

EARLY HISTORY OF THE IOWA STATE HIGHWAY COMMISSION

One very recent college graduate, a desk and two small filing cabinets, all occupying floor space of less than 90 sq. feet in a corner of a student's drafting room on the fourth floor of Engineering Hall at Iowa State College in 1904, constituted the full force and equipment of the Iowa State Highway Commission. Seventeen years later, during the fall of 1921, the Commission occupied floor space in a dozen different buildings in a dozen towns and cities in Iowa, totaling more than 20,000 feet of floor space, had some 200 regular employees working direct for the Commission and approximately 400 working indirectly on construction and maintenance of roads and bridges in every county in the state. From a total appropriation for salaries, quarters, materials and experimental work of \$3,500 for the year 1904, the Commission in 1921 had exercised direct and indirect supervisory control over Federal, State, County and Township funds for road building totaling approximately 39 million dollars. So far as authority was concerned in 1904 the Highway Commission had none. The lone employee of the Commission sat at his desk ready and eager to help with advice or with actual work out in the field if only any one came or made a request for help or advice. Few came. Cerro Gordo, Woodbury and Story County supervisors frequently wrote in for information. These counties together with Van Buren asked for plans and help in making plans on a few bridges and culverts. They occasionally asked for an inspector for this work. When such a request came in, T. H. MacDonald, now Chief of the United States Bureau of Public Roads, the highest executive road official in the United States, who was then the lone employee went out himself or recommended some other engineer for the job. Fred White, now Chief Engineer for the Commission got his start with the Commission in this manner, being recommended as inspector on the Kilbourne bridge in Van Buren county by Mr. MacDonald.

So far as having any actual authority to command any improvement of any road or bridge or to enforce the adoption of any engineering principles or standards of construction in either road or bridge building was concerned the Commission had absolutely none. The Commission and its employee was there simply to give advice if advice was asked.

In April 1904 the Iowa legislature authorized the Iowa State College to act as a Highway Commission. The trustees of the college assigned this work jointly to A. Marston, Dean of Engineering and C. F. Curtis, Dean of Agriculture. The legislature assigned \$3,500 to cover all annual expenses. It stipulated that the services of the college as a Highway Commission should be without expense. Dean Marston, on order of the Board of Trustees, made a trip to Birmingham, Albany New York, Boston and Trenton for a double purpose of investigating road buildi

and of securing an expert road engineer to work for the Commission. He failed to find a suitable man and upon his return recommended the employment of Thomas H. MacDonald, who had just graduated from the Civil Engineering department of Iowa State College. Mr. MacDonald in his school work assisted in a series of traction tests and experiments and had made a special study of road building materials. Mr. MacDonald came on the job and was given a flat top desk and two filing cabinets. With this equipment he was installed in a room on the fourth floor in the south end of Engineering building. The room is now occupied by the Architectural department as a work room. There were several other occupants in the room along with Mr. MacDonald. If the joint stenographer for the engineering department and the Highway Commission happened to be busy, letters and correspondence were written out in long hand. Records show that Mr. MacDonald worked for the first nine months for \$50 a month and the balance of the year, two and three quarters months, at a raise of \$10 or \$60 per month. The first year he drew \$650. During this first year, records show that Mr. MacDonald made trips to study road building and investigate road work in Greene, Carroll, Calhoun, Bremer, Butler, Chickasaw, Cerro Gordo, Floyd, Buchanan, Sac and Hamilton Counties. As an experimental road the short stretch of gravel with clay binder was built on the college campus. This was along side the old Veterinary building on the road that now skirts Lake LaVerne. Numerous tests were carried on to determine the quality and comparative values of various road materials.

A road school was conducted from June 12 to 17¹⁹⁰⁴ at which D. Ward King, of Split-Log, Road Drag fame, and B. Stanton, an engineer who had applied railroad grade building methods to highway construction in Poweshiek County, were the chief instructors. The total expense of the road school conducted the first year was \$381.60. There were about two dozen people in attendance. At the annual road school and conference in the spring of 1922 there was a total attendance of approximately 450 supervisors, engineers and auditors and there were a score of expert and trained highway engineers to lead the discussions on road and bridge building.

An agricultural census of the state was started during the first year, in an effort to get an idea as to the amount of traffic on the average Iowa highway and to get some idea as to how much agricultural produce was transported over the Iowa roads from the Iowa farms to the market places.

In the records of the first year the name of C. S. Nichols, now Associate Professor of Civil Engineering, worked as stenographer at 20¢ per hour. John T. Hoover, whom all the Iowa State College students for many years following will remember as conductor on the college street car line during most of the year, and judge of horses during the County Fair season and who is now superintendent of the Fr. Dodge, Des Moines Street car line, worked for the Commission to the extent of \$70 worth, doing road

dragging, handling blade graders, harrows, discs and other road building implements at various road building demonstrations.

It will be interesting to note in the records that one of the first expenditures was \$27.50 for a kodak, which is still in use by the Commission. Another expenditure was for \$68 for a stereopticon, an accessory for use in making road talks. Another expenditure was \$226 for 15,000 copies of a 24 page bulletin, entitled "Good Roads Problem in Iowa."

During this same year, Professor S. J. Zintheo, of the Farm Mechanics department, was instructed to look up a line of the best road building machinery, for it was recognized that road building in Iowa would have to be done on a wholesale scale and would undoubtedly become a matter of machine building rather than hand labor.

The work of the department, according to the first annual report, was divided into four parts; investigations, plans and publications, experiments and road school. The investigation work started consisted of a study of the glacial district of Iowa as affecting the soil, drainage and topography features with relation to Iowa road building and maintenance. Another investigation conducted was to secure accurate knowledge of the status of road work in various counties, to learn of the deposits of available material, and to study the various county methods of handling road funds. A road census, as previously started, was conducted to get an idea of the amount and kind of traffic on the Iowa country roads. Experiments were put under way to test out the durability of gravel roads with clay binder and, in the construction of a limestone macadam road on the college campus, to test the value of the soft Iowa limestone for road building. A series of tests on the strength of reinforcing concrete for bridge and culvert work also was begun. In line with the educational policy, there was issued a manual for highway officers, which received a great deal of favorable comment from road men all over the country. The demand for plans for concrete culverts, even the first year, became so large that considerable student labor had to be employed to assist in the necessary drafting work.

In the first annual report made by Mr. MacDonald and the Commission, it is interesting today to note the legislative recommendations then made, which to a large extent have since been enacted into road laws. Some of these recommendations were, for state supervision of highways in a general way, a complete annual accounting by county and township officers to the Commission, larger units of administration in road affairs, skilled superintendents of these units, recommendations for a County Engineer in direct charge of county and general supervision over township work, preparation of road material by convicts, compensation for the use of wide tires on the highways, and authority for contracting with land holders for road dragging and weed cutting.

There were also prepared, during the first year, general specifications for building a macadam road way, a form of contract and a bond to be given by the contractor as security and guarantee for the work.

Engineers and others familiar with the present day work of the Commission and with an acquaintance with present road laws in Iowa will see how accurately the general trend of road development in Iowa was forecasted during this first year by Mr. MacDonald and the Commission and how closely this development forecasted has been followed by actual events.

The work, as outlined in 1904, continued along about the same line until 1913. Each year the scope of the study and experiments was widened and the influence of the Commission slowly increased. In 1906 the legislative appropriation of \$3,500 per year was increased to \$5,000 annually. In the report of 1905 Mr. MacDonald, who had appeared on the records as Assistant Engineer, was given the title, Highway Engineer to the Commission. In the report of 1907 and 1908, which was combined for the two years, legislative recommendations were made for a bridge law that would provide real competition for county contracts and that would protect both county and contractor, for a concentration of more of the road funds under the county supervisors to provide an adequate building fund, a mandatory road guide law, a state reward for construction under plans and specifications prepared by the Commission, provisions for inaugurating roadside tree planting and for the destruction of weeds. The present motor vehicle law was forecasted, a proposal for the collection of an annual tax for automobiles to be set aside for use by the State Highway Commission in encouraging road improvement and offering reward for improved road construction by the individual county. The same report shows that Mr. MacDonald's salary had risen to \$100 per month.

In the fall of 1911, demands for plans for culverts and bridges had increased to such an extent that it became necessary to employ someone to give their entire time to drafting and to oversee the work of student laborers employed for this purpose. C. B. McCullough, now Bridge Engineer for the Oregon State Highway Commission, who had completed school that year, became the first assistant engineer to Mr. MacDonald. He had a regular desk and a regular title. Office work had also developed to such an extent that a regular stenographer, bookkeeper and accountant was required, and Miss Annie Laurie Bowen came on the pay roll. The Highway Commission force now numbered three people. J. E. Kirkham, a practical railroad engineer for many years, who at that time taught Structural Engineering in the College, acted as advisory and consulting engineer on all bridge and culvert work.

Later, in the fall of the same year, J. H. Ames, present Bridge Engineer for the Commission came on the staff of the Commission as Assistant to Mr. McCullough. Mr. Ames had been employed from time to time to assist in drafting work during his college course. Charles Wright, later Engineer in Carroll County and still later a

district engineer for the Nebraska Highway Commission, also was employed on regular time to work in the drafting room.

Some time during 1910, Mr. MacDonald's desk was moved from the fourth floor of engineering hall to room 103 on the ground floor in the north end of Engineering Hall. About January 1st, 1912, the old cement laboratory in the northwest corner of Engineering Hall was assigned to the Commission, and most of the drafting work was done in these quarters. During the year 1912, J. A. Paulsen, a graduate of Iowa State College, and now District Engineer for the 7th District, came on the Commission force as draftsman; C. E. Olson, who had been an inspector on the Eureka Mill bridge in Greene county, the first large reinforced concrete bridge to be built in Iowa, was employed as a draftsman, also, Walter Root, who also had been inspector on other bridge building in Greene county and later had been employed in Butler county in making one of the first county bridge maps of the state, also came upon the pay roll as draftsmen. It took high financing, in its day, to meet the demands made upon the Commission with the money available. The good results which had accrued to every county making use of the advice and help of Mr. MacDonald and his increasing force of assistants made its impression on the people of this state.

In the spring of 1913, the legislature, after a long and memorable fight, enacted what we now know as the Highway Commission law. This law established the Highway Commission as we now know it and made it a vital authoritative factor in Iowa road building. This law provided for a Commission of three members. One of these was to be ex-officio the Dean of Engineering at Iowa State College. The other two members were to be named by the Governor of the State, one from each of the two leading political parties. Governor Clarke named J. W. Holden of Scranton as member representing the Republican party and H. C. Beard of Mt. Ayr as third member representing the Democratic party. The membership of the Commission remained unchanged until 1917 when Dean Marston entered military service and Professor S. W. Beyer, who succeeded to the position of Acting Dean of Engineering, became ex-officio a member of the Commission. In 1918, Dean Marston returned to his position at Iowa State College and automatically resumed his position as member of the Commission, replacing Dean Beyer. Mr. Beard resigned his position January 1, 1919 and Mr. Wm. Collinson, Attorney of Chariton Iowa, was named in his place by Governor Harding. These three still constitute the State Highway Commission, Mr. Holden having been twice reappointed and Mr. Collinson being renamed at the expiration of the regular term.

With the death in 1919 of Logan Walter Page, then Chief of the United States Bureau of Public Roads, negotiations were started with Mr. MacDonald to fill the vacant place. It was not

until the spring of 1919, after the campaign to secure adequate Federal Aid legislation was successfully carried through the Iowa legislature, that Mr. MacDonald consented to leave his home state for the larger place. The call for Mr. MacDonald came just at a time when one phase of the campaign for road advancement and improvement had been fairly well completed in Iowa, and a new order was just beginning.

From 1904 to 1917 the great task had been to devise a system and to secure adequate road laws to put this into effect with an established method of financing road building. While this was going on, there was a gain being registered at each legislature; a road building organization and system was being worked out and developed. At each legislature the idea of centralized authority and larger units in road building, with more strict State supervision and authority to enforce road building according to state standard plans and specifications, gained momentum. When the legislature adjourned in the spring of 1918 with much needed legislation successfully enacted, after an extremely bitter fight, there was at hand the nucleus of a splendid State road building organization with the Highway Commission as the central body, the District Engineers and County Supervisors and Engineers extending the organization over the entire state. At the close of this season, there was the legislation that had been asked, an adequate means of financing had been provided, and the law specifically instructed that the Highway Commission should prepare and have available standard plans for all road and bridge building. There had been worked out in a general way a system of accounting and methods of procedure and administration with which all were familiar and were in daily use. None of these things were radically changed or disturbed. The old working force, scheme of organization, accounting system, methods, etc., were left intact and left simply as a nucleus to develop their work around. In general, older employees, trained for years in their special place of work, became heads of departments. New men were added from time to time as suitable men and the absolute need of help arose under the Commission. The result was that the Commission was able to expand in a very short time from a matter of 50 or 60 employees to over 400 during the busy construction season without serious disturbance or revision of methods during any stage of the development.

As an example of this expansion, one man, in 1918, handled the accounting, purchasing and office management of the Commission. In 1921 it required the full time of over 25 people to look after this side of the Commission's business and to keep the detailed accounts of considerable over 100 road projects. It must be remembered that every penny which goes out of the Primary Road system must have its record for what it is spent for and where it goes, checked and O.K'd in the Commission office. During the war, when it became impossible to get men to do all the drafting work, women were trained to do this class of work. The good results secured from the experiment lead to the establishment of the Women's drafting room to handle certain classes of the drafting work. This was one of the first Women's drafting rooms

in the United States.

With the opening of extensive construction work in 1920, Contractors and county officials were finding it difficult to secure suitable material for concrete aggregate. Professor R. W. Crum of the Iowa State College was secured to head a department of Materials & Tests. It became his business and the business of his force of assistants, including Bert Meyers and Perry Preston, to find sources of material and to test all material going into the various jobs. Field parties went into the counties where material was needed, quizzed residents as to locations of known gravel deposits and dug into likely looking hills, mounds and knolls until the desired material was found. On some of the larger construction jobs, branch testing laboratories, located some times in a temporary shed, were established where the quality of material was thoroughly tested out. The wide distribution of the construction work over the state made it necessary to establish branch laboratories in Mason City, Davenport and Des Moines.

Today, the State Highway Commission, with the possible exception of the State Board of Control and its various departments and employees, forms the largest department of the Iowa State government. It may seem like a huge organization, but it must be remembered that the road building in Iowa is the largest single business in which the state is engaged, that the improving of the Primary Road system, 6,616 miles, alone outranks even the building of the Panama Canal, in the size of expenditures for labor and materials required. Add to this the additional supervisory work covering both County and Township systems combining almost 100,000 miles of highway and the organization begins to look small for the job it faces. Iowa road building is a huge job, and it takes a huge organization to handle simply the road administration work. Dean Marston and Dean Curtis, when they hired MacDonald to teach road building officials to apply engineering principles in their road building and placed him at a small desk in Professor Asbaugh's room, little dreamed that they were starting what a few years later was destined to become the largest department of the Iowa state government.