

THE DEPARTMENT OF CONSERVATION, STATE OF INDIANA, PRESENT AND FUTURE.

DIVISION OF GEOLOGY AND NATURAL RESOURCES.

W. N. LOGAN.

The personnel of the geological force as at present organized is as follows :

W. N. Logan, Ph.D., Economic Geology.
E. R. Cummings, Ph.D., Stratigraphy and Paleontology.
C. A. Malott, Ph.D., Topography and Glaciology.
S. S. Visser, Ph.D., Geography and Hydrology.
J. R. Reeves, Laboratory Assistant and Draftsman.
H. W. Legge, Preparator.

Office Force.

B. J. Malott, A.B., Assistant Geologist and Supervisor of Natural Gas.
A. J. Coleman, Curator of Museum.
Miss Alice O'Connor, Stenographer.

Field Corps for 1919.

W. N. Logan	S. S. Visser
C. A. Malott	J. R. Reeves
P. B. Stockdale	G. A. Lee
Willis Richardson	O. H. Hughes
Ted Jean	Fred Call

Topographic Corps, U. S. G. S.

Oscar Jones, Topographic Engineer.
J. I. Enders, Assistant Topographic Engineer.
Clarence Long, Chainman.
G. M. Rariden, Chainman.
L. C. Pitts, Rodman.

LINES OF INVESTIGATION.

The various lines of investigation carried on by the Division in the field and laboratory include: The investigation of the origin, mode of occurrence, distribution and utilization of Indiana kaolin. The results of these investigations are embodied in a report of some thirty thousand words accompanied by more than 100 maps, charts and photographs. A topographic map of thirty-six square miles in the heart of the kaolin district was completed for the use of those desiring to develop the kaolin mining industry.

A study of the stratigraphy of the Chester division of the Mississippian was continued by Dr. C. A. Malott who assisted in the field work on the kaolin report and later on, assisted by Mr. P. B. Stockdale made structural maps of portions of Jennings, Orange, and Pike counties and investigated oil conditions in Pike County.

One of the tasks assigned the Division by the passage at the last General Assembly of the Conservation laws was that of determining the

amount of minable coal under navigable stream beds. The investigation of the amount of minable coal under the Wabash River in Vigo County was undertaken by Dr. S. S. Visser, who completed a report for publication. Dr. Visser also collected samples of limestones, collected information from industrial plants that use Indiana raw materials, located in Vigo, Clay and Putnam counties and carried on investigations in the oil field of Sullivan County.

In cooperation with the United States Geological Survey, the mapping of the Bedford and the Heltonville quadrangles lying adjacent to the Bloomington quadrangles was begun in September and continued until the first of November. Work will be resumed with favorable weather in the Spring.

PUBLISHED PAPERS.

Shorter articles were prepared and published as follows:

"The Natural Resources of Indiana and Their Utilization", published in the Guide book issued by the American Chemical, Metallurgical and Mining Institute.

"The Raw Materials of Indiana", published in the Chemical and Metallurgical Journal.

"The Occurrence of Coal in Monroe County", by the Indiana Academy of Science.

"On the Occurrence of Indianaite", Indiana Academy of Science.

"High Grade Clays and Kaolins of Indiana", United States Geological Survey.

PROPOSED LINES OF INVESTIGATIONS.

The division has in progress the investigation of the oil bearing shales of Indiana; the investigation of the shales of the Chester group and the fire clays of the state to determine their value to the ceramic industry; the investigation of the limestones of the state to determine which are best suited for agricultural purposes; the preparation of a hand-book on the Geology of Indiana. In the preparation of this volume, Dr. E. R. Cummings will have charge of the portion on stratigraphy and paleontology, Dr. C. A. Malott the portion on topography and glaciology, Dr. S. S. Visser the portion on geography and hydrology, and the writer the portion dealing with economic geology. Two advance chapters of this volume which have been prepared will be given wider distribution than the handbook. The study of the stratigraphy of the Chester group will be continued by Dr. Malott. It is hoped that we will be able to continue the topographic mapping until every quadrangle in the State of Indiana has been mapped.

THE DIVISION OF ENTOMOLOGY.

FRANK N. WALLACE.

The Division of Entomology of the Department of Conservation carries with it all the powers and duties of the old office of State Entomologist and in addition has new duties and broader powers than the State Entomologist had under the old laws. These powers and duties of the Division of Entomology cover such a wide field of activity that an appropriation of four or five times the amount now available would not be sufficient to see the work carried out as I would like to have it.

There are many duties of this office which are specifically required by our laws and it is only after these are accomplished, that we can turn to the other phases of the work. The field of insect study and control is so broad and the need so great, it is deplorable that more money is not available for this work.

Primarily, the State Entomologist's Office was established for the inspection and regulation of nurseries in the state and this is still one of its principal duties. The nursery agents and dealers are also licensed by our department and we now have a fairly good control over the nursery business. We have been able to eliminate most of the crooked methods which were practiced in the old days by some of the nurserymen and their agents.

The apiary inspection is an important part of our duties and this work has increased rapidly the past few years and most of the beekeepers of the state are now appreciating what the inspectors really mean to the beekeeping industry of Indiana. There is now a spirit of cooperation among the beekeepers, in the districts where the inspectors have worked during the past two years, that is extremely gratifying. Last summer I had four inspectors in the field and even then we could not cover as much territory as we had calls from. Yet, we visited 1772 apiaries and inspected 19,245 colonies. We were able to do this because we had a definite plan of work outlined last spring and followed it throughout the season. A comparison of this years work with former years will give you some idea of the benefit of our system of work. During the four years of Mr. Baldwin's regime, 844 apiaries were visited and 12,258 colonies of bees inspected. This record was taken from Mr. Baldwin's published reports and I am only quoting his figures. It shows that this season we did 57% more work than was formerly done in four years.

When disease is found we require each beekeeper to report to the office when his treatment of the disease has been completed and in most instances where we could get no report an inspector was sent out to see if our instructions were followed. We had to burn some hives on these reinspections as a few of the beekeepers still contend that they can keep bees in any manner they see fit. Out of 1772 inspections this season we have only 40 reports which have not yet been checked up on the work finished as we directed.

Beekeepers tours were held in many counties and 147 demonstration

meetings were given where the treatment of foulbrood was shown and many other phases of beekeeping actually demonstrated.

Another service we have been able to render the beekeepers was securing sugar to feed colonies which were short of stores. All during the sugar shortage we have been able to secure sugar for all beekeepers in actual need of sugar and this fall we have again supplied many tons of sugar when it could be secured in no other way.

Under the Conservation Act we have very broad powers and the Division of Entomology should be able to handle any emergency that may arise in insect or plant disease control. It was this very fact that we did have the power to handle such situations that helped us this summer at Washington when the Federal Horticultural Board was considering placing a quarantine against the shipment of all small grains out of this state, because they believed the "Take-All" disease of wheat was established here. The Chairman of that board, Dr. Marlatt, said he hoped some day each state would see the wisdom of giving broad enough powers to a commission or board so that emergencies such as ours, could be handled by the states themselves, without the federal government having to establish quarantines against them.

You would naturally suppose that any excitement caused by an insect outbreak would be to our liking, yet we often bend our efforts to allay the excitement rather than add fuel to the flames. The army worm scare this summer will illustrate this. While in the southern part of the state, I had an urgent call to go to Henry County and when I arrived there a day late I found about two or three thousand farmers and other volunteers out digging trenches around wheat and rye fields. Not one trench in a hundred was effective and in only one case was trenching really necessary. I asked the newspapers to publish the real facts in regard to the army worm situation in their county and to get the farmers back to work on their corn which needed cultivation. The army worm panic cost \$30,000 a day in that county as a farmer's time was worth at least \$10.00 per day in his corn fields and the trenches that were dug were worse than useless. The army worm scare did an immense amount of damage because the first people on the ground did not understand conditions. I saved many counties from having a similar panic by getting there in time to allay their fears by showing the real conditions.

The florists have many perplexing insect problems and have had very little systematic help in any of the states. Their problems are different from the farmers or gardeners in that they do not have seasonal controls such as the winter brings to the farmers. With the thermometer held at a growing temperature the insect pests can multiply all year unless artificial means are used to control or exterminate them. A wide range of plants is often grown under one roof and an insecticide, which will give results on one plant, will ruin the foliage on others. I am hoping to be able to give the florists and greenhouse men more assistance along these lines and have plans under way to assign a man to this work this winter. We have rendered much valuable assistance to the florists but I would

like to standardize some of the methods so that the growers would be able to apply remedies before pests became numerous enough to do serious damage.

I am often asked if insect damage is greater now than thirty or forty years ago. It is a difficult question to answer, but I believe that with our present knowledge and methods of control the insect pests do relatively less damage. The farmers and growers now recognize that much of the insect damage is preventable and are accepting any practical control which is presented to them. I hope the Division of Entomology will be able to render greater assistance now than it has under the old office.

THE DIVISION OF FORESTRY.

CHAS. C. DEAM.

The popular definition of forestry is the work of growing forest trees; their sale and conversion into lumber. This conception of forestry is the one, for the greater part, that is practiced in the United States. Foresters, however, see a wide difference between the growing of a tree and its utilization, and suggest a more restricted definition of the term. They prefer something like this: "Forestry is the work of growing the *greatest amount* of the most *valuable* timber in the *shortest* time at the *least expense*." The forester grows the forest; the axman and millman destroy it, diverging operations.

In the five minutes allotted to me to discuss this subject, I must assume that you are already acquainted with the present work of the Division of Forestry, and I will call your attention to the possibilities of the forestry of the future.

The achievements of the *future* must not be measured by those of the past. The present high price of lumber is arousing the people from their apathetic state of mind, induced by being surrounded on all sides by forests for centuries. The lumberman years ago appreciated the shortage of timber when he was compelled to go to other States for a supply. The consumer who is just behind the lumberman is now beginning to feel the pinch, and is asking, "will the present high price of lumber continue, diminish or increase?". I answer, "they will increase unless active measures are adopted to provide a future timber supply." How is this to be done? First, set aside enough timber land to insure a future supply of timber. In doing this it is best to err on the side of having too much rather than too little.

A study of the social and economic conditions of the land owners of the State, which considers the geographical location of the State, the fertility of our soil, the small size of our farms, the improvement and high price of our land, our railroad facilities, etc., shows that little can be expected from private forestry, and that our future timber supply must come from State owned forests.

The latest statistics credit Indiana with about two million acres of good

timberland. The annual cut in the State far exceeds the growth. Yet, with this excessive cutting, our present forests furnish only 30% of the timber we consume. It is extremely conservative to place the number of acres of timberland we should have at a million acres. How many acres of timberland does the State now own? Only 2,000 acres. When the State buys 998,000 acres more, we can feel reasonably secure as to our future supply of timber.

Our forests must be placed under scientific management. Our empirical knowledge of forest management must give way to such work as is being done on the Clark County State Forest. Here a study is being made on about 175 acres which is divided into about 75 plots on which have been planted and are growing 24 species of native trees. This study consists of making and recording observations on the species in the several plots to throw light upon some of the following problems: Why do not forest trees bear seed every year? Why are the seed more viable some years than others? The best time of year to gather the seed? How to handle and store them? When to plant the seed? How deep to plant them? What protection the seed and seedlings should have in the nursery? The size of the seedling to be planted? The best time of year to plant? The spacing required by each species? What cultivation, if any, the young trees should receive? The control of insects and diseases. Now these problems with others, must be worked out for each species separately, and on different sites, before the forester's definition of forestry can be fulfilled.

The facts of plant physiology, those of physical and colloidal chemistry and other sciences, must be used to penetrate the unknown of plant behavior and response. The recent discovery and application of the laws of heredity offer a great opportunity to the forester. By breeding we have seen how quality and quantity have been greatly increased in both plants and animals, and it is reasonable to presume that in time, the forester will be able to double the growth rate of trees and greatly improve the quality of the wood. The nuts of the hickory and walnut will be improved as much as those of the pecan.

It is believed that the cry of the people for relief from a timber famine will be heard. The response will come from a Legislature that will know no politics; heed no preferences or prejudices; and will generously provide for State forests and their scientific management.

THE DIVISION OF LANDS AND WATERS.

CHAS. G. SAUERS.

Recreation is necessary to the stability and physical welfare of the community. The Lands and Waters Division is seeking to furnish recreation to a large share of the Hoosier public through the establishment of State Parks. Two are now maintained—Turkey Run in Parke County and McCormick's Creek Canyon in Owen County. There were 33,500 visitors to Turkey Run during the past season. Accessibility has been a great problem.

The auto now permits use of sites which a decade ago would have been inaccessible backwoods retreats. Our ideal is a chain of state parks, depicting the great natural beauty and physical features of the state, connected by a state parkway. A trip over this road would show virgin tracts of timber, broad open prairies, the Ohio valley, the magnificent beech woods of Southern Indiana, the lakes of the north and the great mining and quarrying districts—a gallery wherein are displayed the natural resources and beauties of Hoosierdom.

The Division of Lands and Waters is charged with investigation of cases of stream pollution. Our rapid industrial development has greatly increased the pollution by industrial waste, until the situation has become acute in many localities. The question is entirely economic and requires earnest co-operation between public, state and commercial interests. A campaign of relentless prosecution cannot succeed. It is the policy of the department to seek out cases of pollution and work with the offender to remedy the situation. Of course where reciprocity is lacking, the offender is prosecuted. The whole problem is very complex and requires the combined work of biologists, chemists, and engineers. The Department of Conservation is the logical clearing house for pollution matters, for developing co-operation among industries concerned, so the findings of the scientists may be made available. Much waste material may be reclaimed in profitable by-products; in some cases the disposal means increased cost in production of the original article, in any case the value of any waste product is its commercial value, when properly recovered, plus the amount of loss it occasions when unrecovered.

An almost untouched field is the regulation of the removal of sand, gravel, coal and marl from lake and stream beds. The drainage situation in the north must have exhaustive study.

The Division is an infant with enormous possibilities for growth. The duties bestowed upon it by the conservation law are numerous and far reaching. Our ideal is the establishment of a system of state parks—"public estates", where money spent in development will be profitably invested but where the chief return is in pleasure, happiness, and vitality, the value of which it is impossible to estimate; streams, which are clean and wholesome and abound in fish for the angler, furnish beauty to the tourist and healthful water to the cities; streams and lakes which have not given up their beauty and utility needlessly to the dredge: in brief the control of the lands and waters of the state to the end that they may serve their most desirable, useful and economical purpose with the greatest possible profit and pleasure to Hoosiers.

DIVISION OF FISH AND GAME.

GEORGE N. MANNFELD.

History and observation compel us to believe that conservation is more professed than practiced; that much that assumes the name and passes as

such, is utterly spurious. Yet it is true that the doctrine of conservation, which seeks public good, is in obedience to the laws of nature, and a real and active virtue.

There can be no doubt that certain men are endowed with a sort of inherent instinct which leads them to hunting and fishing. There is nothing so satisfying and alluring to them as a day in the open. I think it may be safely said that the true hunter and fisherman is born, not made. I believe, too, that those who by instinct and birthright belong to the sporting fraternity are actuated by a genuine spirit of conservation. They are neither cruel, nor greedy and wasteful of the game and fish they pursue, and I am convinced that there can be no better conservators and protectors of game and fish, than those who are most enthusiastic in their pursuit. For it is they who restrain and regulate themselves, showing thereby fairness and generosity which is felt and recognized only by a true sportsman.

To the Indians and especially to the pioneers the word conservation had but little meaning. Our resources were used by them only to satisfy their needs. There was such an abundance that little thought was given to hunting and fishing for pleasure, or to cutting away the forests for profit. It was largely a matter of necessity with them.

All this has changed, and we now consider these natural resources from an entirely different angle. This means that a radical change has taken place since the days of the pioneers. Fishing and hunting as an occupation is a thing of the past. The trapping of fur-bearing animals, once a very profitable business, now will require strict regulation.

The disappearance of wild life in Indiana can be attributed to many things. However, they can all be traced back to the main cause, which is man himself. Nature in lavish fashion originally provided things so orderly that each particle of vegetable, mineral and animal life was put in its proper place. Man was only a minute thing in the grand whole, but, by his superior powers he has put himself in a dominating position. He has, in fact, made himself the possessor of all other things. This has come about through a slow process of evolution. There was a time when man was in the minority. All around him was an army plotting and waiting for a chance to attack and annihilate him. His enemies were all about him. They were the powers that ruled, but in time they were checked and man, assisted by his allies, the birds, became the conqueror. Today, he regards with disdain the army which is an enemy, and is prone to forget his true friends, the useful insectivorous birds. Being endowed with superior intelligence, he has been able to secure control over all the lower forms of animal life. This does not mean that his position is secure, but rather how strong his enemies may become, and how wisely he is holding his alliance with his feathered friends.

It is but natural that we should partake freely of the supplies of nature. That is what they are here for, but beyond satisfying our real needs, we have no right to destroy them to gratify our passions. For, should that be so, it would lead to the conclusion that one generation has the right to exterminate living creatures and deprive all future generations of their

share of them. The remnant of wild life that is handed down to us, is a heritage. It should be used economically to supply our needs only, and then be passed on to our descendants. We have inherited a treasure, and it is a responsibility we have to see that others are left that heritage.

If the natural law was strictly observed, the balance in nature would remain fairly even. Upsetting the balance has resulted in a great need for conservation. Thus it can be seen that the enactment of protective laws was necessary, and their enforcement absolutely imperative now.

Wild life depends on forests for shelter and food, but mankind has taken them over for profit. Whole forests have been destroyed merely to gratify a desire for wealth. Little thought has been given to the consequences. Thus has wild life been destroyed and driven away.

In like fashion what has been done with our streams? Water is one of our primary natural resources and absolutely necessary for our existence. Instead of safe-guarding it for our own use and that of generations to come, we are daily polluting it and making of our streams dumping grounds for filth. Thus have the waters of our state year by year been made less fit for fish to live in and their number greatly lessened.

One of the first requisites then is to see that birds, game animals and fish have a home and proper environment to live in; then to see that they have food and are properly protected when they are reproducing themselves. This must be done by strict laws rigidly enforced. In proceeding with the work of game and fish conservation, the co-operation of every good citizen is needed. Public opinion must be molded in favor of game and fish laws. The public press here becomes of great importance.

Laws are but the crystallized expression of public opinion. If public opinion is opposed to a law, merely putting it on the statute books will not produce any results. It is necessary to create and foster an enlightened public opinion. When that is accomplished game and fish laws become more easy and effective of enforcement.

What is needed therefore, is a campaign of education. The public as a general rule is not informed as to game laws and the reason for their enforcement. As a wise man said, "He who knoweth the law, and knoweth not the reason of the law, knoweth not the law, for the reason of the law is the life of the law." If this be true, it follows that to teach the public the reason of a law is the first requisite. Game and fish propagation serve as an aid toward increasing wild life in the state, but the greatest good it accomplishes is in educating the public.

Fish hatcheries and game farms bring to public notice the life history and habits of fish and game in their wild state, which could not be imparted in any other way. A visit to a fish hatchery while the fish are spawning, convinces one that they should be protected when spawning in the lakes and streams. Such a visit has converted many a violator who formerly killed fish while on their nests.

The foregoing leads to the conclusion that:

1. Birds are of value to the people as insect, rodent and weed seed

destroyers; that they aid our vegetable and other crop producers, and assist in preserving our fast diminishing forests.

2. That game and fish are valuable as a food asset.

3. That hunting and fishing are an incentive and inducement to outdoor life, whereby man may recuperate his powers and renew his health.

4. That game and fish are valuable in an economic and financial way, because of the tourists' and sportsmen's travel attracted thereby.

These in themselves are well worth any effort that we put forth to conserve the supply of fish, game and birds of the State.

CONCLUDING REMARKS.

RICHARD LIEBER.

The Department of Conservation has for its object the business-like management of the people's interest and share in Nature's gifts. Reduced to its primitive principles, the basis of the wealth of a people consists in the relative fertility and productiveness of the land it inhabits. Water, air, soil, its richness in mineral and its fruitfulness determine the possibilities of national wealth, while cultivation, propagation and conservation are the forces at work which will guarantee the greatest possible return from Nature's bounty. To obtain this desirable end, sundry state offices were created in the past, which led a disconnected existence. As political offices they may have worked satisfactorily. As public offices, with the best of intentions on the part of able and industrious office holders, they have been failures or near failures.

Besides that, these offices were created at different times and in no way coordinated with the business of the State at large. That much overworked word "reconstruction" nevertheless found a correct use when applied to the realignment of all of those offices which have to do with the conservation of natural resources of our State, for the most backward in national economies is being driven to admit that public offices must serve as agencies to advance the interests of the human society, and their activities, therefore, must not only be efficient in their particular line, but must also be kept up to the modern standard of keen business administration.

Order is the first requisite of successful business: Order and co-ordination. In a private business the various branches are all co-ordinated. There is a system whereby the most infinitesimal detail is within immediate reach of the head of the institution. A private business would never dream of establishing a branch and then leave it to its own devices until inventory time, as the State does. In State affairs we have noticed that whenever a new demand was made on the state's administrative force, a new office or a new commission had to be added which, while in semi-touch with the administration, was entirely incapable of aligning itself with the balance of the state's work performed in the many other Departments, because it was thinking and operating disconnectedly.

Laboring under these conditions the State House has resembled more

an office building where people hardly know their neighbors than a department store or an industrial plant where everybody is fitted into a coordinate place and function.

The Department of Conservation is an attempt on a large scale and I believe a successful one, at coordination. Every one of its branches is depending on and co-operating with the other.

Charles Richard Van Hise tersely says, "The principle of Conservation is not a simple subject which can be treated with reference to a single resource, independently of others; it is an interlocking one. The conservation of one resource is related to that of another. * * * * *

A complete treatment of any part of the subject in all of its ramifications of necessity repeats a portion of the treatment of another part of the subject."

It has been the experience of those states that are in the lead of conservation work—New York, Louisiana and Wisconsin—that no single natural resource can be dealt with separately and independently from the other, and that only consolidation of the work makes real results possible.

The correctness of this theory was proven out in the first six months of our work. Not only did this natural support of one Division by another greatly facilitate work, but it also saved a great deal of time and avoided duplication. It made larger results possible, or, to put it in another way, it got more direct returns out of the moneys appropriated.

Starting with a well defined policy of self-limitation, it nevertheless took the Department some time to get under way because of the difficulty of limiting the scope of work in a well nigh unlimited field. Requests, if not demands for assistance, were naturally made, which, even if the office force had been adequate, would have exhausted our funds in short order. Many of these demands were entirely reasonable and in many instances the people should have had relief where we found it impossible to help owing to lack of personnel and funds.

If ever proof was wanted that the State needed a Department to conserve its natural resources, the large and variegated correspondence in our office containing requests for assistance and advice would furnish it. From topographic survey to petroleum lands; from analyses of clays, soils and minerals to identification of relics; from a lonely elm tree to Sand Dunes; from drainage projects to the use of cat-tail swamps as food producers; from farmers' woodlots to flood control; from kaolin to coal; from the protection of game and fish to that of lake levels; from stream pollution to fish culture; from wheat diseases to sugar supply for beekeepers, and so on without end.

As the Department advances, these demands will increase. The organization is such that it may be indefinitely enlarged and it is left to the wisdom of our lawmakers to make more extended work possible by legislative action. But before a legislature would be willing to appropriate more funds, it must needs have proof of results. Let me cite a few.

The working agreement between the Department of Conservation and In-

diana University whereby a part of the Division of Geology's allotment of funds is paid out for field work during the summer months, gives the State practically eight months laboratory and research work in addition, free of cost. A part of that work is recognized in the report on Indiana Kaolin, Oil-bearing Shales, Limestones, the report on coal under state lands and the Handbook of Geology now in preparation.

By order of the Conservation Commission a log has to be kept and returned to the Office on all new wells drilled for oil and gas. Aside from safeguarding the field in a thorough manner these logs are of very great value in determining the substrata.

The work of the Division has demonstrated the need of a thorough-going soil survey in conjunction with the United States Government. The building stone industry has received valuable assistance through the result of a topographic survey conducted in Lawrence County together with the United States Geological Survey.

The Entomologist's efforts in warding off a Federal quarantine against Indiana wheat and thereby saving the Indiana farmers very considerable sums of money was made possible only by the fact that the Department has been clothed with police powers. Of similar value was the assistance rendered in the fights against the Army Worm and the Chinch bug.

The Tri-State Forestry Conference held in conjunction with the Federal Government and the wood-using industries is a land mark in the development of an effective forest policy.

A new hotel which was much needed has been completed at Turkey Run. Turkey Run, the first State Park to be developed, stands the State approximately \$80,000 which includes individual contributions to the amount of \$40,000. In the past season (May to October inclusive) it has returned in round figures, an income of \$4,500, thus showing that state parks, if needs be, can be made self-supporting.

Reference is made that the Division of Fish and Game distributed within the State approximately 1,500,000 fry and fingerlings.

The results in the Game Warden Service were largely made possible through the readjustment of the work and speak for themselves. As a matter of comparison it is stated that whereas, in the first six months of the fiscal year 171 convictions for violations of the game and fish laws were made which brought to the school fund \$985.00, the second six months returned 542 convictions and \$3,310 to the school fund. Comparing with the preceding fiscal year a saving in salaries and expenses of \$9,515.10 was made and an increase of revenue was had in the amount of \$9,110.98; a total of \$18,626.08. It should be mentioned that this is merely a beginning as the Department lost nearly three months in the necessary reconstruction of the force.

The publication of Dr. Evermann's remarkable Monograph on Lake Maxinkuckee is a work which is expected by the scientific world with keen interest and will widely advertise the natural advantages of Indiana lakes.

A full list of publications is as follows:

"Laws of Indiana Relating to the Natural Resources", 123 pages—compiled by Charles Kettleborough.

"A Digest of the Laws for the Protection of Fish, Game, Birds and Fur-Bearing Animals."—1919-1920, 44 pages.

"Your Part in a United Effort to Protect the Fish, Game and Birds of Indiana."—6 pages, Chas. Biedenwolf.

"The Way and Wherefore of Conservation in Indiana."—1919, 8 pages.

"Train Schedules and Hotel Rates of State Parks." Leaflet.

"Trees of Indiana", 299 pages—Chas. C. Deam.

"Turkey Run State Park, History and Description", 48 pages.

"The Natural Resources of Indiana and Their Utilization", W. N. Logan—Published in guide book of American Chemical, Metallurgical and Mining Institute.

"The Raw Materials of Indiana"—In Chemical and Metallurgical Journal.

"The Occurrence of Coal in Monroe County"—Indiana Academy of Science.

"On the Occurrence of Indianite"—Indiana Academy of Science.

"The High Grade Clays and Kaolins of Indiana."—U. S. Biological Survey.

On Press.

"Indiana Kaolin"—W. N. Logan—50 pages (estimated) Maps, colorprints and halftones.

"Lake Maxinkuckee" a monograph—Barton W. Evermann—1,500 pages (estimated), Maps, colorprints and halftones.

"Proceedings of Tri-State Forestry Conference, 100 pages (estimated).

That, in part, is the work done in the first six months of our official existence.

The importance of conservation, at this time, is only dimly seen. But, as Van Hise remarks: "In a hundred years from now the great political issues will be forgotten, but our times will be noted for the beginning of that movement which is destined to protect our natural wealth and build up a true appreciation of national values and responsibilities."

Up to the beginning of the present century we were all living in a fool's paradise, thinking that we were richer in every way than everybody else in the world, believing that our natural resources in minerals, coal, forests, waters, game and fish were inexhaustible. Our very laws expressed and breathed this spirit. We know now that in visible time we will have reached an end of many of Nature's gifts. The past war, for the first time in modern times, has confronted us with the ugly realization of a universal shortness of food. How then, could laws that were made before we knew what ailed us, before we realized our true condition, before we went through the actual experience, be made applicable and of working efficiency in our present day status?

The natural wealth of the State is the foundation and main-stay of our prosperity. The proper use, propagation and conservation of these riches

are of the utmost importance to all of the people within the State and should be treated comprehensively in an entirely non-partisan, non-political and business-like manner. It is purely and simply a business matter, whether our people will get much or get little out of their own State. That they should get all that is to be had and that the natural wealth of our State may be kept in sustained use is the work of the Department of Conservation.