

Home Course In Road Making

I.—The Office of Public Roads.

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IN March, 1893, a petition was presented to congress asking that a road department similar to the agricultural department be founded at Washington for the purpose of promoting construction and maintenance of roads and for teaching students so that they might become skilled road engineers and to establish a permanent exhibit of sections of road illustrating various methods of construction and the best road materials and machinery. This petition was signed by the governors of many of the states, including Governor McKinley of Ohio, by chambers of commerce and universities and was indorsed by resolutions of legislatures.

The office of road inquiry was established under authority of an act of



UNITED STATES OFFICE OF PUBLIC ROADS

congress approved March 3, 1893, making appropriation of \$10,000 for the department of agriculture. The clause relating to this work provided that the secretary of agriculture should make inquiries in regard to systems of road management throughout the United States, make investigations in regard to the best methods of road making, prepare publications on this subject and assist agricultural colleges and experiment stations in disseminating information.

Since 1893 the total amount appropriated for the office of public roads is \$864,860, and since its establishment the office has issued 40 bulletins, 95 circulars, 9 farmers' bulletins, 21 year book reprints and 18 annual reports, a total of 183 publications.

The office has directed the construction of about 346 object lessons and experimental roads, illustrating macadam, bituminous macadam, brick, gravel, sand-clay, shell and earth construction. The approximate expenditure on these object lessons and experimental roads by local authorities has been \$400,762, and the subsequent road work due directly to the object lesson roads represents expenditures running well up into millions. Lectures and personal advice by engineers and experts have constituted a prominent feature of the work of the office since its establishment. The road material laboratory was installed in December, 1900, and from that time to July 1, 1911, about 5,300 samples of road material have been received from practically every state in the Union and tested to determine their character and value for road building.

A photographic laboratory was installed in January, 1909, and has now a complete outfit. This was the direct result of a great need for illustrated lectures. The office has now a collection of about 6,000 negatives and about 2,000 slides, many of which have been colored. These illustrate all phases of road work.

Experiments have been conducted with oils, tars, rock asphalt and various preparations for the purpose of preventing dust and preserving macadam roads from destruction under modern traffic conditions. The office has conducted investigations to determine the feasibility of the sand-clay method of road building in the southern states as well as in the prairie states, and this method of construction has been found to be quite practicable, especially in the south.

A study of the construction of roads, of natural soils by treatment with asphaltic oils, has been made and was published in circular No. 90. The office is conducting investigations on the use of slag as a road material and the improvement of sand roads in parts of the country where clay is not accessible. Practical efforts have been made toward bringing about the more general use of the split log drag in the maintenance of earth roads.

One of the unique and striking exhibits at the Alaska-Yukon-Pacific exposition consisted of a series of miniature models illustrating every known type of improved road and the various

road building devices, such as rollers and crushers, in actual operation. This exhibit was designed and prepared by the office, and since the exposition closed similar exhibits have been shown in many parts of the United States, partly through the medium of expositions and partly by means of exhibit trains operated by several railroads. Lecturers and demonstrators accompany these exhibits, making them in reality schools of instruction in road building.

Graduates in engineering are appointed from colleges each year after a competitive examination, and are given thorough training while rendering practical services to the government. In this way an efficient corps of engineers is being built up, which will aid the development of road building along proper lines, both during and after their connection with the government. This work was begun in the fiscal year 1905.

Investigations into the decomposition of rock powders under the action of water have led to important discoveries with reference to increasing the cementing value of road materials. The investigation into the corrosion of iron and steel culverts has brought out important results. The generally accepted theories regarding the rusting of iron have been demonstrated to be incorrect, and it has been shown that by treating the surface of the iron with a strong oxidizing agent the rusting can be inhibited.

In May, 1907, the office inaugurated a project designed to introduce the best possible systems of construction, maintenance and administration of roads in the various counties. Under this plan engineers are assigned to make thorough investigation on all phases of the road work of the county to which they are assigned, and prepare exhaustive reports giving plans, estimates and recommendations.

The number of the employees of the office has increased from one on July 1, 1893, to 157 on July 1, 1911. The present appropriation of the office is \$100,720, out of which \$3,500 is paid for rent, leaving \$157,220 to pay the salaries of these 157 employees, as well as traveling expenses, the purchase of equipment and supplies, and the usual running expenses.

The most thorough and systematic methods of organization have been introduced into the administration of the office, and the great library on all phases of road work is the best in the western hemisphere, and the library is being added to constantly.

The policy of the office in recent years has been to co-operate with the officials in charge of road work in the various states as closely as possible, and the endeavor is being made so to correlate road work in each state by voluntary co-operation as to constitute one great movement along uniform lines and make the progress and methods of each state known to every other state through the medium of the office. In furtherance of this object a comprehensive investigation was begun in



SECTION OF THE BITUMINOUS LABORATORY OFFICE OF PUBLIC ROADS.

1904 to ascertain the mileage of improved and unimproved roads, the character of improvement, the amounts expended, rates of levy and sources of revenue in every county in the United States. This work was finished in June, 1907, and the results were published in the form of a bulletin, which shows that there are over 2,150,000 miles of road in the United States, of which only 7.14 per cent were improved in 1904, and that the expenditure in money and labor for that year was nearly \$90,000,000. This bulletin comprises the first complete data ever assembled on this subject.

THE MEANEST SOUND THAT'S HEARD.

How oft within the still night
That tomat yells from the back fence!
I throw a brickbat at his skull.
Consign him quick to hades hence!
He quiet, then, like Casar's ghost,
He will not down; but, with a yowl,
He snorts and hesses, cat-a-wauls
And makes of night a hideous howl.

And there's the hound that never sleeps,
A cavernous moving mouth is he,
"Bow-wow! Ki-yi!" I fire a gun,
He bow-wows back; he thinks its fun,
I throw the bed slats at his head,
I swear till all is lurid red,
I yell till I'm exhausted quite,
Yet that hound howls till morning light.

But what are such to human bores,
The grouchy glooms that growl around?
The pessimist with mournful mouth,
The knocker with his rasping sound—
Beside such cats are nightingales;
Beside such Towzer's a sweet bird.
Yes, pessimistic, knocking cuss,
You make the meanest sound that's heard.

C. M. BARNITZ.

THE PERIOD OF INCUBATION.

Broody Biddy is apt to fool us by hatching her eggs before or after the date set. Though a hen generally finishes her hatch the twenty-first day, the condition of hen or eggs or weather may vary the time. We have known eggs to hatch the eighteenth, nineteenth, twentieth, twenty-first and even on the twenty-fourth day. A hot blooded hen that sits tight on strongly fertilized fresh eggs often finishes on the eighteenth. A hen of low hatching heat hatches late, and though the eggs are strong her chicks may be weak. A fussy hen that goes off and on and neglects her eggs may retard her chicks to the twenty-fourth. Extremes of temperature often affect the time of hatching, heat hastening, cold retarding the chick. We believe incubation may be suspended without injuring the germ.

English fanciers guarantee all eggs in a setting fertile. They place them under heat just long enough to see the germ, test out infertiles, then ship. We have reset eggs deserted by hens for several days, and they hatched well. Through accident to an incubator 200 eggs were away from hatching heat for thirty hours. They were kept covered, reset and 160 chicks hatched one day behind time.

We mention this so you may not rush to throw out eggs that do not hatch on the minute. Though circumstances may cause occasional variation, each breed of fowls has its period of incubation, the following table being considered standard for the species mentioned:

| | Days. | | Days. |
|---------|-------|-----------|-------|
| Chicken | 21 | Turkey | 28 |
| Guinea | 25 | Pheasant | 25 |
| Goose | 28 | Pheasant | 25 |
| Duck | 28 | Partridge | 24 |

FEATHERS AND EGGSHELLS.

Duck yards should be scraped often. Wet weather soaks them up and the white ducks puddle, and how filthy they get and, oh, what a smell! "Nuf sed."

Aniline dye instead of eggs is being used in Philadelphia to give cakes that pretty yellow color. Yes; the fools and the deep dyed villains aren't all dead yet.

Butter and eggs naturally go together, and poultry and dairy go so well together that many are combining the two. With bees and fruit added there's a boodle bonanza.

A butcher of San Francisco swallowed fifty-four eggs in 186 seconds and won \$100. Then he took two drinks of whisky and resumed his butchering. That sure beats the Old Nick.

Cock fights, dog fights and bull fights are now under the ban in the Panama canal zone. Think of \$50 fine or jail for fighting roosters! This new law spoils another good market for gamecock breeders.

There are some markets where there are but few calls for ducks. It's not wise to dress a whole stack of ducks and then have to haul them back home. Better take a crate of live ducks to market and test the demand.

Cuba and South America are the market for gamecocks. Enthusiasts find it pays much better to breed and ship these fighting birds than to fight stags in this country and get fined and have their names in the newspapers.

In buying that new gobbler don't go to a neighbor, but buy far away from home. On many farms turkeys are related unknown to their owners. They travel so far and are often out of sight so long and often there is a general mixup.

The appetite is the signboard to digestion both in man and hen, and the quantity to feed a flock must be judged by the way the hens go for the feed. Breeds differ in the quantity they eat, and the same flock on different days does not always require the same quantity.

We asked a farmer's wife who was dressing a hen how she could tell a healthy chicken. She replied that she always kills the hen that's laying—that it is always healthy. This is not always true, and if it was, killing layers is bad policy, for "the hen that lays is the hen that pays."

When a York (Pa.) belfry was entered it was found almost filled with sparrows' nests, and almost a wagon load was thrown out, and, oh, the feathers! Those measly little sparrows had gathered up pounds and pounds of feathers that wasteful people had thrown out. Go thou and do likewise.

A black and white Homing pigeon, band numbered 017,759, was captured in a Bristol (Pa.) yard where it alighted for rest. An old cluck, mistaking the pigeon for a hawk, was fighting the tired bird when it was rescued. Stray fowls should always be advertised. It's brotherly and also the law.

Plant an ad in these columns and watch your business grow.

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