	110.4	88.4	164.2	126.1	86.2	123.4	195.6
1905	87.0	106.6	216.7	182.5	126.8	142.5	218.8
1906	102.2	94.9	193.3	158.4	128.7	99.5	192.2
1907	95.4	102.4	205.3	173.2	126.2	107.7	171.0
1908	85.7	102.9	209.2	154.0	96.6	163.7	231.1
1909	94.4	111.5	208.9	157.3	125.2	160.3	222.1
Average (1900-1909)	92.0	99.9	200.0	151.1	118.7	133.8	193.8

(a) Bushels of 60 pounds. (b) Winchester bushels.

The problem which immediately confronts the people of the United States is how to provide a living for the rapidly increasing population. In twenty years we shall have upwards of 130,000,000 people. At the present rate of production we shall not be able soon to produce enough food stuffs to supply our own needs. There is no more free land. The future must wring its living from a soil greatly impoverished by the process of mining which has been robbing it of its fertility.

Conditions in this country have radically changed and the new conditions must be met. We no longer have a free domain for settlers. The rush of farmers to the west has been stayed by the approaching exhaustion of the available lands. The tide has turned back to the lands of the east which, as has been shown, are increasing rapidly in value. In the meantime the increase of city population has made the food supply

a pressing problem. With 46.3 per cent, of the entire population living apart from the soil and yet depending upon it, and the relative number of tillers of the soil decreasing, and with a decrease in the average yield per acre recorded in many states, it is not hard to see why the cost of living increases.

These are facts of very great significance. Indeed, it may be questioned whether any other set of facts in the world today are of equal social and industrial importance. Population has spread over the country. The cheap lands are gone and there is no other equal area on the globe comparable in productiveness, remaining to be exploited. Farm values have doubled and yet the productiveness of the soil remains practically stationary. We can not look upon the relatively diminishing supplies with other than apprehension.

Commenting upon this situation, a bulletin of the National City Bank of New York recently said: "In all of the arts of manufacture and in facilities for transportation we make constant progress, and the benefits of that progress are quickly shared by all. But it is unmistakably true that in recent years a considerable share of the natural gains of industrial progress have been offset by higher costs for food, clothing and raw materials. A part of the higher prices goes to the fortunate possessors of land, timber and other natural resources, but a part is expended in the greater effort necessary to produce the commodities in the greater amounts required.

"There is only one possible source of relief from this threatening situation, and that is by raising the productiveness of our lands through more intelligent and scientific culture. There is no known limit to the possibilities of nature, and our average production is far below the results of the best practice. The average yield of corn per acre in this country has never reached 30 bushels but once, and that was in 1872. The important question is, if we have gained nothing in the cultivation of corn in the last forty years, how fast will it be possible to revolutionize farming methods in the future?"

The problem is simple to state. More products must be raised on each acre of land. The interests of society and of the farmer himself demand it.

Concretely the problem to the farmer is this: Land has practically doubled in value in 10 years. When land that is worth $100 per acre produces 29 bushels of corn per acre, and the corn is worth 60 cents, the return per acre is only $17.40 of which $6 approximately goes to pay interest on the cost of the land. Now suppose the value of the land is doubled, making an interest charge of $12 per acre. The same production at the same price as before would leave a deficit. Either the price or the production must be doubled or both must be increased proportionately. What has happened in the last few years has been the increase in price of the product with no appreciable increase of production except in a few states. This result continued indefinitely would mean national starvation.

The conclusion from these statements of conditions is as plain as day. We must raise more per acre of every product. All the agencies of progress working along this line can hardly increase the yield fast

enough to supply the demands which an ever increasing city population make.

That the increase in production can be brought about is proven in this state with its staple product, corn. The average yield per acre is 34.7 against 25.8 bushels for the country as a whole. Improved methods and educational activity have brought this about. The same activity and education applied to all farming products would, we believe, bring the average production to the same relative position with the rest of the country.

James J. Hill, speaking of the problem, said: "We can not feed our future population with our present methods. We must improve, and years of scientific investigation and practical experience have demonstrated how it may be done.

"There is scarcely a limit, at least none has yet been reached by the most intensive cultivation, to the value which an acre of ground may be made to produce. Right methods of farming, without which no agricultural country such as this is can hope to remain prosperous, or even to escape eventual poverty, are not complicated and are within reach of the modest means. They include a study of soils and seeds, so as to adapt the one to the other; a diversification of industry, including the cultivation of different crops and the raising of live stock; a careful rotation of crops, so that the land will not be worn out by successive years of single cropping; intelligent fertilizing, by this system of rotation, by cultivating leguminous plants and, above all, by the economy and use of every particle of fertilizing material from stock, barns and yards; a careful selection of grain used for seed; and, first of all perhaps in importance, the substitution of the small farm, thoroughly tilled, for the large farm, with its weeds, its neglected corners, its abused soil and its thin product. This will make room for the new population whose added product will help restore our place as an exporter of foodstuffs. The fruit farmer, the truck farmer, every cultivator of the soil who has specialized his work, has learned the value of these simple principles.

"The problem is, how to impress it upon the thirty million or more persons who live on the land and till it."

But there is a side to the question other than that of production. We produce in order that the well-being of society may advance. The end of it all is to provide better social and economic conditions. Dr. Liberty Hyde Bailey has expressed this idea in his work "The Country Life Movement."

"I am not one of those," he said, "who consider a sordid and commercial end to be the necessary result of industrialism. We must develop the ideals in an industrial civilization that they may lead us into the higher personal endeavor; and everywhere it should be possible for a man to make the most of himself. There must be something in every business besides the financial gain, if it is to make any contribution to civilization. * * * A new social order must be evolved in the country, and every farmer of the new time must lend a strong hand to produce it. We have been training our youth merely to be better farmers; this is the first thing to do, but the man is only half trained when this is done. What to do with the school, the church, the rural organization,

the combinations of trade, the highways, the architecture, the library, the beauty of the landscape, the country store, the rousing of fine community helpfulness, to take the place of the old selfish individualism and a hundred other activities, is enough to fire the imagination and to strengthen the aim of any young man or woman."

The commission found some rural communities with much of the community helpfulness mentioned by Dr. Bailey. It only remains to have that spirit spread throughout the state and nation to make the rural communities the backbone of the new industrial and social democracy.

SYSTEMS OF AGRICULTURAL EDUCATION

Agricultural schools in this country are divided into four main divisions.

1. Departments of original research and graduate study, which are found in most of the leading agricultural colleges.
2. Agricultural colleges which have been established in all the states and territories.
3. Secondary schools of agriculture which are maintained as separate schools and also as departments of the agricultural colleges.
4. Elementary schools which include the public, high and common schools giving instruction in agriculture.

In addition to the schools mentioned there are other effective agencies at work to promote investigation, research and practical application. The experiment stations maintained generally in connection with the agricultural colleges are effective in practical work of investigation and also through extension work in bringing the results to the farmer.

The U. S. Department of Agriculture makes extensive and intensive studies of farming problems and publishes the results in numerous bulletins of the greatest practical value.

The United States Bureau of Education collects and classifies information on agricultural education and publishes frequent bulletins of great value to teachers.

In addition the state departments of agriculture, conservation commissions, geological departments and state entomologists are supplementing the above studies with further intensive studies of rural problems.

Private individuals, private schools, railroad companies and bankers' associations have been active in disseminating information to the farmers.

Taken all together these agencies constitute a powerful force in the country as a whole but there are few states where these agencies have been developed fully enough to get the concentrated benefits of all this educational activity. Some have it in one form, others in another form.

The extent of the work in the public schools and colleges is instructive. It is significant of the awakening in this field that aside from the establishment of colleges of agriculture most of the present activity has come in the last ten years.

There are now in the United States, sixty-seven agricultural colleges established by the states and territories with federal aid. Nearly all of these give instruction also in mechanic arts and two give instruction only in mechanic arts. Sixteen of these states maintain separate institutions for colored and white students. Thus there are sixty-five colleges giving courses in agriculture.

Special agricultural schools apart from state colleges of agriculture are now maintained wholly or in part by state funds in seventeen states. Not less than seventy-six such schools have been established. These schools confine themselves to practical work of a secondary grade. They are intended for those who will follow the vocations of agriculture and who do not intend to go to college. In Wisconsin, Michigan, Minnnesota, Maryland, North Dakota and Mississippi, these schools are county schools maintained by the counties with state aid. In New York, Minnnesota, Colorado, California, Massachusetts, Nebraska, Pennsylvania and Vermont these are secondary schools maintained by the state which serve an indeterminate area; in Georgia and Alabama the state maintains a secondary school in each congressional district; in Oklahoma the state maintains one such school in each supreme judicial district and one special; in Arkansas the state is divided into four parts and a school is maintained in each.

In addition to these schools many of the state agricultural colleges are giving special short courses which are intended to train young men for the farm without reqiuring a large amount of preliminary work. These courses are given during the winter at a time that the boy or the practical farmer can get away temporarily for this work.

Secondary instruction is offered in a large and rapidly increasing number of high schools sometimes at local expense but generally with state aid. In 1909 in addition to the seventy-six secondary schools mentioned above, twenty-nine public high schools and twenty-four privately endowed colleges had departments of agriculture. At that time over one hundred and fifty normal schools were preparing teachers of agriculture. Over four hundred public and private high schools were giving some instruction.

The teaching of agriculture has been made compulsory in the common schools in many states by law and in others by the authority of the state superintendent of public instruction. In practically every state the courses of study outlined include agriculture.

The progress of agricultural education at public expense in Indiana has centered largely around the agricultural college, experiment station and extension division at Purdue University. This institution ranks high among those of like kind, and the practical work done has helped vastly to promote the agricultural interests of the state.

Purdue University was established in 1869 under the provisions of the Morrill act of 1862, which granted aid from the Federal Government. This act was accepted by the state legislature in 1865 and the faith of the state was pledged to the support of the maintenance of one or more agricultural colleges.

The institution is supported by the income from federal grants, by direct appropriations from the federal government amounting to $69,000, and by appropriations from the state treasury. The purpose of the university is to afford young men and women an opportunity to acquire a good college education in mathematics, science, literature and art and at the same time to secure instruction and practice in such lines of work as

will fit them to engage in the practical industries. The university offers instruction in the science and practice of agronomy, home economics, horticulture, entomology, agricultural chemistry, veterinary science, dairying and animal husbandry. The university offers three courses in agriculture.

1st. Regular four-year college course.
2d. Winter school of eight weeks.
3d. Farmers' short course of one week.

The regular four-year course offers a broad education by providing well balanced instruction in the science and art of agriculture.

The winter school is designed to meet the needs of those who from lack of time or preparation may be unable to enter the regular four year study. "The object of the work is to help young men and women to produce better corn and livestock, better milk and butter, better fruit and to make better homes and at the same time to secure a greater profit from the time and energy and money expended."

The farmers' short course is designed to meet the needs of the busy farmer. It is continued for one week in January at a time when the farmers can attend. Lectures, laboratory exercises and demonstration in soils, crops, livestock, dairying, horticulture, domestic science and poultry are given.

In addition to the courses at the university there are two separate branches.

The Agricultural Experiment Station makes investigations and experiments of the principles and application of agricultural science. The station is not concerned with teaching.

The Department of Agricultural Extension which was organized under an act of the legislature of 1911 has for its object the extension of knowledge by carrying the work of the experiment station and the agricultural college to persons in all parts of the state. This work of the department is outlined as follows:

1. The instruction of farmers assembled in organized meetings such as institutes, short courses, conferences, clubs, educational trains, etc.
2. Practical demonstrations in field and orchard of new and improved practices; exhibits and contests.
3. The encouragement of the teaching of subjects in the public schools relating to rural life.
4. Instruction in domestic science by lectures and demonstration.

By these means instruction has been carried to all parts of the state. The work is intensely practical, being designed to meet the actual needs of the farm and home workers. The work of this division is now organized for wide usefulness and needs only an additional appropriation to make it realize its fullest possibilities.

In secondary education Indiana has not kept pace with other states, many of which are less favored for agricultural work than this state.

Outside of the secondary work in short courses, farmers' week and the extension work done at Purdue, there are no public institutions giving such work except occasionally a high school, academy or consolidated school which maintains a department of agriculture. One private institution is engaged in agricultural instruction, namely, Winona Agricultural School at Winona Lake.

A course of study has been outlined for the common schools, but it is not compulsory and at best such courses are not sufficient for the needs.

The teaching of agriculture in secondary schools is so slight as to be all out of proportion to the importance of the industry in this state. Yet due credit must be given to those few schools which have shown what can be done in making agriculture a vital subject in the school curriculum and in advancing the efficiency and happiness of rural life.

DOMESTIC SCIENCE AND ITS EDUCATIONAL NEEDS

The problem of industrial training for girls is made difficult by the dual nature of woman's employment. Arthur D. Dean, in his book, "The Worker and the State," says: "Today a large majority of the girls are wage-earners from fourteen or sixteen to twenty or twenty-one, when they take up home making as a career.

"If they enter upon the wage-earning occupation with no preparation, they are destined to have low wages and incur the danger of being exploited. If they enter upon the subsequent vocation of home making, without preparation, the conditions are disastrous to health and to the home."

It is necessary that careful attention be given to the preparation of girls for wage-earning occupations, but it is an economic loss if they are so prepared at the expense of preparation for their larger and permanent occupation. It is the first duty of school authorities to learn what wage-earning occupations are open to women and how the efficiency of women may be advanced in them. Many trades are closely related to the home, such as dressmaking, millinery, catering, etc. These offer a fine opportunity for temporary work and at the same time for the permanent vocation in home making.

While suggesting the importance of training for girls for temporary work, the commission wishes to emphasize primarily the field of the large vocation of women in home making. Yet preparation of the girls for the wage-earning occupation must be carried on in order that the period of employment may be more effective and also that those who choose to remain in industry may be properly prepared for their life work.

Any form of education for girls that ignores or neglects all those lines of instruction embraced in household arts fails to bring our girls to womanhood properly equipped for woman's highest function.

In this age of enlarged opportunity and usefulness for women in the world's work we are not to lose sight of the fact that women's largest opportunity and supreme importance lies in the realm of home-making. That many are to be efficiently fitted to take their places in the industrial and commercial world goes without challenge, but that all women should have the deepest insight possible into the problems and possibilities involved in home-making, and the family as an institution, is a proposition, the solution of which promises the highest type of social integrity, and adds beyond measure to the economic efficiency of a people.

Upon the wise ordering and management of the home depends, in a very large measure, the character of the children born there, and