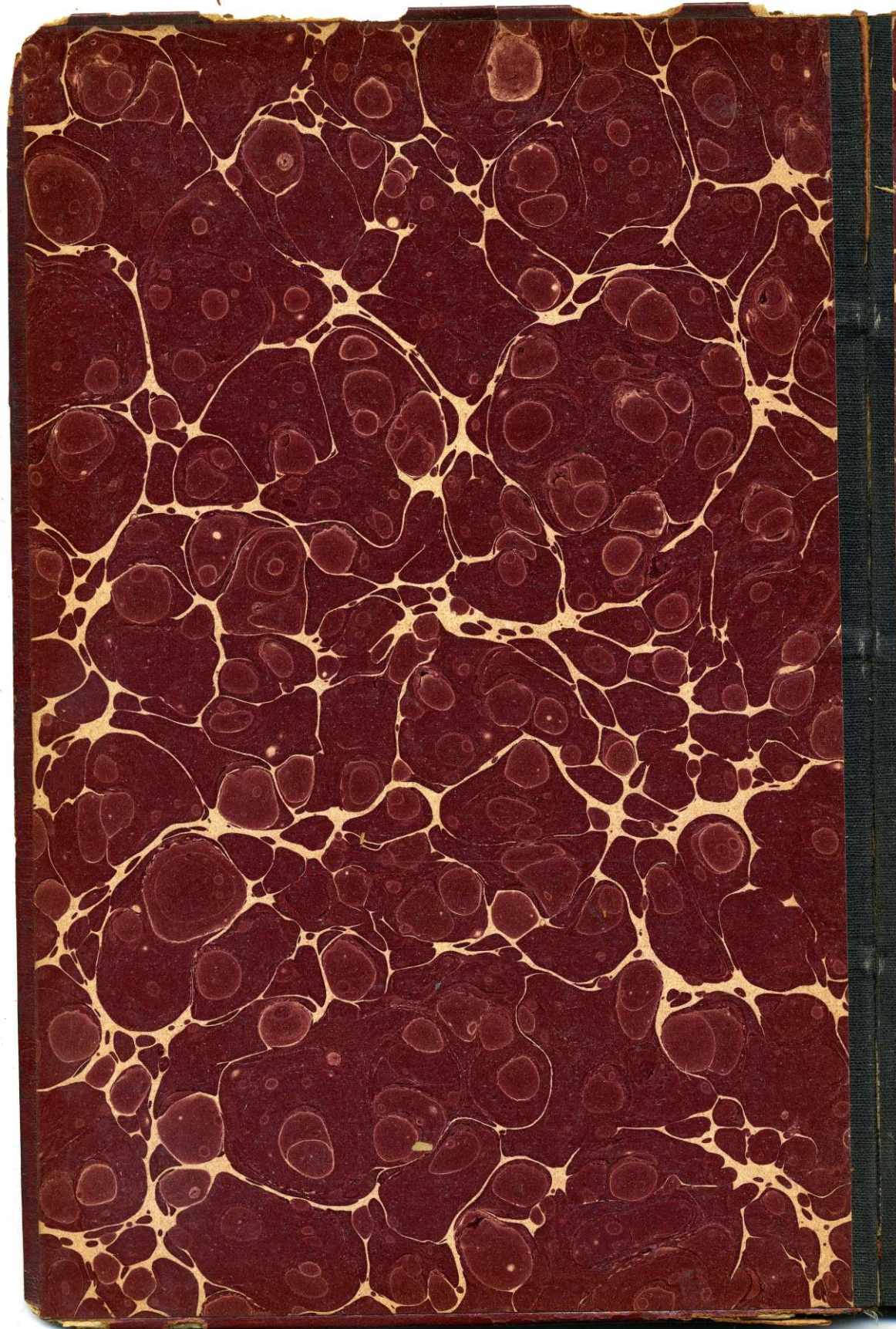
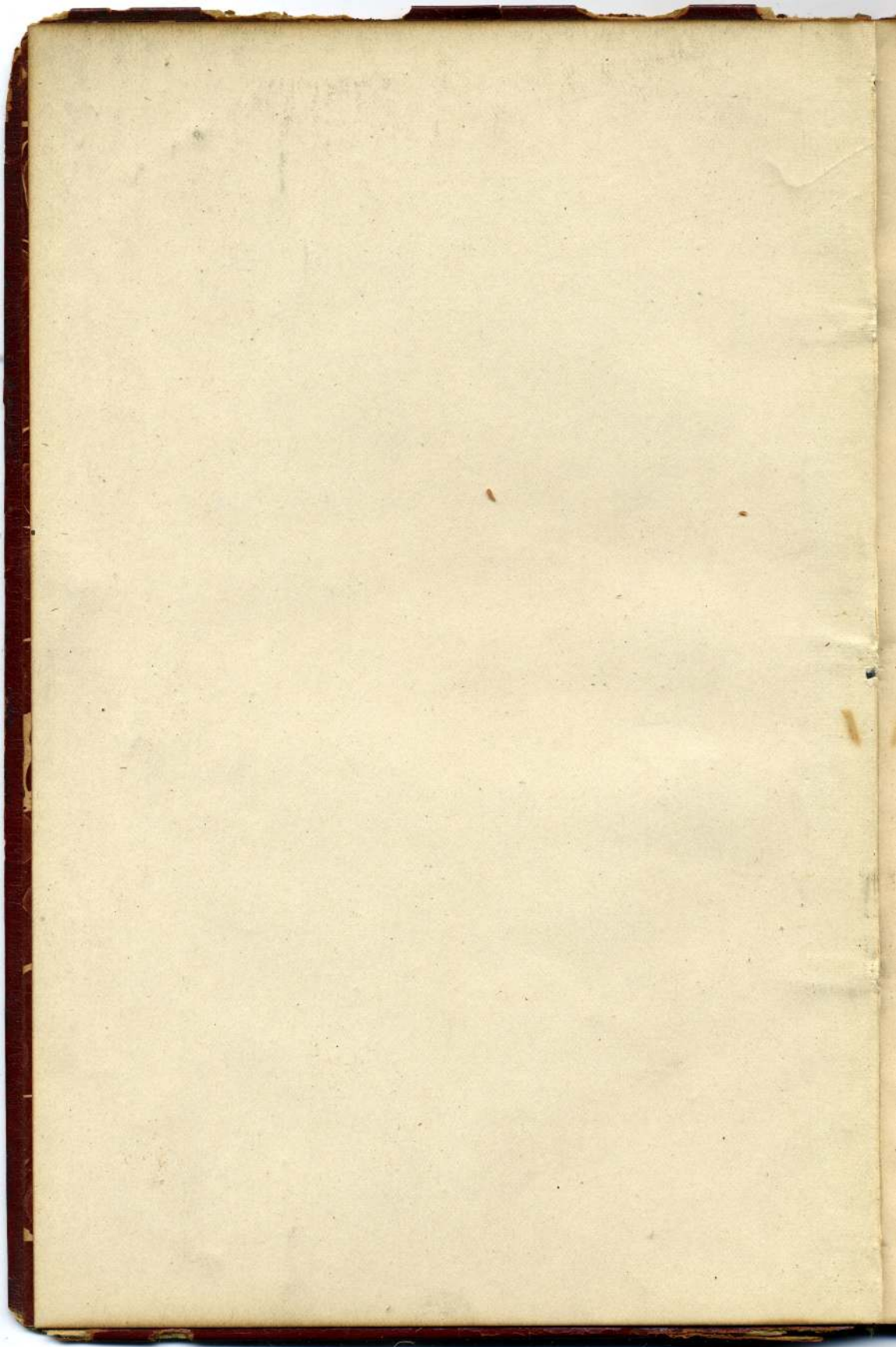
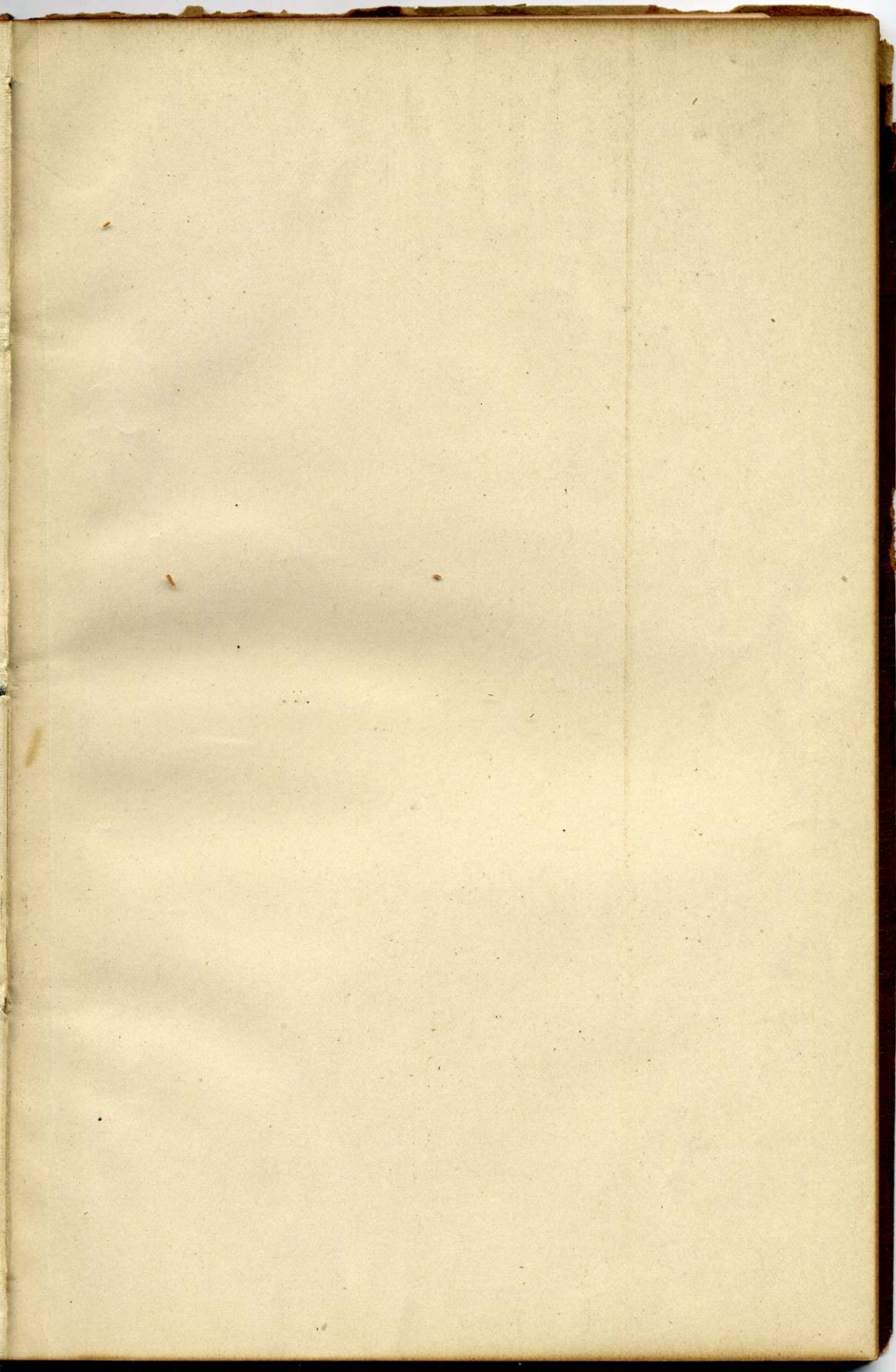


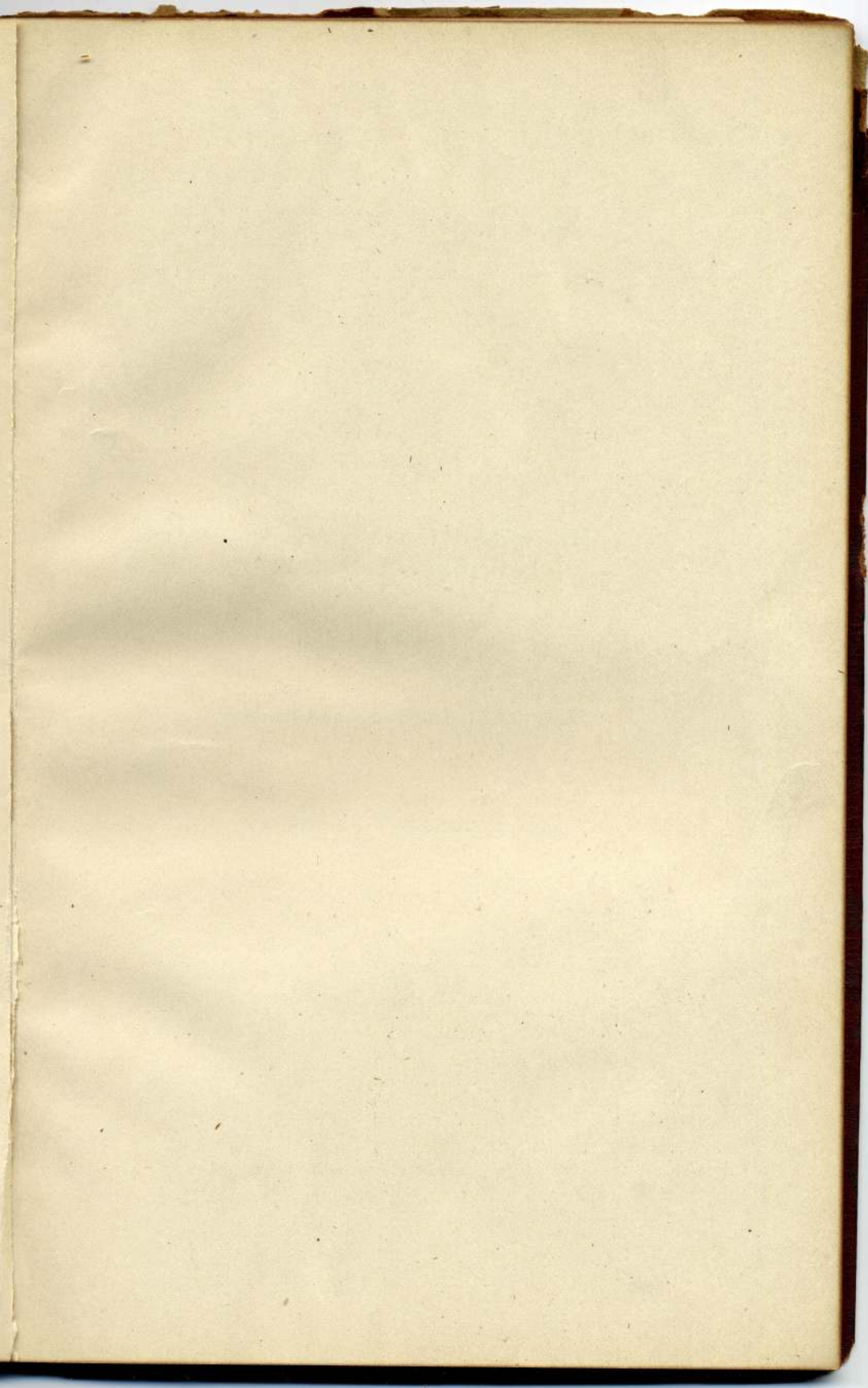
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SPEECHES
DELIVERED BY
HON. GEORGE C. STURGISS
OF WEST VIRGINIA
IN THE
HOUSE OF REPRESENTATIVES
FEBRUARY 3, 11, 16, 26
MARCH 1, 1909









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THE FOREST SERVICE

SPEECH

OF

HON. GEORGE C. STURGISS
OF WEST VIRGINIA

IN THE

HOUSE OF REPRESENTATIVES

WEDNESDAY, FEBRUARY 3, 1909



WASHINGTON
1909

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THE UNITED STATES

BRANCH

W. GEORGE C. STUBBS
OF WEST VIRGINIA

1871

OFFICE OF THE SECRETARY

DEPARTMENT OF THE INTERIOR

WASHINGTON

SPEECH
OF
HON. GEORGE C. STURGISS.

The House being in Committee of the Whole House on the state of the Union, and having under consideration the bill (H. R. 27053) making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1910—

Mr. STURGISS said:

Mr. CHAIRMAN: I desire to consider the bill under consideration from a business standpoint. Every enterprise must be judged by the amounts of its receipts and expenditures to ascertain whether it is a business success. I desire to submit some facts and figures relating to the Bureau of Forest Service, which are drawn from official sources, and which are so striking that they must command the attention and confidence of the House.

EXPENDITURES AND RETURNS—SUMMARY.

Since it took charge of the national forests in 1905, the total expenditures of the Forest Service for the fiscal years 1905, 1906, 1907, and 1908 have been, in round numbers, \$7,250,000. By classes, these expenditures have been approximately as follows:

General administration of the Forest Service.....	\$500,000
Use, maintenance, and protection of the national forests....	4,900,000
Permanent improvements on national forests.....	675,000
Studies.....	1,175,000
Total.....	7,250,000

Under general administration of the Forest Service is included the salaries and expenses of its administrative officers in Washington, and of its general inspectors. It will be observed that the total charge for administration is less than 10 per cent of the total expenditure for the period specified. This compares very favorably with the proportion between the expenditure for general administration and operating expenses in large business enterprises comparable with the Forest Service.

Under use, maintenance, and protection of the national forests is included the salaries, station, field and traveling expenses of the executive and protective force upon the national forests, the rent of supervisors' headquarters, and the purchase of the necessary equipment and supplies.

Under permanent improvements on national forests is included the construction and repair of roads, trails, telephone lines, fire lines, bridges, fences, rangers' cabins and barns, and other permanent improvements needed to safeguard the national forests from fire and to develop their fullest possible use by the people.

Under studies is included investigations of forest conditions and needs upon the national forests, required to promote the use and protection of these forests; and the work of the Forest Service independently and in cooperation with States and private owners, aimed at bringing about a more conservative use of forests not in federal ownership, and of forest products.

EXPENDITURES AND RETURNS.

I. ON NATIONAL FORESTS.

Since the Forest Service took charge of the national forests in 1905 it has expended upon them in the fiscal years 1905, 1906, 1907, and 1908, for their protection and for the handling of current business, \$4,900,000. The receipts from the national forests from all sources, for the same period, have been about \$4,200,000. The net cost of the national forests to the Federal Government during this period has been \$700,000. The amount expended in this period for the construction of roads, trails, and other permanent improvements is \$675,000.

The States in which the national forests lie have since 1905 received \$675,606 of the receipts from national forests, for the maintenance of schools and roads.

When the Forest Service took charge of the national forests on February 1, 1905, their total area was 63,027,884 acres. Their total area is now 168,681,039 acres, or over two and one-half times as much. The protective force was utterly inadequate in number and low in efficiency. Practically nothing had been done to promote the use and protection of the national forests by the construction of roads, trails, telephone lines, and other improvements, and the benefits of these forests to the people were very slight. Before the service took charge of them, the national forests constituted a resource whose usefulness had been little developed, and whose safety was seriously endangered by lack of effective administration on the ground.

At a money cost of \$700,000 to the Federal Government, the Forest Service has accomplished these things upon national forests. It has increased their value, their usefulness, and their safety from fire by the construction of 708 miles of roads, 9,421 miles of trails, 3,400 miles of telephone lines, 50 miles of fire lines, over 400 cabins for its rangers, and 644 miles of fence. It has planted 2,500,000 trees, and it has 9,000,000 more in its nurseries as stock for future planting. It has issued 87,219 grazing permits, under which 4,289,203 horses and cattle and 21,216,381 sheep and goats have been grazed. It has made 8,663 timber sales, and it has granted 66,182 permits for the free use of timber for domestic purposes by settlers. More than half of the 5,923 permits issued for the conservative use of lands for special purposes of various kinds have been given free of cost to those who benefit by them. Applications for agricultural settlements to the number of 2,514 have been approved, which has opened 295,000 acres to farming. The total number of permits of all kinds issued for the use of the national forests is close upon 200,000. The total amount invested by the Forest Service in permanent improvements on the national forests is \$675,259, or nearly twice the net cost of administering these forests for four years.

Through the administration of grazing on national forests by the Forest Service range wars within them have absolutely ceased. The investment of productive capital in national forests by the people of the West in power plants, sawmills, transmission lines, railways, and other improvements has increased by many millions of dollars, giving added employment to labor and added industrial development to the regions in which the national forests are situated. The use of the national forests by the people has multiplied many times in every respect; but the use of the national forests by the small owners has increased in proportion to its use by the large owner in the relation of 10 to 1.

In 1902, under the administration of the national forests by the General Land Office, an average of $5\frac{1}{2}$ acres to every 1,000 acres were burned over. In 1907, under the administration of the Forest Service, less than 1 acre per 1,000 acres burned over. In 1908 the Forest Service saved, compared with the forest-fire damage on a similar area of private forest lands, \$34,000,000 worth of timber in national forests by its fire patrol.

These facts show that the total net cost of administering the national forests is utterly insignificant compared with the results attained in the increased usefulness of the national forests to the people and in the actual value of the national forests themselves, through their development by the construction of permanent improvements, through the improved condition of the forest and the range, and through added safety from damage by fire.

The national forests should not only be so handled as to prove of permanent and increasing public benefit, but that they should pay all costs of their maintenance. If the Forest Service is permitted to pursue its avowed policy with reference to national forests and is given the funds urgently needed for its work, it will not only attain but it will much surpass, this result.

But it is necessary to face the fact squarely that the appropriations hitherto made for the national forests are barely sufficient to provide for their protection alone. They do not make provision for the proper handling of current business, and they entirely fail to take into account that this business is increasing. Last year so great were the demands upon the time of the forest rangers to handle the business of the people upon national forests that only about one-fifth of their time could be devoted to fire patrol.

The force upon national forests, never adequate for fire patrol alone, not only has to protect the forests but to handle a business which, in the aggregate, has increased several times faster than the force available. In the year 1908 the business of the national forests, as shown by the actual number of permits granted, was about five times the business transacted in 1905. But the force which handled this business in 1908 was less than two and one-half times the force which handled one-fifth as much business in 1905. Not only the business but the area which each forest officer must cover has increased, until now the average area in charge of a ranger is about 125,000 acres, or nearly 200 square miles. To handle grazing, timber sales, and

other uses of various kinds on an area of this size in rough mountain country, and also to protect it from forest fire, is much more than one man can do effectively. Not to increase the force means inevitably to increase the already excessive burden upon the ranger, because the demands upon him by the people who wish to use the national forests are steadily growing larger.

Should the funds needed by the Forest Service to protect the national forests and to supervise their legitimate use not be made available, this service faces these alternatives: To reduce a forest-fire patrol, already insufficient, to the point of grave danger; or to limit the growing use of the national forests by the people. Under such circumstances, the proper course for the Forest Service to pursue would be to limit the use, rather than to endanger the forests themselves. This would necessarily mean that much timber which is ripe for the ax and for use by the people could not be sold; that grazing would have to be limited correspondingly; and that in other important respects the forests, beyond the point to which they could be safely guarded by the funds available, would have to be locked up against use by the people.

EXPENDITURES AND RETURNS.

2. IN FOREST STUDIES.

Since the Forest Service took charge of the national forests in 1905, it has expended \$1,175,000 in studies to bring about a more conservative use of forest products and of forests in private and state ownership.

In considering the need for the continuance and extension of this work, a brief summary of how this Nation stands with relation to the forests is of value.

Four-fifths of the forests of the United States are in private hands. From these forests the timber supply of the future must mainly come. At present less than 1 per cent of the forests privately owned are logged conservatively or adequately protected from fire.

The growth of timber in all the forests of the United States approximates 7,000,000,000 cubic feet per year. But this Nation is using 23,000,000,000 cubic feet of timber per year, or nearly three times as much as all our forests produce.

Since 1870, forest fires have annually cost an average of 50 lives and not less than \$50,000,000 worth of timber. They have burned over at least 50,000,000 acres of forest each year. Through destructive logging, one-fourth of the timber which might be utilized is wasted. The waste in the mill is from one-third to two-thirds of the lumber sawed. These wastes combined mean that for each 1,000 feet of timber which stood in the forest, about 320 feet, or less than one-third, is actually used. The remaining two-thirds are wasted.

We can not count upon other countries to supply our need when our own forests are gone. The condition of the world supply of timber makes us already practically dependent upon what we produce. We send wood out of our country and we bring it in, but we export one and one-half times as much as we import. From this time on we must grow our own wood supply or we must do without.

These central facts have recently been compiled by the National Conservation Commission. They are not hysterical state-

ments based on guesswork, but conservative estimates, backed by reliable data. It is much more probable that they understate than that they overstate the actual condition.

These facts mean that we must act vigorously if our forests are to be preserved. Even the most vigorous action will not prevent grave timber scarcity, which our waste of the forest has made inevitable. But if we fail to act, we shall face not merely timber scarcity, but timber famine.

Realizing these facts, the Forest Service has felt that its duty to promote the conservative use of forests not in federal hands, as well as all economy practicable in the use of forest products, is no less urgent than its duty to rightly administer the national forests. To this end the Forest Service is doing all it can with the funds available to teach American citizens how to practice forestry. It has carried forward a national campaign of education in forestry by spreading broadcast the useful knowledge obtained by its forest studies, in actual cooperation with States as well as with the individual forest owner and user in the handling of his timber tract, his wood lot, his forest plantation, and his timber-treating plant.

The results of this work, so far as they can actually be measured in dollars, are worth to this Nation many times the amount expended in obtaining them. But an even greater accomplishment is the awakening of the American people to their national and individual need for forest conservation. We are still far behind all other great nations in our treatment of the forest. But no nation possesses a more wholesome public sentiment upon which to build a structure of forest conservation which will endure than does our own.

In the period and for the expenditure specified, the Forest Service has, in cooperation with private owners, made detailed working plans for the conservative handling of nearly 6,000,000 acres of private forest land. It has prepared 114 planting plans for settlers and small farmers, especially in the Middle West. Through its timber tests, which are now accepted by engineers, architects, and builders as the standard timber tests in the United States, it has promoted economy in the use of structural timbers and greatly increased the range of species used for this purpose, thereby decreasing the drain upon our forests. Chiefly as the result of educational work done by the Forest Service as to creosoting and other useful methods of wood preservation about 60 timber-treating plants are now in successful operation in the United States, which turn out 1,250,000,000 feet of treated timber annually. The increased life given to timber in use through preservative treatment would mean, if all timber which could profitably be treated were treated, an annual saving of about \$72,000,000 a year. The Forest Service answers about 140 inquiries a week for practical advice in timber preservation alone.

Through its studies of wood utilization the Forest Service is pointing out practical economies in the sawmill, in the factory, and in the use of timber itself, which have had a material effect in reducing these great forms of waste.

These are a few examples only of the direct results from the studies conducted by the Forest Service. The range of its usefulness in answering requests for advice regarding the best use

of forests and forest products in every field is indicated by the fact that these requests average 100 a day.

Since 1905 the Forest Service has distributed over seven and one-half million publications containing useful information in the field of practical forestry.

In its work with States the Forest Service has put into actual effect the principle of cooperation between State and Nation, upon which the effective solution of our national forest problem directly depends. It has completed cooperative studies with 13 States, and cooperation with as many more is either in operation or directly pending.

The results of this state cooperative work have been far-reaching. The admirable forest law of California is the direct result of a study of state forest conditions made by the Forest Service, one-half the cost of which was borne by the service and half by California.

Through a study made by the Forest Service, Alabama has enacted advanced conservative forest legislation.

Illinois has profited greatly through the information furnished by the Forest Service on the care of the wood lot and on forest planting.

The service has for two years been making a state forest study in cooperation with Kentucky. The result will be to improve logging methods, bring about more accurate knowledge as to timber values, and lead the farmers and other owners of timber land to take better care of their holdings.

In Michigan an examination of a portion of the State has been made, particular attention being paid to forest fires. This has led to important pending state legislation in regard to the control and prevention of forest fires.

In Delaware a study of forest conditions was made with special reference to the advisability of growing loblolly pine.

In Maine and Florida forest fires were studied, with a view to shaping legislation for their control. These studies have already borne fruit in better legislation.

In Maryland five counties were studied, and the facts ascertained in these counties led to the appointment of a state forester and to much better care of forests within the State.

In Mississippi a cooperative study was made of cut-over long-leaf pine lands. This resulted in the gathering of much useful information and called to the attention of the state legislature the need for forest legislation along various lines.

In Missouri a detailed study of forest conditions in the Ozarks awakened a keen interest in forestry in the State, which promises splendid results.

In New Hampshire two studies have been made, one of forest conditions, the other of forest taxation, which have had admirable results.

A bill is pending in the West Virginia legislature providing for a study of its forests by the State and the Forest Service.

Forest conditions in Wisconsin have been studied by the service, with the result that a state forester has been appointed, and Wisconsin stands now probably at the head of States in the care of its forests.

To sum up, the studies made by the Forest Service, both independently and in cooperation with States and with individuals, and the wide distribution of their results, have been and are

the prevailing influence in the United States for the better use of the forest and its products. Of the two great tasks before the service—the administration of the national forests and popular education in forestry—the one is quite as important as the other. It is no less necessary to the future of our forests that right use of the four-fifths of them which are in private hands be encouraged than of the one-fifth which is in the hands of the Government.

TIMBER SALES.

The receipts last year from the sale of timber on national forests were about \$850,000. Had the Forest Service sold all the timber it was asked to sell, it would have sold about ten times as much. Had it made these sales, the receipts from them alone would have covered the total expenditure of the Forest Service for the year and put a net balance of over \$5,000,000 into the United States Treasury.

It costs the Forest Service from 20 to 30 cents per thousand feet of timber sold to mark the trees to be cut, to supervise the logging, and to burn the brush as a precaution against fire. This expenditure is necessary to insure clean work in the woods and the production of a good second crop.

The reason why the service did not sell more timber last year, and thereby much more than pay back the total cost of all its work, is that it did not have the money needed to safeguard the forest in logging. The Forest Service therefore confined its timber sales strictly to the number which it could handle properly with the funds available. It would have been very easy for the Forest Service, at the expense of the national forests with whose welfare it is intrusted, to have shown a large credit balance at the expense of the forests themselves. This it has declined to do.

During the past year the Forest Service gave timber to settlers in small quantities for domestic use to the total value of \$169,000. This is in pursuance of the policy of the service to give all aid practicable to the small man within and near the national forests who is trying to establish a home. This free use of timber by settlers involves certain necessary expenses in supervision by the Forest Service, from which, of course, there is no direct return.

The national forests contain over 400,000,000,000 feet of timber, which is one-fifth of all timber standing in the United States. They contain, also, vast quantities of wood suitable for posts, poles, and fuel. Handled on a strictly commercial basis, the timber alone in the national forests could be made an important source of money revenue to the Government. Handled as the Forest Service is handling them, with a view to reasonable money returns, but also with a view to making them of direct public benefit in the development of the West, the national forests will easily pay back all costs of their administration and protection. Thus far the Forest Service has not been given an opportunity to make the national forests pay their costs, because the funds provided have never been sufficient for the adequate protection of the national forests. And the Forest Service has steadily refused, and rightly so, to devote money needed for fire patrol to increasing current business at great risk to the safety of the national forests themselves.

FOREST FIRES.

For the last thirty years forest fires have destroyed annually in the United States an average of 50 lives and \$50,000,000 worth of timber. The area burned over each year has averaged not less than 50,000,000 acres.

For the last year, the most calamitous year as to forest fires that this country has known for a decade, the total damage by forest fires in the United States has been conservatively estimated at not less than \$100,000,000.

Through its fire patrol on national forests the Forest Service saved last year, compared with the actual fire damage on private forest lands of similar area, over \$34,000,000, or enough to pay all the expenditures of the service, at last year's rate, for about ten years.

The force employed upon fire patrol through which the above result was obtained was equivalent to one man to each 500,000 acres, an area half the size of the State of Delaware. The public expenditure was about one-third of a cent per acre. The result was the protection of timber worth seldom less than \$75 per acre, and frequently as high as \$100 and even \$200 per acre. This is fire insurance at an average rate of one three-hundredths of 1 per cent.

The national forests contain one-fifth of the standing timber and one-fifth of the forest area of the United States. In West Virginia, whose forests comprise one-sixteenth of the area of the national forests, the damage by fire was five times as great; in Wisconsin, whose forests comprise one-fourth of the area of the national forests, the damage by fire was nine times as great; in the Adirondack region of New York, whose area is about one one-hundredth of the national forests, the damage by fire was equally great.

The expenditure for fire patrol per acre on national forests is far below the amount actually expended by the lumbermen associated together for fire protection in the States of Washington and of Idaho. The Washington Forest Fire Association, organized by private owners of timber land to protect their holdings from fire, has a membership of 138, and comprises a total acreage of nearly 3,000,000 acres. This association expended 1 cent per acre in the protection of the forests of its members from fire in 1908, or three times as much as the Government expended in the protection of the property of the people in national forests.

The national forests, with the safeguarding of which the Forest Service is charged, are worth about \$2,000,000,000, which is more than the total value of the equipment of the army and navy combined.

The commercial timber alone in national forests is worth \$1,000,000,000, or equivalent in value to seven such fleets as the one which has just carried the American flag around the world. The preservation of this vast natural resource is no less essential to our national prosperity and industry than is the fleet to the maintenance of our independence as a nation.

The force upon national forests is called upon to protect the forests from fire and to handle at the same time a rapidly increasing business with the people. One hundred thousand per-

sons used the national forests under permit last year. In the not far distant future this number should be increased to one million. It is unjust and unwise to require the Forest Service to give adequate protection to the national forests for one-third the amount which private owners are expending in the protection of their timber lands and at the same time to extend and to expect this force to handle a business already vast and rapidly growing.

The fire-patrol force has been inadequate for safety since the beginning through lack of funds. Congress has assumed that the increased appropriation asked by the Forest Service is due only to increasing business. It is due mainly to the desire of this service to effectively safeguard the national forests from fire.

Unless the force on national forests is greatly increased—and that necessarily carries with it an increase in appropriation—the Forest Service must do one of these two things—turn away national forest business or reduce a fire patrol already insufficient. This is an urgent and immediate condition, not a theory. [Applause.]

GRAZING.

The regulation by the Forest Service of grazing upon ranges within the national forests has in three years reduced the waste of forage at least 30 per cent. This means that the number of sheep and cattle fed upon these ranges is increasing in proportion.

Through the control of these ranges by the Forest Service steers grazed in many of the national forests last year weighed from 50 to 100 pounds more than steers grazed on outside ranges, and brought from \$5 to \$10 per head more on the open market. The same is true of lambs and sheep. The natural increase in calves and lambs from stock ranged on national forests is from 10 to 20 per cent larger than from stock ranged outside national forests.

During the past year the killing of mountain lions, wolves, and other predatory animals within national forests by hunters employed by the Forest Service has saved the stockmen from losses, which, on the basis of actual past experience, would have considerably exceeded the amount paid by these stockmen in grazing fees.

The grazing fees charged on national forests are from 30 to 35 cents per head for cattle, and from 10 to 12 cents per head for sheep, for the entire year. These charges are far below those paid for similar grazing privileges outside the national forests. For example, on Indian reservations in Arizona and New Mexico a fee of \$1 per head for cattle and 25 cents per head for sheep is paid, or two or three times as much as the fees on national forests.

Large tracts of grazing lands in southern Colorado owned by the Ben Butler estate are leased at a rate equivalent to from \$1.25 to \$1.75 per head for cattle, or from three to over four times the rate charged on adjoining national forests. Lands owned by the Southern Pacific Railway Company within the boundaries of the Tahoe National Forest are leased for grazing at a rate equivalent to about 25 cents per head for sheep, or

nearly four times as much as is paid for grazing on public lands in the same forests. On Indian reservations in Oregon and Washington a charge of \$1.50 per head is made for cattle and 25 cents per head for sheep. On adjoining national forests the charge is from one-half to one-third as much.

The above figures show that the Forest Service in its administration of ranges within national forests is giving for fees which run from one-half to one-fourth the actual value of the grazing privileges effective protection of the range, increasing safety from predatory animals, and a product in beef and mutton worth considerably more on the market than the product of outside ranges.

Had the Forest Service charged last year for grazing privileges what they were actually worth these charges would have more than paid all the expenditures of the service for the current year. That the service did not increase grazing fees is due directly to its conviction that the great value of its administration of grazing is to aid the small man in establishing a home, and that the transition from free range to grazing fees should give opportunity for the easiest adjustment practicable of the stock industry to the new condition. Had not this opportunity been given, the transition would have meant inevitable hardship, especially to the small stockman.

CONCLUSIONS.

The funds recommended are needed for the government forest work for these main reasons:

1. The protective force on national forests has been inadequate from the beginning, and the increase in it has not kept pace with the increase in business.

2. Unless the force is greatly increased the Forest Service must do one of these two things: Turn away national forest business or reduce a fire patrol already insufficient. This is an urgent immediate condition, not a theory.

3. It is no less necessary for the better protection and fuller use of the national forests that money is provided with which to hire men than that money is provided with which to build trails, telephone lines, fences, and other permanent improvements. Without the men, the permanent improvements are of little use; without the permanent improvements, the efficiency of the additional men will be greatly reduced. Both are essential.

4. The fact that the protective force on national forests has carried a heavier load of current business per man during the last year than ever before and has held the fire damage down to 1 per cent of that on private forest lands is creditable in the highest degree. But it is unfair, as well as unsafe to the forests, to rely upon the men keeping this up. The force is at present seriously overworked, and unless it is increased the inevitable result will ensue—a serious falling off in individual efficiency.

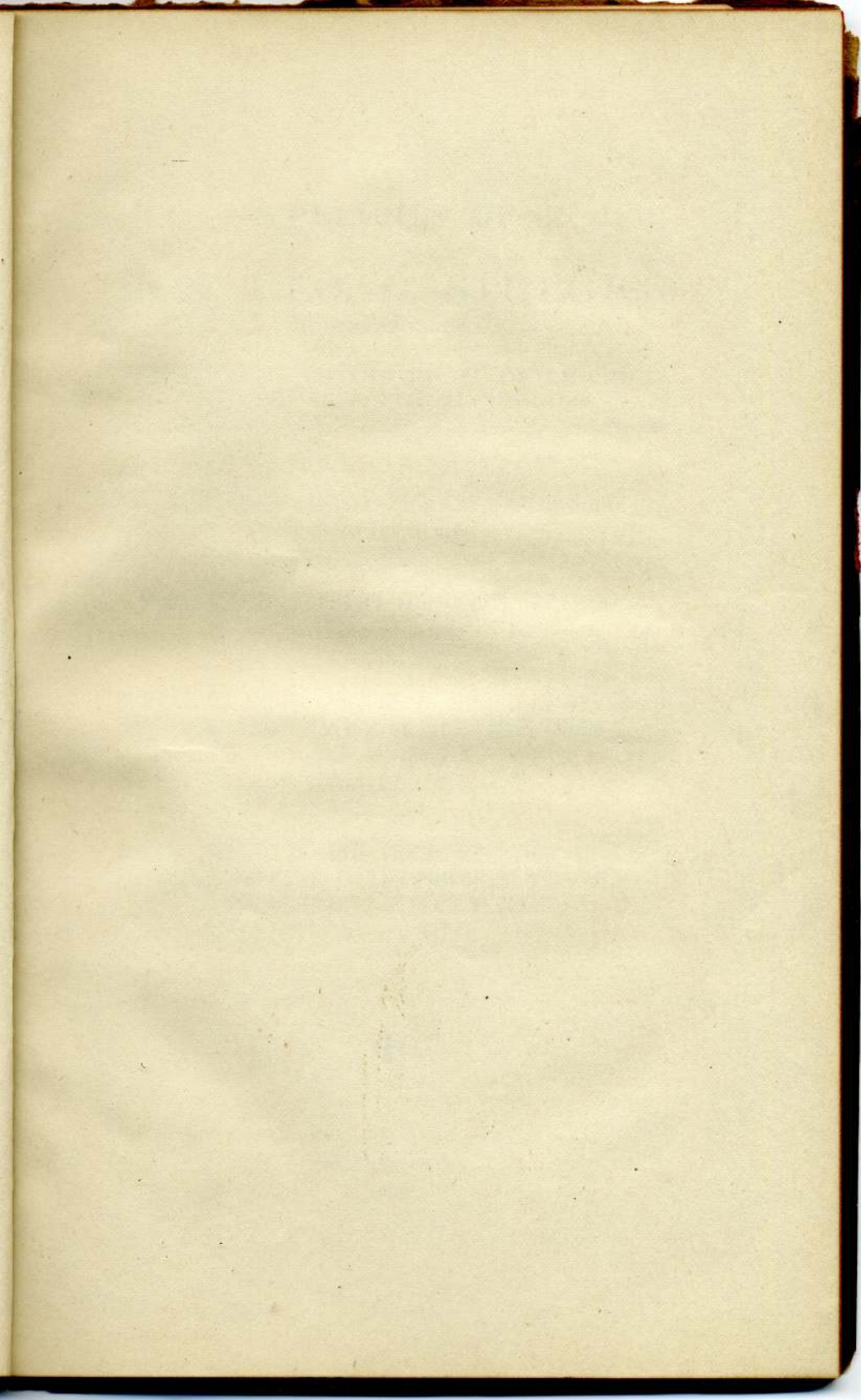
The estimates for the ensuing fiscal year are the first estimates presented for the Forest Service, which, if granted, would put it really abreast of its task. If it is necessary that the increased expenditures proposed should be met by increased returns, that can be done; if it is necessary that they should be materially exceeded by the returns, that can also be done,

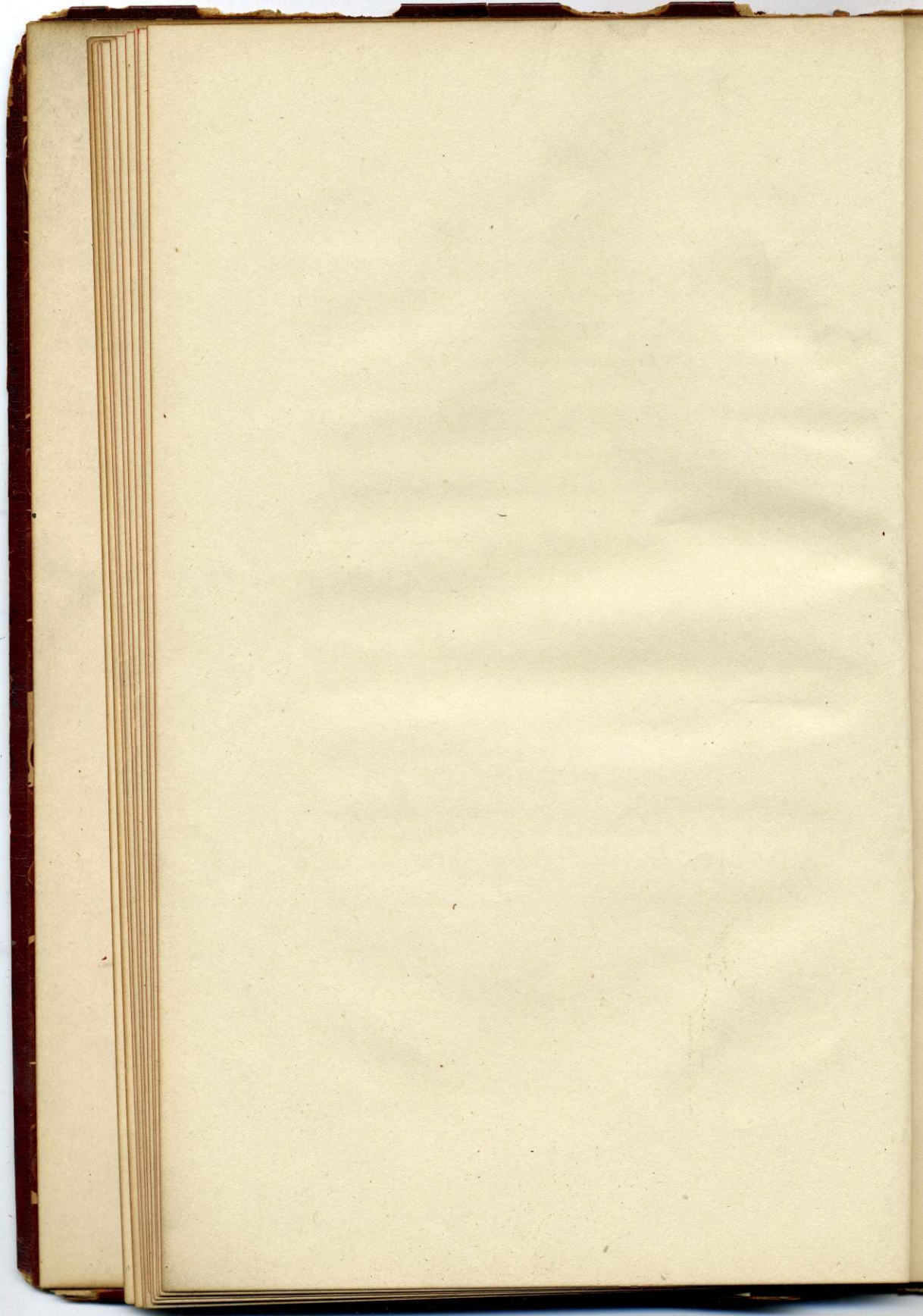
although neither is advisable. The growth of business on national forests can go on until the returns greatly exceed the expenditures with absolute safety to the forests themselves, provided that the growth does not get beyond the trained force available to handle it. What the Forest Service is doing now is to train up the force, get ready for the business, and take care of the increase so far as it can. When the force is once adequate in training and in number, the service can take care of all the business, which means many times that now handled with a revenue many times as great. [Applause.]

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SPEECHES OF
HON. GEO. C. STURGISS
OF WEST VIRGINIA

DELIVERED IN THE HOUSE OF REPRESENTATIVES,
SIXTIETH CONGRESS

GOOD ROADS AND A HIGHWAY COMMISSION
FEBRUARY 11, 1909

WIRELESS TELEGRAPHY FOR OCEAN STEAMSHIPS
FEBRUARY 16, 1909

BUREAU OF MINES, SCHOOLS OF MINING ENGINEERING
AND INVESTIGATION OF MINE EXPLOSIONS
AND ACCIDENTS
FEBRUARY 26, 1909

FOREST RESERVES AND THEIR RELATION TO NAVI-
GABLE STREAMS, WATER POWER, FLOODS, AND
INSUFFICIENT WATER SUPPLY
MARCH 1, 1909



WASHINGTON
1909

SPEECHES
OF
HON. GEORGE C. STURGISS.

February 11, 1909.

GOOD ROADS AND A HIGHWAY COMMISSION.

A rapidly growing public sentiment will not much longer tolerate inaction upon this highly important subject by Congress. It is no longer a question of the right and power of Congress to act affirmatively, but solely a question of expediency and wise statesmanship.

Mr. STURGISS. Mr. Chairman, I shall be very brief in what I have to say on this subject. I know there is a difference of opinion between Members of the House on the subject.

I believe the investigations and studies of the subjects embraced in the section proposed to be amended will, if properly conducted, prove of great value in inducing the assumption by the United States, in conjunction with the States, of the work of systematically constructing and maintaining public highways of the highest character in the interest of interstate commerce, of military and post roads, and of the general welfare.

A rapidly growing public sentiment will not much longer tolerate inaction upon this highly important subject by Congress. It is no longer a question of the right and power of Congress to act affirmatively, but solely a question of expediency and wise statesmanship.

On the constitutional right, I desire to incorporate as a part of my remarks the following extracts from a pamphlet printed recently by the National Grange, an organization of farmers in 27 States, with an aggregate membership of nearly 1,000,000 members:

The power vested in Congress to enact such legislation has been clearly established by repeated decisions of the Supreme Court of the United States in defining the scope of that paragraph in the Constitution reading as follows:

"Sec. 8, par. 3. The Congress shall have power to regulate commerce with foreign nations, and among the several States, and with Indian tribes."

The right of Congress to improve our harbors and waterways, to construct canals, and to regulate the height of bridges spanning rivers, channels, and other waterways lying wholly within the boundaries of a State is based entirely on this paragraph.

The fact that up to the present time Congress has not exercised the right to promote commerce between the States by constructing and improving public highways in the various States can not be construed as evidence that the power to do so has been abrogated. In the case of *County of Mobile v. Kimball* (162 U. S., 695) the question was raised as to the right of the State of Alabama to enact a law for certain improvements in the port and river of Mobile, it being contended that such a law was in conflict with the constitutional right of Congress to regulate commerce between the several States. Mr. Justice Field, who delivered the opinion of the court, said:

"Inaction of Congress upon these subjects, unlike inaction upon matters affecting all the States and requiring uniformity of regulation,

is not taken as a declaration that nothing shall be done with respect to them, but is rather to be deemed a declaration that for the time being, and until it seems fit to act, they may be regulated by state authority."

In the case of *Miller v. The Mayor of New York* (109 U. S., 385) it was held that the act of Congress authorizing the building of the Brooklyn Bridge, a structure wholly within the State of New York, was constitutional. The court said: "Such uniformity has been the construction given to that clause of the Constitution which confers upon Congress the power to regulate commerce," citing *Pennsylvania v. Wheeling and Belmont Bridge Company*. (59 U. S., 421.)

In the case of *Clinton Bridge* (10 Wall., 454) Mr. Justice Nelson, on the authority of the *Wheeling and Belmont Bridge Company* case, held that the act of Congress declaring the Clinton Bridge across the Mississippi River at Clinton, Iowa, a lawful structure and a post route, and prescribing certain regulations for its maintenance, was constitutional. He said:

"The question whether or not it was competent for Congress to interfere and legalize the bridge, under the power to regulate commerce, and whether or not the act put an end to the pending suit, were questions examined and settled in the affirmative in the case already referred to. (*Wheeling Bridge case*.) The reasons for the conclusions arrived at will be found there and need not be repeated here."

"Several cases have been before this court relating to bridges over navigable waters of the United States in which questions were raised as to the authority by which the bridges could be constructed, the extent to which they would obstruct the free navigation of water, and the right of private party to interfere with their construction and continuance. * * * The power vested in Congress to regulate commerce with foreign nations, and among the several States, includes the control of the navigable waters of the United States so far as may be necessary to insure their free navigation; and by navigable waters of the United States are meant such as are navigable in fact, and which by themselves or their connection with other waters form a contiguous channel for commerce with foreign countries or among the States." (*The Daniel Ball*, 10 Wall., 557.)

"East River is such a navigable water. It enters the harbor of New York and connects it with Long Island Sound. Whatever, therefore, may be necessary to preserve or improve its navigation the General Government may direct; and to that end it can determine what shall and what shall not be deemed an interference with or an obstruction to such navigation."

Under this case of *Miller v. The Mayor of New York* it would seem that Congress has the power under the commerce clause not only to construct, improve, and maintain or authorize interstate highways, either by water or by land, but it has power to construct, improve, and maintain any and all public highways by water or by land which connect with or intersect or lead into such interstate highways.

The case where the matter was fully considered, and the authority of Congress clearly defined, is the case of *Luxton v. The North River Bridge Company*. (153 U. S., 525.)

In this case, by act of July 11, Congress authorized the incorporation of the North River Bridge Company, and authorized the construction of a bridge across the Hudson River between the States of New York and New Jersey. The third section of this act is as follows:

"That the bridge with its approaches and railroads thereon, constructed under the provisions of this act, shall be a lawful structure and a military and post road, but no toll charge shall be made for the transmission over the same of the mails of the United States, or for the right of way of the United States postal and telegraph purposes."

The fourth section of the act incorporated the company and gave it the right and power of eminent domain.

The question in the case arose over the right of the corporation to condemn a certain parcel of land in Hoboken for the purposes of the bridge and for a roadway thereto, through commissioners appointed by the circuit court for the purpose. It was claimed that the act was unconstitutional. Mr. Justice Gray, writing the opinion for the court, said:

"The validity of the act of Congress incorporating the North River Bridge Company rests upon principles of constitutional law now established beyond dispute. The Congress of the United States being empowered by the Constitution to regulate commerce among the several States and to pass all laws necessary or proper for the purpose for carrying into execution any of the powers specifically conferred, may make use of any appropriate use to that end."

"Congress, therefore, may create corporations as appropriate means of executing the powers of government—as, for instance, a bank for the purpose of carrying on fiscal operations in the United States or a railroad corporation for the purpose of promoting commerce among the States." (*McCullough v. Maryland*, 4 Wheat., 316; *Osborne v. The Bank of U. S.*, 9 Wheat., 738; *Pacific Railroad Removal cases*, 115 U. S., 1-18; *California v. Pacific Railroad*, 127 U. S., 1-39.)

"Congress has likewise the power, exercised early in this century by successive acts in the case of the Cumberland or National road from the Pacific across the Alleghenies to Ohio, to authorize the construction of a republic highway connecting several States." (See *Indiana v. U. S.*, 148 U. S., 148.)

"And whenever it becomes necessary for the accomplishment of any object within the authority of Congress to exercise the right of eminent domain and take private lands, making just compensation to the owner, Congress may do this with or without a concurrent act of the State in which the land lies." (*Van Blocklin v. Tennessee*, 117 U. S., 151-154; *Cherokee Nation v. Kansas Railroad*, 135 U. S., 614-656.)

"From these premises the conclusion seems to be inevitable that although Congress may, if it see fit, and as it has often done, recognize and approve bridges erected by the authority of two States across navigable waters between them, it may, at its discretion, use its sovereign powers, directly or through a corporation created for that purpose, to construct bridges for the accommodation of interstate commerce by land as it undoubtedly may to improve the navigation of rivers for the convenience of interstate commerce by water."

Mr. Justice Gray held that the judicial opinions cited in support of the opposite view were not, having regard to the facts of the cases in which they were uttered, of controlling weight. He cites the case of *United States v. The Railroad Bridge Company* in the circuit court of appeals (6 MacLean, 517), and says that Justice MacLean's dissenting opinion in the *Wheeling Bridge Company* case is absolutely unsound, and concurs with Mr. Justice Nelson's majority opinion, citing the *Clinton Bridge case*, *Miller v. New York*; also *Stockton v. Ball*, and the *N. Y. Railroad Co.* (32 Fed., 9); *Wm. Ette Bridge v. Hatch* (125 U. S., 1), in which case it was decided that Congress might allow the States to construct bridges between States; or, exercising its sovereignty, might construct them itself. Mr. Justice Gray then said:

"In *California v. The Pacific Railroad* (127 U. S., 1) it was directly adjudged that Congress has authority in the exercise of its power to regulate commerce among the several States, to authorize corporations to construct railroads across the States as well as Territories of the United States, and Mr. Justice Bradley, speaking for the court and referring to the acts of Congress to build railroads across the continent, said:

"It can not at the present day be doubted that Congress, under the power to regulate commerce among the several States, as well as to provide for postal accommodations and military exigencies, had authority to pass these laws. The power to construct or to authorize individuals or corporations to construct national highways and bridges from State to State is essential to the complete control and regulation of interstate commerce. Without authority in Congress to establish such highways and bridges, it would be without authority to regulate one of the most important adjuncts of commerce. This power in former times was exerted to a very limited extent, the Cumberland or National road being the notable example. Its exertion was but little called for as commerce was then mostly conducted by water and many of our statesmen entertained doubts as to the existence of the power to establish ways of communication by land. But since, in consequence of the expansion of the country, the multiplication of its products, and the invention of railroads and locomotion by steam, land transportation has so vastly increased, a sounder consideration of the subject has prevailed and led to the conclusion that Congress has plenary power over the whole subject."

After quoting the above, Mr. Justice Gray said:

"The act of Congress now in question declares the construction of the North River bridge, between the States of New York and New Jersey, to be 'in order to facilitate interstate commerce,' and it makes due provision for the condemnation of land for the construction and maintenance of the bridge and its approaches and for just compensation to the owners, which has been accordingly awarded to the plaintiff in error."

"In the light of the foregoing principles and authorities, the objection made to the constitutionality of this fact can not be sustained."

"Congress, therefore, may create corporations as appropriate means of executing the powers of government—as, for instance, a bank for the purpose of carrying on fiscal operations in the United States or a railroad corporation for the purpose of promoting commerce among the States." (McCullough v. Maryland, 4 Wheat., 316; Osborne v. The Bank of U. S., 9 Wheat., 738; Pacific Railroad Removal cases, 115 U. S., 1-18; California v. Pacific Railroad, 127 U. S., 1-39.)

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"In the light of the foregoing principles and authorities, the objection made to the constitutionality of this fact can not be sustained."

From the above cases and authorities it is clear that under the commerce clause of the Constitution Congress has the power to construct, maintain, improve, and regulate any of the public highways of the United States between the several States, and any public highways leading into or connecting therewith. There is, therefore, no question but that the Currier bill is a constitutional measure.

I have introduced a bill (H. R. 27825) creating a national highways commission, with appropriations that must be supplemented by state, county, and municipal appropriations bearing a fixed ratio to the national grant before the latter can become available, thus stimulating local effort and taxation to the certain betterment of the public highways of the whole country.

Of the wisdom and policy of the preliminary study and investigation of the subjects contemplated in the paragraph proposed to be amended there can be no doubt. The more extensive and thorough this work is now done the more economical and intelligent will the practical work of constructing and maintaining public highways be done when that work is undertaken, as it will be sooner or later.

In support of the wisdom of undertaking this great work jointly with the several States I desire to incorporate as a part of my remarks an article printed in the National Grange by Edward W. Perry, full of sound common sense, fortified by a convincing array of facts and figures:

American country ways can scarcely be called ways of pleasantness. On the contrary, they are usually crude and dirty, rough and noisy. They waste time, patience, and energy, and they spoil the comfort of all who must endure these defects. In dry seasons they are dusty, in wet weather they are little better than canals of mud; and at all times they are needlessly steep and costly.

This is true largely because American highways, like Topsy, "jest growed." Practically all our roads began as mere trails through wilds, were widened a little by the pioneer who lopped off a branch here, a root there, and cut down a tree yonder, that his pack animal might squeeze past. Later comers dug up a stump or a stone, now and then, and trimmed down the sharp banks of the stream, because they were using cart or wagon to carry wife and babe and household belongings to their new home in the wilderness.

All these early travelers followed the line of least resistance, so far as they found it without too much searching. Believing that they would not soon go that way again, and used to making light of such difficulties, our sturdy fathers did little more than was necessary to the moment. So many followed that in a few years they found it good to come together, now and then, to make roads, as neighbors in those friendly days used to have logging bees, house raisings, apple-paring parties, and quilting bees, and such other meetings for mutual help as might fairly be made an excuse for dance and frolic. To this hour, in many a corner of the land, road making is regarded as a yearly "bee" at which neighbor and friend should swap tobacco and yarns and jests between short spells of work.

But millions who dwell in country places now see that their wagon roads should be made far better than they have ever been, even when at their best. It has at last been seen that the condition of these roads affects the pocketbook of every human being in all the land more directly and materially than it is affected by any other one cause. This will be so while every human being in the land must use products of the American farm, because all these products must be hauled over these thoroughfares from farm to market. The cost of such moving is increased by everything that hinders the easy moving of the wheels by which the products are carried.

More than half of the scores of millions of tons of things taken each year from American farms; practically all of the tens of millions of tons of food required by 70,000,000 people of this country; all the millions of tons of cotton and of wool they eat, and many another thousand tons of other things they want for their health, their comfort, or their luxury, must be hauled by animals through dust or sand or

mud, up steep grades or over pebbles that make up the first stage of their journey from field to consumer. From this wastefulness no present relief is offered, because almost 93 of every 100 miles of American wagon roads are rough and steep, badly drained, and costly.

These truths about our highways were scarcely known to the people as a whole before the Office of Public Roads, a bureau of the Agricultural Department at Washington, gave us, last year, the nearest approach ever made to the precise truth about the condition and the cost of our public highways. This is the more notable because at the end of each of many decades our National Government has given us tomes of copious and most minute information about the number, birth, and color, the work, wages, and wealth of our people; about the size, products, and value of our farms; but never before last year had any administration even an approach to fair support for its efforts to give to the nation accurate data covering the miles and the character, the annual cost and the existing condition of its country roads, which are as the arteries and the veins through which must flow that commerce which is as the very lifeblood of our prosperity.

Perhaps no more complete nor accurate information about our roads as a whole will be given before the national census shall have covered this field as fully and as accurately as it has covered other great interests of the nation. That census can not give information that would interest and benefit a larger number of our people, nor serve them more directly and clearly than would such full and exact information as the next national census may properly give about their highways.

From the best data we have it seems that all of the United States, except Alaska and our island possessions, had 2,151,570 miles of wagon roads in the year 1904. Of these only a minute fraction more than 7 per cent were called improved. This betterment was by means of realigning and grading, by draining and bridging, and by surfacing with material intended to make the roads dry and hard at all seasons, therefore easier and more durable than ordinary earthen roads can well be.

Thus it appears that we had, that year, about three-quarters of a mile of wagon road for each square mile of land in the territory mentioned, or about 6 feet of road for every acre of land. For each mile of such road there were 35 people in this country. That is, for each of us there were 151 feet of wagon road of all characters, but less than 10.7 linear feet of improved road per capita. In fact, for each mile of improved roads in the country we had 494.9 people.

In the year 1904 the work done on all these roads was valued at \$79,771,418. This equaled \$37.07 per mile, or \$1.05 per capita of population—2 cents a week for each of us. Many a frugal shopgirl spends as much daily for gum.

Lack of such improvement as our roads need compelled us to pay, in the year 1907, much more than we should have been made to pay for about 196,153,000 tons of farm products, not including any of the many thousands of tons of fruit; of vegetables other than potatoes; none of the millions upon millions of gallons of milk; none of the myriad million of tons of wood, nor any of the other products hauled from field or forest to market. Nor does it include any of the hundreds of thousands of tons of fertilizers and of feed, or lumber, coal and wire, of machinery and other things taken from town to the farm.

We have been told by authorities that the American farmer loads an average of a little more than 2,000 pounds on his wagon and draws it 12 miles, at a cost of \$3. This equals 25 cents a ton mile. If we assume that the wagonload is an even 2,000 pounds and that the cost of hauling will be \$2 instead of \$3; and if we assume that the 9,404,430 persons in agriculture in this country use half of the products of our farms, and that the other 66,568,350 persons use only the other half of these products, the cost of taking these to market would be \$196,153,000.

Many tests have shown that loads may be drawn in wagons over macadam in average condition at a cost only a little more than one-third that of moving like loads over earth roads in ordinary condition. If this is correct, a saving of \$130,768,680 might be made in the cost of marketing half our crops of a year if they could be hauled over macadam rather than over common earth roads. That saving would equal \$1.72 apiece for us, or much more than all our road work for the year costs.

But macadam roads cost much money. Still it may be that the first cost will concern the American people less than will the question, What will the investment in good roads actually pay us? Of course every-

body knows that this Nation can get, at moderate rates of interest, all the money it will spend on improvements which will pay interest and sinking fund if the financing were done honestly.

A saving of \$130,768,680 per annum would be enough to pay 4 per cent interest and 2 per cent sinking fund on \$2,179,478,000. That would be enough to build 243,000 miles of good macadam, and in nine years such amount could macadamize every mile of road in the land.

In the ten years which ended with 1906 the exports from the United States were, in the main, as shown below:

Industry.	Valuation.	Per cent.
Agricultural.....	\$8,070,764,278	59.13
Forestry.....	497,823,882	33.65
Manufacturing.....	3,788,121,805	27.75
Mining.....	340,945,341	2.50
Fisheries.....	70,062,102	.51
Miscellaneous.....	882,219,915	6.46
Total.....	13,649,937,318	100.00

In view of the fact that more than half of all we exchange for the gold and the manufactures of other nations comes from products of the toil of our farmers, who are only a little more than one for each eight others of our population; in light of the fact that every other industry in this country depends largely, if not wholly, upon our agriculture for its well being, if not for its very existence, it is interesting and instructive to study the figures that tell us what use has been made of the money of the Nation which owes so much to its farmers, what part of the money they have brought into our National Treasury has been spent to benefit the farmer, and what share of those funds have gone mainly to profit those who exploit the farmer.

During the ten years mentioned Congress apportioned the money of the Nation as follows:

Department.	Amount.	Per cent.
Agriculture.....	\$47,000,817	0.74
Commerce and Labor.....	33,206,760	.53
Executive.....	76,043,944	1.21
Interior.....	1,059,350,002	26.30
Judicial.....	68,804,419	1.08
Justice.....	5,031,456	.08
Legislative.....	109,939,057	1.74
Navy.....	760,287,740	12.05
Post-Office.....	1,302,926,200	20.65
State.....	50,603,791	.80
Treasury.....	935,884,880	14.83
War.....	1,261,102,566	19.99
Total.....	6,309,742,632	100.00

Agriculture would have had \$3,725,900,000 of national moneys to spend for its further improvement and development in these ten years, or almost 80 times as much as it did have, if Congress had devoted to building up the most productive and valuable of our industries money in proportion to the revenue that industry brought to us from foreign sources. In these ten years Congress put \$180,537,000 into improvement of rivers and harbors; that is, for each dollar our Congress allowed us out of our own money to help gather information and in other ways aid the work of making good the roads we must use, it gave \$6,943.60 to deepen and to light channels and otherwise improve waterways, some of which were known to be of little possible use, and others that have been improved almost wholly for the benefit of certain foreign interests—for transportation combinations that have been publicly charged with using these advantages to depress still further and in time to destroy the shipping business of the very people who paid for such improvements.

This is a peaceful Nation, but in the decade mentioned it spent for war purposes \$2,021,390,306, or 43 times as much as was allotted to agriculture. Yet our farms have for generations been our most effective defense against aggressions by other nations. No power dare so war on us as to check the flow of the mighty river of life that flows from America to feed the Old World. Europe could not permit such stoppage and live. A mere threat to do so would insure peace.

Does not justice to the farmer, consideration for the welfare of all consumers, and plain common-sense demand that this Nation shall spend to make its wagon roads good at least as much money each year as it shall spend on its waterways? The wagon roads may be kept always open for free use by all the people; the waterways may be monopolized easily for the great transportation interests.

February 16, 1909.

WIRELESS TELEGRAPHY FOR OCEAN STEAMSHIPS.

"Man's love of humanity and his dominion over the forces of nature have brought life and hope and happiness, as well as peace and prosperity, to millions in every land and every field of activity."

Mr. STURGISS. Mr. Speaker, the last quarter of the nineteenth century and the opening years of the twentieth century have demonstrated beyond all the other years of history the supremacy of mind over matter. The mighty and often most terrible forces of nature have been subdued and not only stripped of their power for evil, but subjugated and harnessed, and have become benign instruments for helping to make life easy, attractive, and safe.

The most striking and recent illustration of this assertion was witnessed when two great ocean-going steamers, loaded with hundreds of people, the one nearing the conclusion of a 3,000-mile voyage, the other just leaving New York Harbor with a thousand pleasure-seeking passengers for a season's travel in the Mediterranean and the Orient, each all unconscious of the proximity of the other, till with a mighty crash in the darkness they were hurled against each other, dealing a deathblow to one vessel and inflicting great damage to the other, killing some passengers, and putting the lives of all in great peril. But mind, dominant over sea and darkness and distance, called aloud for help with the still, small voice of the radio-telegraph and told the tale of disaster and impending death and brought helping hands and words of cheer from scores of listening watchers.

One has truthfully said "the undevout astronomer is mad," who, having contemplated the stupendous magnitude of the solar systems that light our midnight skies, the enormous numbers of revolving suns and satellites, and the perfect harmony that holds each in his orbit and place, can see no divine supernatural power and wisdom displayed in all this mighty creation.

But the power and wisdom and beneficence of that Being who holds the firmaments in the hollow of His hand are no less plainly shown in the adaptation of mind to matter in this workaday world as in the heavens above; and the scientist who thoughtfully studies the qualities and properties, often occult and mysterious, that are inherent in matter, and considers the powers of the mind of man to discover and reveal them and apply them to his everyday uses and can see no God in it all, is undevout and mad. There are 10,000 inventions

and discoveries that have so long been used that we regard them as commonplace and no longer marvel at them that illustrate the truth just stated.

The magnetic needle, the steam engine, the ocean greyhound, the railway locomotive, the telegraph, the submarine cable, the telephone, the phonograph, electric lighting, heating, and power, the natural gases, noxious and highly explosive, piped into our homes, furnaces, and factories, to give light and heat and power, are but a few illustrations of the nine days' wonder grown commonplace and prosaic. But each is proof of the fact that the mind of man, when stimulated by cupidity, curiosity, benevolence, or necessity, finds every form of material things endowed with or possessing inherently the property, quality, or characteristic that man needs in his operations and which he would give to matter if he possessed the power.

He wanted the magnetic needle, and found the loadstone; he needed the transparent glass, and with opaque sand and alkali he made the crystal lens; he wanted mechanical power to do his work, and found it in the energy of expanding steam, and so built his engine and steamship and locomotive; he wanted the metals with all their differing qualities of ductility, malleability, hardness, and temper, and found them in the ores and stones; he needed fuel for light and heat, and found it in coal and oil and gas; he worshiped in fear the lightnings of heaven till he had measured this most terrible and apparently most refractory element, but when his brain had mastered it, he found it possessed of the most varied and valuable properties; it became his messenger, outstripping Mercury, the winged god of the ancients; on land and under sea instantaneously it responded to his thought and touch; from it he derived light for his home and shop and street, and electricity made night as bright as the noonday; he grew tired of steam as a motive power and harnessed the lightning to his car; and needing a heat more intense than any fuel could produce, found it in the electric arc. He found this element was all about him, harmless and unnoticed in equilibrium, like the air we breathe, but like the air, which disturbed in its equilibrium, becomes the mighty tornado, destroying life and property, only a thousand-fold more terrible and quicker in its death-dealing and property-destroying power.

He devised the dynamo, like a great ventilating fan, gathering in the electric element, disturbing its equilibrium, and sending it out in mighty impulses over the wires to do his bidding. He found he must have a good conductor to transmit and control the electric current, and found in copper and aluminum just the quality or characteristic needed, but at the same time he found that absolute nonconductivity was just as essential in order to insulate his wires and handle this fearful genius with safety, and in glass, porcelain, and hard rubber he found or created from crude materials the most perfect nonconductor.

And so far as the mind has explored the realm of nature, man has found the former dominant over matter and natural forces, and the latter everywhere responsive with the properties and qualities and characteristics that he needs.

Can it be that all this is chance, a mere fortuitous combination of elements, but always, when properly understood and ap-

plied, working for the good of humanity? Rather does it prove beyond all reasonable doubt that an all-wise, all-powerful, and always beneficent God reigns not alone in the invisible and visible heavens, but on and in the earth and the elements thereof and in the heart and brain of man.

What heart was not touched and eye moistened and love to man and praise to God stimulated when the account of the rescue of over sixty score passengers and half as many of the crews of the ill-fated *Republic* and *Florida* was first read a few days ago? Out of the darkness of fog and night came the sudden and awful collision that gave the death wound to one vessel and for a season paralyzed the other, giving promise of a fearful harvest of death. But here came a miracle of human genius and the application of the property of electricity and of the air to transmit for hundreds of miles the call of distress to all the listening ears on ship and shore that might be equipped with the newest device and discovery by man that wires are not needed to transmit thought and words, but that God's ether, ever around us, is ever ready to respond to man's call to his fellow-man in distress and in defeat, and in joy and in triumph.

Marconi, the inventor and discoverer, joined with Binns, the practical operator, in bringing speedy aid by friendly hands out of the darkness, from ship and shore, and in receiving words of cheer and encouragement for those waiting in suspense and dread. If man's inhumanity to man has caused countless thousands to mourn, nevertheless in these modern and, let us hope, better days, man's love of humanity and his dominion over the forces of nature have brought life and hope and happiness, as well as peace and prosperity, to millions in every land and every field of human activity. But let not our jubilation and emotions evaporate in speech, but let us give practical expression to them by voting for this bill, which requires every ocean passenger steamer embraced in the description in the bill to be equipped with efficient apparatus and a skilled operator that shall enable each vessel to keep in actual communication with every other like vessel and with each shore from the time she leaves port till she reaches her destination, and so diminish the dangers and lighten the solitude of those who sail the ocean and encounter the perils of the great deep.

February 26, 1909.

BUREAU OF MINES, SCHOOLS OF MINING ENGINEERING, AND INVESTIGATION OF MINE EXPLOSIONS AND ACCIDENTS.

"Sentiments of humanity, public policy, increased efficiency, economy of production and conservation of our mineral resources demand immediate and affirmative action on all three of these measures."

Mr. STURGISS. Mr. Chairman, I am heartily in favor of the proposed amendment to increase the appropriation for continuing the investigations as to the causes of mine explosions, with a view to increasing safety in mining. The amount reported by the committee for this purpose is only \$100,000, and the amendment will increase it to \$150,000.

We are appropriating large sums of money for creating and rearing for forest reserves, for irrigation and reclamation of arid

lands, for extension of mail service, for fish hatcheries, for building battle ships and supporting the navy and the army, for fortifications, to support the diplomatic and consular service, for our agricultural colleges, and for promoting the prosperity of our farmers, all necessary and proper purposes for the exercises of government activity. Congresses and conventions to conserve our great natural resources in forests, mines, soils, water, and many other things are important, no doubt, but is it not high time to do something to conserve the richest asset the Nation possesses, the men whose lives are more valuable than all material resources and assets? They are the creators of all wealth. Machinery, labor-saving devices, and intellectual power can never dispense with manual labor in some form, which must supplement and keep in motion these artificial aids to human labor.

These expenditures just enumerated do not have for their object the saving of human life, but only the development of the material and physical resources of our country.

Health congresses to fight tuberculosis, the creation of hospitals and sanitarium, the employment of medical experts, and the myriad forms of help to assure the general health of our people to suppress contagious and infectious diseases are certainly just and proper forms of government aid for promoting the general welfare. In the midst of every great calamity our hearts are touched, our purse strings loosened, and we generously vie with each other to afford immediate relief to the sufferers. San Francisco, calling from her ashes and her desolation, was helped most lavishly. Ere Italy, stunned by the most appalling disaster of modern time, could voice her misery and her needs, millions of treasure and thousands of helping hands were tendered. When in December, 1907, four great explosions in the mines of three States brought sudden and horrible death to many hundred miners, made half a thousand widows and more than a thousand orphans, the hearts of all men and women were touched, and material aid was most abundantly tendered. But this could not bring to life the breadwinners in these homes, to care for the loved ones whose lives must henceforth be marked by harder toil, with greater self-denial, and with perpetual sadness over the tragic death of father, son, or brother. How much wiser and better to have prevented the loss of property, of wages, of human lives, and the consequent misery by precautionary and preventive measures.

It is folly to say that much of this fearful slaughter could not have been prevented. It is a reflection upon the intelligence and capacity and humanity of the people of the United States that the proportion of deaths and injuries in our mines to each 1,000 of men employed underground is much greater than in the deeper mines of England, or of France, Belgium, or Prussia; and it is the saddest part of the whole history of mining in this country that the percentage of deaths and injuries is steadily increasing.

We employ in the mines and quarries of this country over 1,000,000 persons, and the percentage of deaths is annually greater than among railway employees. In the last eighteen years over 25,000 lives have been sacrificed in the mines of this

country. The percentage as compared with the principal mining countries of the Old World is as follows:

Number of men killed for each 1,000 employed—averages for five years.

France (1901-1905) -----	0.91
Belgium (1902-1906) -----	1
Great Britain (1902-1906) -----	1.28
Prussia (1900-1904) -----	2.06
United States (1902-1906) -----	3.39

Is it any wonder public sentiment has been greatly aroused to the absolute necessity of a thorough study of the causes that have produced these fearful losses of life, with a view of preventing their recurrence or greatly reducing their number and consequent losses?

Three principal measures have been proposed, each of which should be enacted into law, and all plainly within the scope of federal power.

First. The creation of a bureau of mines in the Department of the Interior. Many hearings have been held by the Senate and House committees on this subject and a mass of evidence taken showing the necessity of such a bureau. In this opinion, miners, mine owners, and experts all concur. The House has passed a bill, now on the Senate calendar, which can and should be enacted before the close of this Congress.

It is as follows:

A bill (H. R. 20883) to establish in the Department of the Interior a bureau of mines.

Be it enacted, etc., That there is hereby established in the Department of the Interior a bureau, to be called the bureau of mines, and a commissioner of said bureau, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of \$6,000 per annum; and there shall also be in the said bureau such clerks, agents, experts, and other employees as may be necessary to carry out the provisions of this act.

SEC. 2. That it shall be the province and duty of said bureau and its commissioner, under the direction of the Secretary of said department, to foster, promote, and develop the mining industries of the United States; to make diligent investigation of the methods of mining, the safety of miners, the possible improvement of conditions under which mining operations are carried on, the treatment of ores, the use of explosives and electricity, the prevention of accidents, the values of mineral products and markets for the same, and of other matters pertinent to said industries, and from time to time to make such public reports of the work, investigations, and information obtained as the Secretary of said department may direct, with the recommendations of such bureau.

SEC. 3. That the Secretary of the Interior shall provide the said bureau with furnished offices within the city of Washington, with such books, records, stationery, and appliances, and such assistants, clerks, stenographers, typewriters, and other employees as may be necessary for the proper discharge of the duties imposed by this act upon such bureau, fixing the compensation of such clerks and employees within appropriations made for that purpose.

Second. The establishing in each State of schools of mines and mining engineering, in which should be taught a scientific and practical knowledge of all that pertains to mining operations, with a study of the conditions peculiar to the mines of the State in which the school of mines and mining engineering is located, and with an exchange of bulletins and reports of all research and investigation work done in each year. These schools should furnish skilled miners, fire bosses, engineers, and superintendents, with a knowledge up to date as to explosives, gases,

safety devices, ventilation, and all that tends to economy and conservation of products, safety and sanitary conditions as related to employees and rescue work.

Such a bill has passed the Senate, and a substitute for it practically along the same lines has been approved and recommended by the House Committee on Mines and Mining.

It is as follows:

That there shall be appropriated from the sale of public lands, not otherwise appropriated, the sum of \$5,000 for the fiscal year beginning July 1, 1909; the sum of \$10,000 for the fiscal year beginning July 1, 1910; the sum of \$15,000 for the fiscal year beginning July 1, 1911; the sum of \$20,000 for the fiscal year beginning July 1, 1912; the sum of \$25,000 for the fiscal year beginning July 1, 1913; and \$25,000 for each succeeding year thereafter, to each State and Territory in the United States, for the establishment and maintenance, under the control of the Secretary of the Interior of the United States, of a school or department of instruction in mines and mining.

Sec. 2. That if there be already established in any State or Territory a school of mines and mining under the control of said State or Territory, or a department of instruction in mining connected with any institution of learning controlled by said State or Territory, then the moneys appropriated in section 1 of this act shall go to said school or department of instruction already established.

That if there are two schools or departments of mines and mining in any State or Territory under the control of said State or Territory, then the money so appropriated shall be equally divided between such schools or departments.

That if there be no school or department of instruction in mines and mining already established in any State or Territory, the school or department of instruction in mines and mining herein provided for shall be established in connection with an agricultural college, if there be such, controlled by said State or Territory. In States and Territories having no school or department of instruction in mines and mining already established, or agricultural college, then the Secretary of the Interior shall designate some other institution of learning controlled by said State or Territory, in connection with which said school or department of instruction in mines and mining shall be established: *Provided*, That if any State or Territory have no school or department of instruction in mines and mining, or agricultural college, or other institution of learning controlled by said State or Territory, then the Secretary of the Interior shall designate some accessible and convenient place in said State or Territory where the school of mines and mining herein provided for shall be located.

Sec. 3. That the moneys appropriated in section 1 hereof shall be expended only for instruction, research, and experiment (including the employment of instructors and experts, the purchasing of apparatus, supplies, and books, and the equipping of laboratories) in mining, mining machinery (with the application of electricity thereto), mining engineering, ore treatment, metallurgy, assaying, and chemistry and geology, so far as these sciences relate to minerals and mining, with a view to teaching a practical and scientific knowledge of the best and safest methods of mining and carrying on the business of mining and of producing gold, silver, coal, and other minerals, oil, gas, and medicinal waters, and also the concentrating, smelting, refining, and other preparation of the same for marketing, so far as the same may be necessary and appropriate to the mineral resources of the State or Territory in which said school or department of instruction in mines and mining shall be located, and especially for the study and prevention of explosions, fires, and other dangers incident to the carrying on of mining and the mining industry, in order to secure the most intelligent conservation, use, and development of the mining and mineral resources of the country, to make the lives of miners more safe, property in mines more secure, and to promote the general welfare of miners and operators of mines.

Sec. 4. That the head of each school or department of instruction in mines and mining established according to this act shall report in writing annually, on or before the 1st day of July, to the governor of the State or Territory in which said school or department of instruction is located, the condition, progress, and work of the school or department of instruction during the year past, together with such recommendations as he may deem best for accomplishing the purposes of this act as set

forth in section 3 hereof; and that a copy of said report shall be also sent to the Secretary of the Interior.

SEC. 5. That if at any time, in the discretion of the Secretary of the Interior, any school or department of instruction in mines and mining provided for in this act shall not be faithfully carrying out the purposes of said act as set forth in section 3 hereof, then all moneys herein appropriated for said school or department of instruction shall be withdrawn from said school or department of instruction until the same shall have produced evidence satisfactory to the Secretary of the Interior that said school or department of instruction is faithfully carrying out the provisions of section 3 of this act.

SEC. 6. That the sums hereby appropriated to the several States and Territories for the purpose herein specified shall be annually paid, on or before the 31st of July of each year, by the Secretary of the Treasury, upon the warrant of the Secretary of the Interior, out of the Treasury of the United States, to the state or territorial treasurer or to such officer of each State or Territory as shall be designated by law to receive the same, who shall, upon the order of the trustees or other board of control of said college or university or separate school of mines, immediately pay over said sum to the respective treasurers of such institutions or to such other officers as may be duly authorized by said trustees or board of control to receive the same.

Third. The investigations as to the causes of mine explosions, with a view to increasing safety in mining, being the item in the sundry civil appropriation bill now under consideration. This is the only one of the three measures for promoting a greater knowledge and safety in mining operations that has yet received congressional sanction, and it is but a beggarly concession to the demands of the public, the miner, and mine owner. The subject is too large, too diverse, the difficulties too great, and the want of exact knowledge such that no miners' organization, no mine owner, and no individual or group of individuals can successfully grapple with it and solve the difficulties. Hence the necessity of government aid.

The work of the testing and experiment station at Pittsburg, for which this appropriation is asked, may be briefly set forth as follows:

MINE-ACCIDENTS INVESTIGATIONS, UNITED STATES GEOLOGICAL SURVEY.

These investigations, conducted under an appropriation provided in the legislative, executive, and judicial appropriation bill, carried an appropriation for the fiscal year 1909 of \$150,000.

The act was approved May 22.

By the 1st of July, the beginning of the fiscal year, a location for the testing work had been secured by transfer of certain buildings under the direction of the Quartermaster-General of the Army at the old arsenal grounds, Pittsburg, Pa. As many as 50 detailed drawings had been made, specifications prepared, contracts entered into, and work started on the repair and rearrangement of these buildings to fit them for their new uses. An equal amount of designing and drafting, specification writing, and so forth, had been completed on the many special detailed instruments and appliances requisite to the work. By the end of August preliminary tests in the steel-mine gallery and in the lamp gallery and the rescue apparatus were in progress.

The plan of the work included a *section of mine-accidents and mine-explosions investigations*; a *section of tests and analyses of explosives used in coal mining*; and a *section of mine-rescue and mine-lighting apparatus and appliances for the testing thereof*.

By midsummer civil-service examinations had been held and a corps of the most skilled mining and mechanical engineers

procurable had been assembled. Mr. George S. Rice, having perhaps the largest experience in actual coal-mining operations and consultation regarding coal-mining methods, was procured as head of the field investigations into mine accidents and explosions. A number of mining engineers familiar with mining conditions in the various coal fields have been secured and have been at work in the field for months past investigating the methods of mining, visiting scenes of explosions and fires, and examining into the conditions which lead to these disasters, with a view to the procurement of information for their future amelioration. By turns these men have been stationed at Pittsburg, familiarizing themselves with testing explosives, testing safety lamps, and of using mine-rescue apparatus and artificial respiratory helmets, etc.

These preliminary investigations having made good progress, and the training having been completed, arrangements are now being perfected for establishing substations as headquarters for mine-accident investigations and for instruction and assistance in mine-rescue operations. Arrangements have been perfected for the establishment of one such station at Urbana, Ill., in cooperation with the state geological survey of Illinois, under conditions whereby the State will furnish the building and accessories and the United States will take charge of the technical work of training miners and others in the use of rescue apparatus and in the direction of rescue operations when called upon, in addition to conducting their field work from this central location. Negotiations are making good progress toward the establishment of similar stations in the other important coal-mining regions.

Mr. J. W. Paul, formerly chief of the department of mines of West Virginia, one of the most experienced mining engineers in the country in inspection of mines and in the investigation of explosions and disasters, is at the head of the section of mine rescue and mine lighting, with headquarters in Pittsburg, and assisted by a corps of mining engineers specially fitted for this work. Under Mr. Paul's direction, instruction is given the mine engineering force in the testing and use of this apparatus. A number of miners provided by the coal operators within easy reach of Pittsburg have already been trained in the use of rescue apparatus at the expense of the mine owners, who have provided at their own expense all necessary instruments and appliances for use at their mines. Whenever a disaster occurs in this region, telegraphic information reaches the Pittsburg testing station, and Mr. Paul and his assistants proceed to the scene after wiring the miners they have trained to join them with their apparatus, and in this manner it is possible to rapidly assemble a large force of men who have had previous experience in mine-rescue work and who are familiar with improved methods of assisting in life saving under such circumstances. The rescue apparatus includes helmets for the protection of the head, and accessories whereby it is possible to artificially breathe air, even when in mines in which the quantity of deadly gas is so abundant that life could not be sustained more than a few minutes without this artificial respiratory arrangement. On a number of occasions, notably at the Hazel mine disaster, near Pittsburg; the Washington mine disaster; Marianna mine; Zieg-

ler mines, Illinois, and so forth, this corps has rendered efficient service in rescuing persons, in removing bodies of the dead, and in directing operations necessary to clearing the mines and placing them in condition to resume operations, whereby those miners who would otherwise have been thrown out of employment for many weeks are enabled to resume work within a few days. Such assistance, however, can only be rendered within a limited radius, as exceedingly prompt arrival on the spot is essential to any successful results. It is for this reason that Mr. Paul and his force is training the mining engineers and force in the use of this apparatus and methods with a view to the establishment of substations locally accessible.

The section of testing of analyses of explosives used in coal-mining operations is under the general direction of J. C. Roberts, an experienced mining engineer, with Clarence Hall, one of the best qualified explosives experts in the country, in charge of physical tests, and W. O. Snelling, a skilled chemist, in charge of analyses of explosives.

At the request of the Illinois powder commission, composed of representative mine owners and mine operators, which samples all the powders being used in the mines in that State, complete analyses and grading of the sizes of powder grains have been finished. Routine analyses of the enormous purchases of explosives for use on the Isthmus of Panama, and by the Reclamation Service in blasting operations in which life is endangered, owing to the frequent receipt of unsafe explosives, have been completed and 43 made, involving several hundred chemical determinations. Over 100 analyses of powders and dynamites in use in mining operations have been made, involving about 800 chemical determinations. These powders are undergoing various tests as to size of grain, durability, safety from spontaneous combustion, and so forth. At least two explosives on the market found to be dangerous have been quietly withdrawn by the manufacturers at the instance of the Geological Survey. Analyses of gases resulting from explosives to the number of 336, involving a thousand determinations, have been completed.

Over 700 physical tests have been made on the various explosives collected by the government mine engineering force, state mine inspectors, furnished by coal operators and miners to determine their behavior under various conditions. For two months continuously the mine gallery has been in operation day and night with three eight-hour shifts, standardizing and calibrating instruments for this gallery, in order that official tests might be commenced at the earliest possible date relative to the behavior of various explosives in the presence of various mixtures of coal gas and coal dust. Many of these demonstrations have been public, and have been most beneficial already in directing attention of those engaged in mining operations, to conditions under which use of explosives are dangerous. These standardizing tests have been completed, and the accompanying notification has been issued manufacturers of explosives inviting official tests of the same, which are in progress.

A large number of tests have been completed of the various safety lamps to determine conditions under which they may or may not remain lighted or cause explosions. Similar tests have been completed to determine the danger of denatured explosives

by dropping or jarring them in handling and to determine the safety of electric lighting of various voltages, electric hauling or hoisting apparatus, and so forth, in the presence of dangerous mixtures of coal gas or coal dust.

What is wanted is not hysterical, crude, and ill-considered legislation to correct admitted evils, but whose origin and cause are as yet unknown or little understood, but a careful study by and through a bureau of mines, with its experts working and investigating everywhere, under all conditions, in all the mining regions of the country, and publishing the results of their studies and investigations; the continuation of the carefully conducted tests and experiments at the experiment and testing station at Pittsburg and elsewhere; and the creation and support of the schools of mines in the several States. All these, cooperating in harmony, should soon be able to gather much accurate knowledge and disseminate it and educate in the highest degree expert and practical students in all that pertains to the mining industry, who should find lucrative employment in manning and managing the second largest producing industry in the country.

Scarcely more than a year ago there was much diversity of opinion whether coal dust was explosive, or in what degree; and to what extent, mingled with mine gases, it was responsible for these explosions. New tests at the station at Pittsburg have demonstrated beyond all doubt that, mingled with a small per cent of the inflammable gases usually found in the bituminous mines, it becomes a force of terrible explosive power. Until greater and more exact knowledge has been accumulated, it will be impossible to legislate intelligently with the purpose of securing greater safety or immunity from danger.

Doctor Holmes, in charge of the technological branch of the United States Geological Survey, has officially expressed the opinion that, with all the investigations of this and other countries up to date, sufficient information had not yet been obtained to justify any changes in present mining methods, and that the causes of these disastrous explosions had not yet been sufficiently determined.

The coroner's jury investigating the mine explosion at Monongah, in my State, on January 15, 1908, stated:

There are many unsolved questions connected with coal-mine explosions. We recommend that Congress make an appropriation for the establishment of a bureau of investigation to aid in the study of the various conditions under which the explosions occurred and as to how they may be prevented.

I am just in receipt of the following telegram from Governor Dawson, of West Virginia:

CHARLESTON, W. Va., February 24, 1909.

HON. GEORGE C. STURGISS,

Care of House of Representatives, Washington, D. C.:

Legislature has adopted joint resolution which has been approved by me urging you to aid in securing prompt passage of pending bill for establishment of national bureau of mines.

W. M. O. DAWSON, Governor.

Mining engineers, mine owners, and operators, all the organized miners, United Mine Workers, the technical press, and the public press are practically unanimous and most urgent in declaring it the duty of Congress to create a bureau of mines, establish schools of mines and mining engineering in the land-

grant colleges and universities, one at least in each State, and to carry on the work of the stations investigating the causes of mine explosions, with a view to increasing safety in mining.

Sentiments of humanity, public policy, increased efficiency, economy of production, and conservation of our mineral resources all demand immediate and affirmative action on all three of these measures. If I can be instrumental in bringing these to a successful issue, I shall regard that as honor enough for half a dozen terms in Congress.

March 1, 1909.

FOREST RESERVES AND THEIR RELATION TO NAVIGABLE STREAMS, WATER-POWER, FLOODS, AND INSUFFICIENT WATER SUPPLY.

"The forest question is the greatest problem in the conservation of our natural resources."

Mr. STURGISS. Senate bill No. 4825 proposes the beginning of the creation of national forest reserves in such States as contain no Federal lands, by the cooperation of the respective States and private owners of lands with the National Government.

The primary purpose is to conserve the forests that are situated upon the watersheds of navigable streams, and to reforest such watersheds as have been denuded of the original forests, and to protect them from fires and excessive or wasteful cutting. It is alleged by the strict constructionist that this can only be undertaken by Congress under some well-defined grant of power to be found in the Constitution of the United States, and this is generally conceded to be found in the "right to regulate commerce among the several States," which has been accepted without dissent, as authorizing the improvement and protection of all navigable streams or rivers that carry interstate commerce, and by virtue of which many millions of dollars for many years have been annually expended in deepening and widening the channels of such rivers, constructing locks and dams, erecting walls, jetties, and piers, regulating the quantity, direction, and flow of the waters, the height and span of bridges permitted to be built over such streams, and the putting up and maintaining lights and other aids to safe navigation. In the judgment of many, the right to do all these things might be placed upon more impregnable ground under the clause that confers powers "to provide for the general welfare."

Any government worthy of the name, and that has any hope of permanence, must have this inherent right, but, because the National Government is one of enumerated and delegated powers, the fathers wisely included this essential power in a specific grant; and while it has been sparingly invoked in the past, it is becoming recognized as the express grant of a power that will be more and more exercised, where, by the limited territorial jurisdiction of the several States, they are powerless to apply the appropriate remedy for patent evils that affect the citizens of each State.

If the water supply of any navigable stream carrying interstate commerce, or the depth of its channel, or any other thing that diminishes its value as an instrument of commerce between the States, is impaired, and the States refuse, neglect, or

are powerless to correct the evil, then Congress must have power under the interstate-commerce clause to apply the appropriate remedy.

If destruction of the forests on the watersheds of navigable streams diminishes the rainfall and the aggregate water supply for the rivers fed by these watersheds, or causes the accumulated waters from rain and snow to be more quickly discharged in great floods, that imperil navigation and endanger life and property engaged in that occupation, and diminishes the quantity of water at intervening periods so as to suspend, in whole or in part, navigation for months at a time, or if this denudation causes such erosion of the soil upon these watersheds as to carry the silt and detritus into these streams in quantities sufficient to obstruct and fill locks and dams and channels that have been constructed and dredged at great cost, for navigation purposes, then no one can question the power and right of the National Government, under the grant relating to commerce, to apply the appropriate remedy. But the opponents of the power or right to reforest the hills, mountains, and valleys that feed our navigable rivers and to protect and preserve those forests now in danger of destruction content themselves with denying that there is any proved relationship of cause and effect between the forests and the water supply, between denudation and injury to navigability, but practically concede that if such relationship were established, then the federal power might be properly invoked to prevent or remove the cause.

But the evils arising and directly traceable to the destruction of our forests do not affect navigation and consequently interstate commerce alone, or chiefly or most disastrously. The floods arising from the bared watersheds of one State are precipitated upon the lands, lots, cities, furnaces, factories, and homes of another State, inflicting enormous losses of property, of wages, and disease and death upon the innocent citizens of the States that have no jurisdiction and can not possibly control conditions at the source of all this disaster.

Again, streams that are nonnavigable, because of their great fall, have been improved by dams, reservoirs, and canals, so as to furnish enormous sources of power, upon which great industries employing millions of capital and thousands of operatives have been founded, and these streams, having their watersheds and sources of supply in other States than those in which the power plants are located, are beyond the control of the States in which are situate the parts of the streams which are so valuable for water power. Must they be denied all relief merely because their streams are nonnavigable and incapable of bearing commerce between the States, although vastly more valuable than many small navigable streams?

Over \$50,000,000 worth of timber has been destroyed by fire each year for the last twenty years, and last year, the most disastrous in this respect in the history of the country, over \$100,000,000 worth was consumed, and an average loss of 50 lives annually for the twenty years or more was caused by forest fires. The humus desiccated by a long, hot, and dry summer burned like peat, and the ashes were washed away by the heavy later rains and carried into the navigable waters below. If any State neglects to preserve the forests growing

therein, and thereby wastes the heritage of her own people, and endangers that of the adjoining States by providing no system of fire patrol, is there no power anywhere to guard the general welfare of each State, both the innocent-suffering one and the wanton wasteful one? Must all suffer for the acts of omission or commission of one guilty one, over whom the others have no control, jurisdiction, or authority? A government that is powerless to provide for the common welfare is a pitiable spectacle and was never contemplated by the founders of the great Republic. A government that has the power and will not exercise it beneficently for the good of the people who created it has failed to achieve that ideal which we boast is the chief excellence of our Government.

It has been charged in the debate on this bill that purely selfish considerations control those who advocate the enactment of this measure. Those who urge that objection forget that patriotism has been well defined as enlightened selfishness; that selfishness that considers the welfare of every part of our common country. Others have asserted that the bill is a subterfuge, and that the proposed purchase of lands is not limited to the purpose of promoting navigability of streams. They have either not read the bill or have read it carelessly. Section 7 provides that the Secretary of Agriculture shall examine and recommend for purchase only such lands as in his judgment may be necessary to the regulation of the flow of navigable streams, and such lands shall be examined by the Geological Survey and a report made showing that the control of such lands will promote or protect the navigation of streams on whose watershed they lie.

If the policy of this bill can be justified only and yet fully upon the constitutional ground that thereby navigation is a direct instrument of commerce between the States, certainly it can in no wise adversely affect that policy if all the benefits and advantages just enumerated will follow as incident to that course of action, even if these incidental advantages far exceed those that relate to commerce.

If the general welfare be promoted as a necessary consequence of creating and preserving forest reserves in aid of navigation, it is in accord with the general purpose of the Constitution, and at least gives no reason for opposing the proposed legislation.

FOREST RESERVES IN AID OF NAVIGATION.

"The meaning of the Constitution does not alter. Its language as a grant of power to the United States is general, and, as changes come in social and political life, it embraces all new conditions within the scope of the powers conferred." (*South Carolina v. United States*, 199 U. S., 437.)

"The United States is a government, and consequently a body politic and corporate, capable of attaining the objects for which it was created, by the means which are necessary for their attainment." (*Van Brocklen v. Anderson*, 117 U. S., 151.)

"The United States, at the discretion of Congress, may acquire real estate in any State when needed for the use of the Government in the execution of any of its powers." (*Van Brocklen v. Anderson*, 117 U. S., 115.)

"That which is implied is as much a part of the Constitution as that which is expressed." (*South Carolina v. United States*, 199 U. S., 438.)

Those who oppose the general policy contemplated by the bill under consideration, namely, the creation and preservation of forests, assume that the right and power to do so can only be invoked if it can be clearly shown that deforesting diminishes the annual precipitation of moisture, occasions irregularity of water flow by increasing the number and magnitude of dangerous floods at one period of the year, or by reducing the water supply at other seasons to such an extent as to impair or temporarily suspend navigation, or by increasing the silt, sediment, and detritus that is carried by the tributaries into the navigable streams and deposited in the channels, locks, and dams or harbors, to the detriment or impairment of navigability. And thereupon these opponents declare and attempt to prove that none of the evil effects upon navigation just enumerated can be traced to any of the asserted causes, or directly or indirectly to the destruction of the forests.

The chief exponent of these views, and one upon whom all others rely, is Lieut. Col. H. M. Chittenden, Corps of Engineers, U. S. Army, and his paper, "Forests and reservoirs, in their relation to stream flow, with particular reference to navigable rivers," presented November 4, 1908, before the American Society of Civil Engineers, was published in the transactions of that society in volume 24, beginning at page 924, and has already been printed in the speech of Mr. HUMPHREY, the Member from Washington, on the 9th day of February of the present session.

After stating generally that the commonly accepted opinion is that forests have a beneficial influence on stream flow, he states four propositions (p. 925) not fully nor fairly setting out the contentions of those who believe that forests do have a beneficial effect on stream flow. These views, he says, were given general currency nearly forty years ago by Sir Gustav Wex, chief engineer on the improvement of the Danube, whose writings were transmitted into English by the late General Weitzel, of the United States Corps of Engineers, and by that translation became known to the profession and the general public, and are now, as he admits, accepted practically without question in the public mind, and he might have added truthfully, by many if not most engineers of reputation and experience.

He admits precise demonstration of the falsity of these propositions is scarcely possible, and then with cheerful alacrity undertakes this admittedly impossible task, extending his argument over fifty pages, with many graphic illustrations whose pertinence is not apparent after a careful study of his paper. It is made up largely of unproved assertions and illogical conclusions drawn from unproved allegations. In concluding his paper he says that the arguments presented are his individual opinions only, and does not assert them as held by any of his fellow-officers or associates nor give the names of any who agree with him. His statements have been so completely refuted in a paper just prepared, but perhaps not yet given to the public, under the direction of the Bureau of Forest Service, by Mr. Gifford Pinchot, that I submit it herewith:

CHITTENDEN ARTICLE.

The article assumes from beginning to end that the forest influence on run-off is nothing more than the influence of a layer of leaves over an "inclined-plane surface, practically impervious to water" (p. 926).

Ground storage is ignored entirely, and consequently no weight is given to those conditions at the surface of a forest soil which tend to divert waters to underground flow. It refers frequently to the action of the "forest bed" merely in holding water, but emphatically says (p. 927) when "the forest bed becomes completely saturated, its storage capacity is exhausted, and it has no more power to restrain floods than the open country itself" (p. 928).

What is the importance of ground storage which is so lightly passed over? Professor King has found that ordinary soils have an absorption capacity of 4 to 5, or even more, inches of water per foot of depth.^a Ground water extends to great depth. Considering the earth masses which lie above the stream levels in mountainous regions, one can get an idea, though a somewhat inadequate one, of what ground storage means to the permanency of stream flow. The ground water is constantly in motion, is replenished entirely from the surface, and is easily disturbed by any change of surface conditions.

By far the most important action of the forest is in providing conditions favorable for rapid and regular absorption by the surface soil of water from rainfall or from melted snow. Ignoring this most evident and important influence of the forest, the author expresses surprise at "the cheerful confidence with which the popular thought accepts" the theory of forest influences upon run off. This is the real weakness of the article. It denies—and denies without proof—that which any man can go out into the woods with his eyes open and see for himself.

It is admitted that for average conditions the forest bed has a degree of retentive action (pp. 926 and 927), but the author hastens to say emphatically that "it is not true for extreme conditions—great floods and excessively low water" (p. 926). The article further says: "When a period of heavy storm occurs, spreading over a great area, continually increasing in intensity, the forests, by retaining some portions of the earlier showers and paying them out afterwards, do produce a general high condition of the river, which may greatly aggravate a sudden flood arising later from some portion of the water shed" (p. 928). The author will surely admit the fallacy of this statement upon more careful consideration.

Whatever retentive action the forest has under normal conditions it certainly retains under extreme conditions. If a forest-covered soil has the capacity to store and gradually distribute the water from a 2-inch rain, it likewise has the capacity to store 2 inches from a 6-inch precipitation, and even more should the latter be distributed over several days. Any other assumption would lead to the conclusion that the immediate result of a heavy rain is to leave the forest dry, which conclusion clearly indicates that the reasoning must be wrong.

A further mistake is made in assuming that the summer rains absorbed by the forest soil are lost through evaporation (p. 929). Except in light rains, this is not the case. The summer rains are often heavy, and the major part of a usual summer downpour passes into the soil to replenish the streams.

The author says (p. 944), "The constantly reiterated statement that floods are increasing in frequency and intensity as compared with former times has nothing to support it."

It is true we have not long records of stream flow in this country. His statement, however, shows that Colonel Chittenden is unacquainted with, or else ignoring, the records which we have.

Figures from fifteen to thirty-four years for those streams whose watersheds lie in the Appalachian Mountains and which have been heavily cut over within the period of measurement refute absolutely the claims made in this article. In the report of the hearing on House resolution 208 before the Committee on the Judiciary it is shown that the Ohio, Cumberland, Wateree, Congaree, Savannah, and Alabama rivers disclose a marked increase of floods and flood duration. A more recent examination of the records of flow for the Allegheny, Monongahela, Muskingum, and Potomac show precisely the same trend. These streams do not show general increases in the extreme height of floods. Rather, they show a marked tendency of the waters to rush away in many sudden, violent floods of short duration, which is to be expected in the case of barren slopes. Most streams of which we have records show a longer low-water period now than formerly, though the tendency is not so marked as the tendency toward increased floods. Where such a tendency is not in evidence, it may possibly be due to the geological formation of the watershed or to the filling of the stream channels, so that the general water level is raised.

In contradistinction to these streams which have mountainous or hilly watersheds, the Red River, whose upper basin is entirely in the

^aF. H. King: Nineteenth Annual Report, U. S. Geol. Survey, Part II. 75468—8115

plains and in a region which has largely been brought under the plow in the last fifteen years, shows both diminished floods and greatly improved low-water conditions during the past sixteen years. This proves the case over again, only from another point of view. Surface conditions over a watershed clearly have great influence on the flow of the streams which drain it.

Colonel Chittenden has made an unfortunate choice in comparing, as he does on page 936, the floods of March 17 and 26, 1907, on Puta Creek and the American River, tributaries of the Sacramento at Sacramento, Cal. His figures of precipitation for the American watersheds are approximately a correct average of the various gauging stations of the watershed. His figures for the precipitation on the watershed of Puta Creek, however, are absolutely misleading, as is shown by the accompanying map. In order to get an average precipitation of 22.7 inches he has taken apparently only two stations on the watershed, and these on the extreme summit of the Coast Range. As the chart shows, all the greater part of the watershed, some of which shows less than 20 per cent of the figure which he uses, has been disregarded. If figures from all parts of the watershed were used, as they should have been, the average precipitation of this watershed would have come much below the average of the watershed of the American River. Using the right figures, this illustration proves exactly the contrary of what Colonel Chittenden uses it to prove. It proves that a larger precipitation on the American watershed, which is wooded, produces a relatively lower flood stage.

Fundamental errors underlie the author's discussion of influence of forest upon snow melting. The first is that the ground does not take up the water from the first melting of snow. The article says (p. 931): "The water from the first melting of the snow blanket does not sink into the ground, but into itself. * * * The author has seen an 8-foot covering of snow dwindle to 2 feet with the ground beneath it still comparatively dry." This is a very singular observation. In my experience, whenever snow begins rapidly to settle on account of the warmth, free water appears and is to be seen in every stream. In a forest, especially in a mountain forest, the snow usually falls on unfrozen ground, and the natural warmth of the ground hastens the melting of the snow at the bottom. Whatever free water appears soaks at once into the ground.

It is true that because the sun is excluded in a dense forest melting begins later than in the open, and Colonel Chittenden correctly states a universally known fact when he says that "even after the ground in the open is entirely bare, except under the drifts, the forest areas may still be covered with an unbroken layer of snow." Why? Simply because it is colder in the forest. It is colder when the process begins; it is colder day by day until the snow is gone in the open. The forest consequently acts in exactly the same way as the gulch on the north mountain exposure. It catches the average amount, or more than the average amount, of snow, and holds it till the melting time in the open is past. If, in either case, the melting went on as fast as in the open, the discharge of water would be greater, considering the whole watershed, and floods thereby intensified.

The only condition under which the melting is anything like as fast as in the open is during a warm rain, such as often accompanies the chinook winds in the western part of the United States. When this happens, the effect is the same on the snowdrift in the gulch and on the snow blanket in the forest. It melts at the most rapid rate. Once melted there is this difference: Water from the snowdrift is at once in the channel ready to swell the flood; water from the snow blanket is caught up in the layer of leaves and humus overlaying a porous soil and at every moment retarded in its downhill course. A portion seeps down through the humus to the streams and escapes within a few hours or a few days; a larger portion goes into the soil and does not reappear for weeks or perhaps months. The little channels through the debris (p. 957), which Colonel Chittenden has observed so effectually to lead the water away through a forest soil, have escaped my own notice.

Colonel Chittenden's graphic illustration of snow melting in forests and open country (fig. 1) neither shows the fact nor agrees with his own statement. The diagram shows the run-off in forest to cease before the run-off in the open, while, as already noted, he says (p. 931) "even after the ground in the open is entirely bare, except under the drifts, the forest areas may still be covered with an unbroken layer of snow." Who is so blind as not to know that the statement is true and the diagram misleading? Here, again, the main point is not delaying for a few weeks the melting of the snowdrifts. The main point is the facilit-

tating of ground storage, and this the forest does far better than any other means.

The author's avowal that his theory is true for the Adirondacks and the White Mountains as well as the West is contrary to the testimony of those who know real conditions in these regions. One well qualified to know how the flow of the Connecticut River has been affected by timber cutting in the White Mountains is Mr. C. C. Goodrich, of Hartford, Conn., general manager of the New York and Hartford Transportation Company. Mr. Goodrich made the following statement before the House Committee on Agriculture January 30, 1908:

"For thirty years I have been manager of some 35 United States vessels engaged in coastwise trade between the various ports upon the Connecticut River, and in this term I have had ample opportunity to realize the effect upon our rivers of the denuding of the forests in the White Mountains, especially of late years, since the cutting has extended to the minor timber—the spruce of 6 or 8 and even 5 inches, which was formerly left to grow. From the beginning of my experience our floods have commenced about from the 1st to the 10th of April, and they came for the next two months pretty steadily, and for two months longer there was still a steady feed from those mountains. In the last twenty years the freshet has come fully one month earlier, the continuation has been more than one month longer, and the total supply of water has been reduced at least 50 per cent, coming rapidly in the spring, when it was of no use to the mill man or the man engaged in navigation, and escaping and going by without being made valuable in any way, and has been followed at the present time by an almost total lack of flow, beginning with about the 10th of May and extending through until the fall rains come again, nearly to the 1st of October."

It is difficult to see the author's object in discussing with vehemence and at length the effect of forests in increasing precipitation, when he finally arrives at the point frankly asserted by practically all observers that we do not know. Belief in the accepted theory of rainfall and knowledge of the influence of the forest conduce to the idea that forest may increase precipitation, and that in considerable degree. But no careful, comprehensive study has ever been made of the rainfall measurements of the United States to determine this question, and until this is done, little is to be gained by discussion.

Colonel Chittenden's statements regarding erosion are so contradictory as to be self-destructive. On page 949 he says: "In his observation, embracing pretty nearly all varieties of timber land in the northern two-thirds of the United States, he has still to see a single example where the mere cutting off of forest trees leads to an extensive erosion of the soil." Yet out of this same remarkable experience he doubtless speaks a few lines below when he says: "A forest soil unprotected by forest debris is almost as erodible as a field under culture."

Again, he says (p. 950) "Roads and trails are one of the great sources of erosion in hilly countries but plowing and tilling are the principal causes." Further on in the discussion in speaking of the silt carried by the rivers, which he estimates at from 50 to 100 per cent higher than anyone hitherto, he asks, "Where does this enormous volume of soil come from? Is it * * * from cultivated fields, an annual toll laid upon the precious fertility of our agricultural lands? Not at all. Only a very small proportion comes from this source."

Still, again, speaking of the sediments carried by the rivers and its great value in enriching the lowlands (p. 953), part of which he everywhere admits to come from cultivated lands, and some portions of which, indeed, must come from the "forest under culture" (p. 949), which he so much fears, he yet finds it possible to say: "The oft-repeated assertion that owing to the cutting off of forests our rivers are shoaling up more than formerly may be challenged absolutely."

In this bewildering array of contrary assertions, which would the author have us accept?

In a translucent way he senses the fact that there is an erosion problem, that somehow and from some place where it does no particular harm an enormous amount of sediment gets into the streams, that it is carried down and deposited by beneficent floods, not in the channels, but to the great benefit of the lowlands. One gets the idea from his statement that on the whole the process is beneficial and to be encouraged.

Side by side with this befogged conception let us set down the statement of a man who has fully grasped the situation. At the White House conference last May, Mr. J. J. Hill, speaking on this very point, said: "To-day as you ride through the South you see everywhere land gullied by torrential rains, red and yellow clay banks exposed where once were fertile fields, and agriculture reduced because its main sup-

port has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore them."

Despite the failure of Colonel Chittenden to comprehend the situation, erosion is going on so rapidly as to form one of the heaviest taxes upon the Nation's resources. It is going on in burnt-over mountain forests; it is going on far more rapidly on agricultural lands; it is going on most rapidly of all on steep mountain lands which have been cleared and tilled when they should have been kept in forest.

The silt and sand thus derived have gone straight into the streams, are going there now faster than ever before, and are there in greater quantity than at any time in the past.

Even though they are contrary to Colonel Chittenden's claims, there are two fundamental propositions which must be accepted:

The first is that the condition of the surface of a watershed does influence the flow of water in the stream which drains it.

The second is that the streams are filling faster than ever before with silt from denuded mountain lands and poorly tilled farm lands.

With these two propositions before us, how can we escape the conclusion that the improvement and maintenance of our waterways and the protection of our watersheds are one and the same problem?

As supplementing in some degree the statements contained in Mr. Pinchot's paper, I submit some facts drawn from my own State, some of which have come within my own observation and in my personal experience.

I have resided in the valley of the Monongahela River for more than forty years, and have traversed the greater part of Monongalia County many times within that period. A very large part of the heavy timber has been cut off within the last fifty years, much land cleared and put into cultivation. In that time the half dozen or more bridges on Dunkard Creek have been carried away by floods three different times, although when rebuilt they were placed at a greater elevation each time, thus showing the increasing height of the floods as the timber had been cut off. This stream is tortuous, flows for its greater part through a hilly but not mountainous country, joining the river on its western bank, and is about 45 miles long.

A similar condition as to floods and their effects upon the bridges is found to exist in Deckers Creek, which is about 30 miles long, arising in a mountain valley, with a fall of about 900 feet in the last 12 miles of its course, joining the river at Morgantown, on the eastern bank. Probably four-fifths of the original heavy forested area has been cut over within fifty years.

The slopes for the greater part are steep and the surface rocky for the mountain section. High floods and very low water alternate with each other nearly every year, the contrast apparently greater year by year, till a dozen grain and saw mills and a paper factory have been abandoned for want of water and power originally ample, and for the first time in the history of the development of this valley deep wells were drilled during the past summer to secure adequate water for industrial plants that theretofore had drawn their diminishing supplies from Deckers Creek, not for water power, but for steam and mechanical and washing purposes.

About ten years ago, the harbor in the mouth of this creek was dredged out under my supervision to a depth sufficient to load barges with lumber and like supplies, and was so used for three or four years, to supply the markets on the lower river. This harbor has been completely filled with sand and silt brought down the stream by the floods, and the small flow of water during the summer and fall would not for a part of the time float a single, and has formed an extensive bar project-

ing into the river and contracting the navigable channel. It is my conviction that the total annual stream flow has been greatly reduced within the forty years that I have been familiar with this stream, and this has been coincident with and reduced with the removal of the forests.

Flood records as follows have been kept on certain rivers, and show the increase in frequency of floods, in percentages:

River.	Place of record.	Period of record.	Years.	Number of floods in first half.	Number of floods in second half.	Percentage increase.
Ohio.....	Wheeling, W. Va.	1882-1907	26	46	59	28
Monongahela.	Greensboro, Pa.	1886-1907	22	30	52	73
Potomac....	Harpers Ferry, W. Va.	1890-1907	18	19	26	37
Kanawha...	Charleston, W. Va.	1888-1907	20	-----	-----	83

As showing the magnitude of the commerce borne by West Virginia rivers and those that derive the greater part of their water supply from the west and northwest watersheds of the State and the enormous amount of money expended by the National Government for improving the navigation of these streams I submit the following table, taken from data furnished by the Department of Commerce and Labor:

Streams.	Miles of navigable channel.	Government has spent for improvements since 1790.	Tonnage in 1906.
Monongahela in West Virginia ^a	33	\$6,794,827.40	11,447,444
Ohio in West Virginia ^a	285	24,485,261.26	13,163,656
Kanawha.....	90	4,739,108.02	1,613,889
Little Kanawha.....	120	488,844.38	106,510
Guyandotte.....	50	22,500.00	-----
Big Sandy, partly in Kentucky.....	170½	1,445,425.32	148,623
New River.....	-----	112,000.00	-----
Gauley.....	-----	15,000.00	-----
Elk.....	-----	35,000.00	-----
Total.....	748½	-----	26,480,122

^a Whole length.

The tonnage borne by the rivers named, viz, 26,480,122 tons, constitutes one-fifth of the whole river commerce of the United States.

For the purpose of showing the commercial value of the rainfall utilized in various ways and the large percentage that is absolutely wasted or lost, I call attention to the following statistics from the report of the Inland Waterways Commission of the National Conservation Congress, gathered under the direction of Hon. THEODORE E. BURTON, chairman of the Inland Waterways Commission:

The sole source of our fresh water is rainfall (including snow). From this source our running, standing, and ground waters are derived. The habitability of the country depends on these waters. The quantity of rainfall, including the rainfall on water areas, is 215,000,000,000,000 cubic feet. Of the total rainfall, over half is evaporated;

of at least \$25,000,000; an annual benefit through cheapened power of fully \$75,000,000; and an annual saving in soil erosion (or corresponding benefit through increased farm production) of \$500,000,000—a total of \$1,000,000,000, or \$12.50 per capita annually; i. e., twenty times the cost. In addition, large benefits would result from extended irrigation, from the drainage and settlement of swamp and overflow lands, and from purified and cheapened water supply, with consequent diminution of disease and saving of human life.

A conference of the governors of the several States and Territories was called by President Roosevelt to meet at the White House, May 13, 14, and 15, 1908, to consider our natural resources and how best to conserve them. At the request of the President, each governor brought with him three citizens from his State or Territory to act as assistants or advisors. The members of the Cabinet, justices of the Supreme Court, Members of both Houses of Congress, representatives of great transportation and other business interests were also present and participated in the deliberations and discussions. After full consideration, this body of able and representative men unanimously adopted certain declarations, among which were the following:

We urge the continuation and extension of forest policies adapted to secure the husbanding and renewal of our diminishing timber supply, the prevention of soil erosion, the protection of headwaters, and the maintenance of the purity and navigability of our streams. We recognize that the private ownership of forest lands entails responsibilities in the interests of all the people, and we favor the enactment of laws looking to the protection and replacement of privately owned forests.

We recognize in our waters a most valuable asset of the people of the United States, and we recommend the enactment of laws looking to the conservation of water resources for irrigation, water supply, power, and navigation, to the end that navigable and source streams may be brought under complete control and fully utilized for every purpose. We especially urge on the Federal Congress the immediate adoption of a wise, active, and thorough waterway policy, providing for the prompt improvement of our streams and the conservation of their watersheds required for the uses of commerce and the protection of the interests of our people.

The provisions of the bill under consideration are as follows:

A bill (H. R. 26923) to enable any State to cooperate with any other State or States, or with the United States, for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers.

That the consent of the Congress of the United States is hereby given to each of the several States of the Union to enter into any agreement or compact, not in conflict with any law of the United States, with any other State or States, for the purpose of conserving the forests and the water supply of the States entering into such agreement or compact.

SEC. 2. That the sum of \$100,000 is hereby appropriated and made available until expended, out of any moneys in the National Treasury not otherwise appropriated, to enable the Secretary of Agriculture to cooperate with any State or group of States, when requested to do so, in the protection from fire of the forested watersheds of navigable streams, and the Secretary of Agriculture is hereby authorized, and on such conditions as he deems wise, to stipulate and agree with any State or group of States to cooperate in the organization and maintenance of a system of fire protection on any private or state forest lands within such State or States and situated upon the watershed of a navigable river: *Provided*, That no such stipulation or agreement shall be made with any State which has not provided by law for a system of forest fire protection: *Provided further*, That in no case shall the amount expended in any State exceed in any fiscal year the amount appropriated by that State for the same purpose during the same fiscal year.

SEC. 3. That the Secretary of Agriculture, for the further protection of the watersheds of said navigable streams, may, in his discretion, and he is hereby authorized, on such conditions as he deems wise, to stipulate and agree to administer and protect for a definite term of years any private forest lands situated upon any such watershed whereon

lands may be permanently reserved, held, and administered as national forest lands; but such stipulation or agreement shall provide that the owner of such private lands shall cut and remove the timber thereon only under such rules and regulations, to be expressed in the stipulation or agreement, as will provide for the protection of the forest in the aid of navigation: *Provided*, That in no case shall the United States be liable for any damage resulting from fire or any other cause.

Sec. 4. That from the receipts accruing from the sale or disposal of any products or the use of lands or resources from public lands, now or hereafter to be set aside as national forests, that have been or may hereafter be turned into the Treasury of the United States and which are not otherwise appropriated, there is hereby appropriated for the fiscal year ending June 30, 1909, the sum of \$1,000,000, and for each fiscal year thereafter a sum not to exceed \$2,000,000, for use in the examination, survey, and acquirement of lands located on the headwaters of navigable streams or those which are being or which may be developed for navigable purposes: *Provided*, That the provisions of this section shall expire by limitation on the 30th day of June, 1919.

Sec. 5. That a commission, to be known as the National Forest Reservation Commission, consisting of the Secretary of War, the Secretary of the Interior, the Secretary of Agriculture, and one Member of the Senate, to be selected by the President of the Senate, and one Member of the House of Representatives, to be selected by the Speaker, is hereby created and authorized to consider and pass upon such lands as may be recommended for purchase as provided in section 6 of this act, and to fix the price or prices at which such lands may be purchased, and no purchases shall be made of any lands until such lands have been duly approved for purchase by said commission: *Provided*, That the members of the commission herein created shall serve as such only during their incumbency in their respective official positions; and any vacancy on the commission shall be filled in the manner as the original appointment.

Sec. 6. That the commission hereby appointed shall, through its president, annually report to Congress, not later than the first Monday in December, the operations and expenditures of the commission, in detail, during the preceding fiscal year.

Sec. 7. That the Secretary of Agriculture is hereby authorized and directed to examine, locate, and recommend for purchase such lands as in his judgment may be necessary to the regulation of the flow of navigable streams, and to report to the National Forest Reservation Commission the results of such examinations: *Provided*, That before any lands are purchased by the National Forest Reservation Commission said lands shall be examined by the Geological Survey and a report made to the Secretary of Agriculture, showing that the control of such lands will promote or protect the navigation of streams on whose watersheds they lie.

Sec. 8. That the Secretary of Agriculture is hereby authorized to purchase, in the name of the United States, such lands as have been approved for purchase by the National Forest Reservation Commission at the price or prices fixed by said commission: *Provided*, That no deed or other instrument of conveyance shall be accepted or approved by the Secretary of Agriculture under this act until the legislature of the State in which the land lies shall have consented to the acquisition of such land by the United States for the purpose of preserving the navigability of navigable streams.

Sec. 9. That the Secretary of Agriculture may do all things necessary to secure the safe title in the United States to the lands to be acquired under this act; but no payment shall be made for any such lands until the title shall be satisfactory to the Attorney-General and shall be vested in the United States.

Sec. 10. That such acquisition may in any case be conditioned upon the exception and reservation to the owner, from whom title passes to the United States, of the minerals and of the merchantable timber, or either or any part of them, within or upon such lands at the date of the conveyance; but in every case such exception and reservation, and the time within which such timber shall be removed, and the rules and regulations under which the cutting and removal of such timber and the mining and removal of such minerals shall be done shall be expressed in the written instrument of conveyance, and thereafter the mining, cutting, and removal of the minerals and timber so excepted and reserved shall be done only under and in obedience to the rules and regulations so expressed.

Sec. 11. That whereas small areas of land chiefly valuable for agriculture may of necessity or by inadvertence be included in tracts acquired under this act, the Secretary of Agriculture may, in his discretion, and he is hereby authorized, upon application or otherwise, to examine and ascertain the location and extent of such areas as in

his opinion may be occupied for agricultural purposes without injury to the forests or to stream flow and which are not needed for public purposes, and may list and describe the same by metes and bounds, or otherwise, and offer them for sale as homesteads at their true value, to be fixed by him, to actual settlers, in tracts not exceeding 80 acres in area, under such joint rules and regulations as the Secretary of Agriculture and the Secretary of the Interior may prescribe; and in case of such sale the jurisdiction over the lands sold shall, ipso facto, revert to the State in which the lands sold lie. And no right, title, interest, or claim in or to any lands acquired under this act, or the waters thereon, or the products, resources, or use thereof after such lands shall have been so acquired, shall be initiated or perfected, except as in this section provided.

SEC. 12. That, subject to the provisions of the last preceding section, the lands acquired under this act shall be permanently reserved, held, and administered as national forest lands under the provisions of section 24 of the act approved March 2, 1891 (26 Stats. L., 1103), and acts supplemental to and amendatory thereof. And the Secretary of Agriculture may from time to time divide the lands acquired under this act into such specific national forests and so designate the same as he may deem best for administrative purposes.

SEC. 13. That the jurisdiction, both civil and criminal, over persons upon the lands acquired under this act shall not be affected or changed by their permanent reservation and administration as national forest lands, except so far as the punishment of offenses against the United States is concerned, the intent and meaning of this section being that the State wherein such land is situated shall not, by reason of such reservation and administration, lose its jurisdiction nor the inhabitants thereof their rights and privileges as citizens or be absolved from their duties as citizens of the State.

SEC. 14. That 25 per cent of all moneys received during any fiscal year from each national forest into which the lands acquired under this act may from time to time be divided shall be paid, at the end of such year, by the Secretary of the Treasury to the State in which such national forest is situated, to be expended as the state legislature may prescribe for the benefit of the public schools and public roads of the county or counties in which such national forest is situated: *Provided*, That when any national forest is in more than one State or county the distributive share to each from the proceeds of such forest shall be proportional to its area therein: *Provided further*, That there shall not be paid to any State for any county an amount equal to more than 40 per cent of the total income of such county from all other sources.

SEC. 15. That a sum sufficient to pay the necessary expenses of the commission and its members, not to exceed an annual expenditure of \$25,000, is hereby appropriated, out of any money in the Treasury not otherwise appropriated. Said appropriation shall be immediately available, and shall be paid out on the audit and order of the president of the said commission, which audit and order shall be conclusive and binding upon all departments as to the correctness of the accounts of said commission.

These provisions may be briefly summarized as follows: Cooperation by the States, private owners of forest lands, and the National Government for the purpose of protecting the existing forests and to reforest suitable lands. Nothing is compulsory on the part of the States or individuals.

An appropriation of \$100,000 is provided to enable the Secretary of Agriculture to cooperate with the States, when requested to do so, in the protection from fire of the forested watersheds of navigable streams, but requires as a condition precedent that before such cooperation shall be begun or entered into the State shall provide by law a system of forest-fire protection and that the State shall contribute an equal amount for the purpose of such fire protection.

The Secretary may protect and administer private forest lands in the same way upon contracts made by him with such owner.

All moneys derived from the sale or disposal of any products or the use of public lands or the resources of same are set apart as a special fund in the Treasury, to be known as "the national forest reservation fund," to be used in the examination, survey,

and acquirement of lands located on the headwaters of navigable streams.

A commission is created consisting of five persons, including the Secretaries of the Interior, of War, and of Agriculture, and a Senator to be appointed by the Vice-President, and a Member of the House to be appointed by the Speaker, to be known as the "National Forest Reservation Commission," with authority to approve the purchase of such lands as may be recommended by the Secretary of Agriculture, and after an examination by the Geological Survey. The assent of the State in which such lands are situate must first be given. Titles must be approved by the Attorney-General before purchase money shall be paid over. Minerals and merchantable timber on or underneath the lands may be reserved by the owners before transferring the land. The lands acquired under the bill shall be permanently reserved, held, and administered as national-forest land under the act of March 3, 1891.

It is provided that 25 per cent of all moneys received during any fiscal year from the national forests acquired under this act shall be paid over by the Secretary of the Treasury to the State in which such forests are situate, to be expended as the legislature may prescribe, for the benefit of the public schools and the public roads of the county or counties in which such forests are situate, in proportion to the area situate in the respective counties.

It will be seen that the only objection to this bill is the fact that it is too narrow and restricted in its operation.

Neither State nor individual is required to part with his land. Each is free to accept or reject the plan proposed, but it is believed that self-interest will induce in most cases, both States and private owners, to willingly go into this limited partnership with the United States in order to secure uniformity and permanence in protecting the forests and reforesting the cut-over areas that can be profitably included in the plan provided for by the bill.

Protection and preservation of the forests, and of navigability of streams, are the primary purposes of the bill. Co-operation of the States and individuals with the National Government is the method by which they are to be accomplished.

If all this can be done, without hardship to any citizen, what endless and enormous good will flow from the doing. What loss and irreparable damage will follow if we fail!

The forest question is the greatest problem in the conservation of our natural resources. It enters more than any other element into more departments of business activities, and the practical destruction of our timber and other forest products will more quickly be felt in the increased cost of living than the destruction of any other one of our natural resources. The quantity of lumber used per capita in the United States each year is about five or six times greater than in England or Europe and is about three times as great as the annual growth, and with the accelerated cutting as population increases the forests will be exhausted in thirty-five to forty years. The bank depositor who checks out three times as much money as he deposits will soon come to the end of his credit and to bankruptcy, no matter how large may have been his original deposit.

Mr. Pinchot draws this graphic picture of the resulting in-

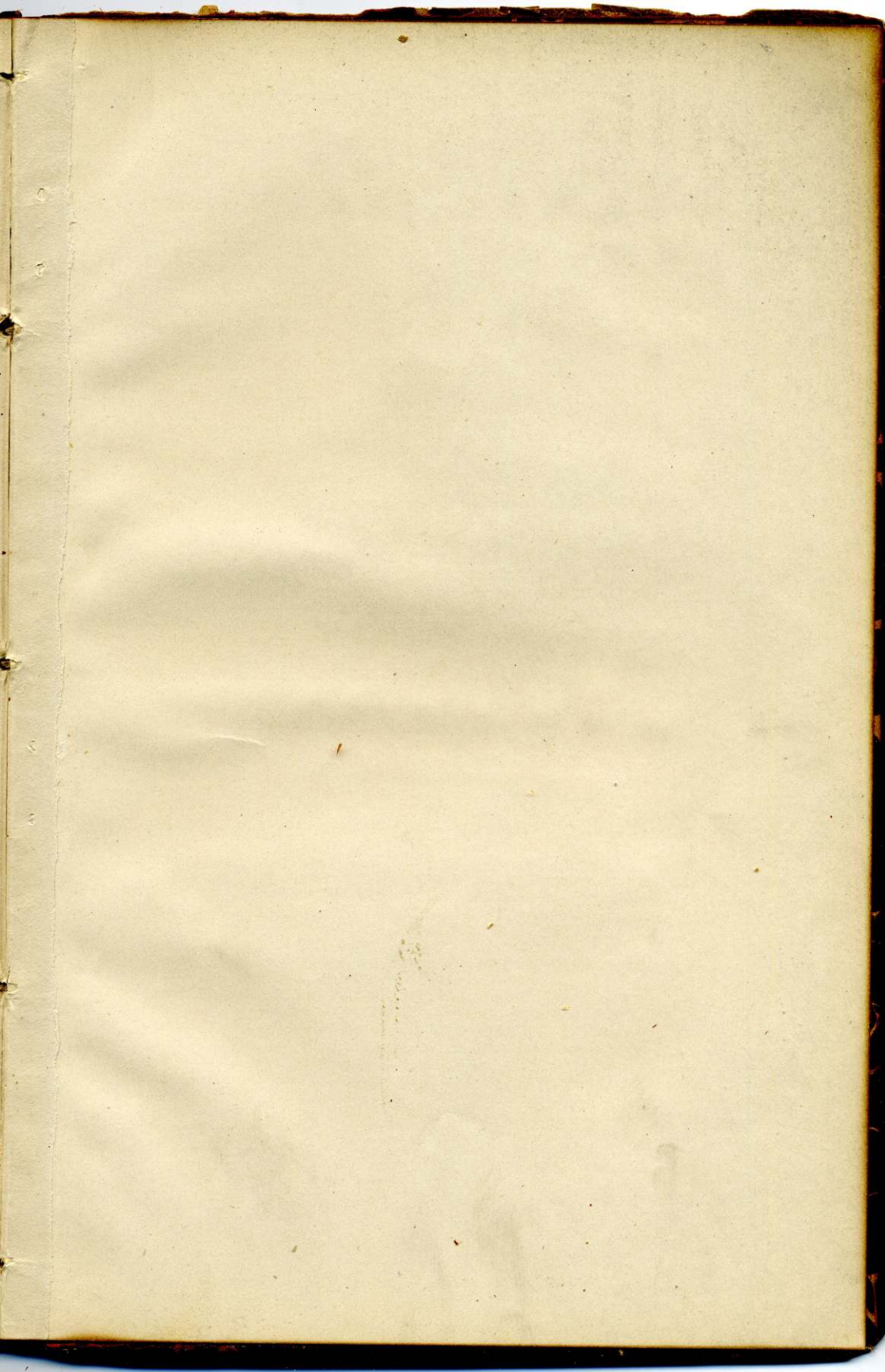
jury and loss in every branch of industry and increased cost of living:

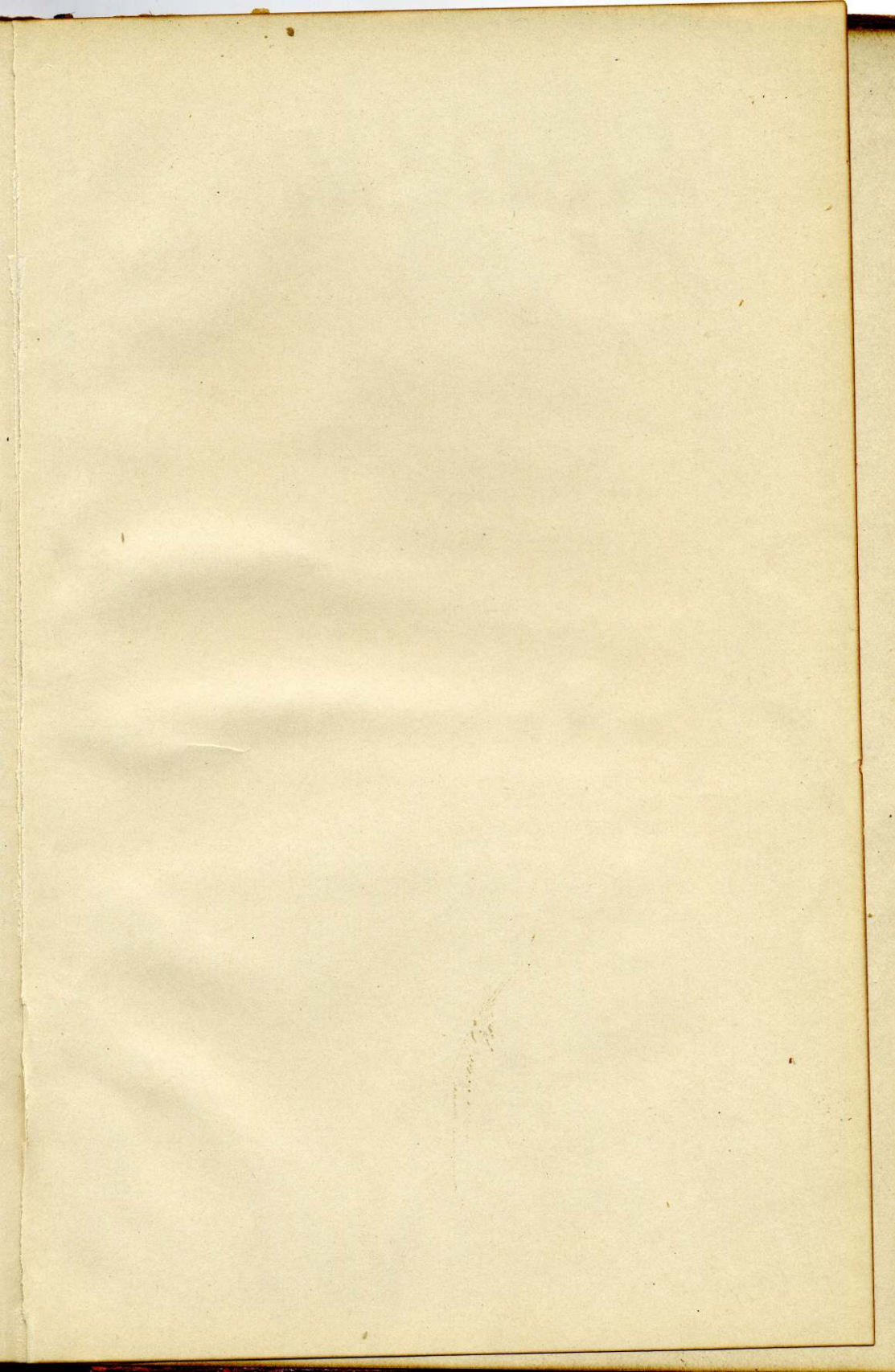
What will happen when the forests fail? In the first place, the business of lumbering will disappear. It is now the fourth greatest industry in the United States. All forms of building industries will suffer with it, and the occupants of houses, offices, and stores must pay the added cost. Mining will become vastly more expensive; and with the rise in the cost of mining there must follow a corresponding rise in the price of coal, iron, and other minerals. The railways, which have as yet failed entirely to develop a satisfactory substitute for the wooden tie (and must, in the opinion of their best engineers, continue to fail), will be profoundly affected. Water power for lighting, manufacturing, and transportation, and the movement of freight and passengers by inland waterways, will be affected still more directly than the steam railways. The cultivation of the soil, with or without irrigation, will be hampered by the increased cost of agricultural tools, fencing, and the wood needed for other purposes about a farm. Irrigated agriculture will suffer most of all, for the destruction of the forests means the loss of the waters as surely as night follows day. With the rise in the cost of producing food, the cost of food itself will rise. Commerce in general will necessarily be affected by the difficulties of the primary industries upon which it depends. In a word, when the forests fail, the daily life of the average citizen will inevitably feel the pinch on every side. And the forests have already begun to fail, as the direct result of the suicidal policy of forest destruction which the people of the United States have allowed themselves to pursue.

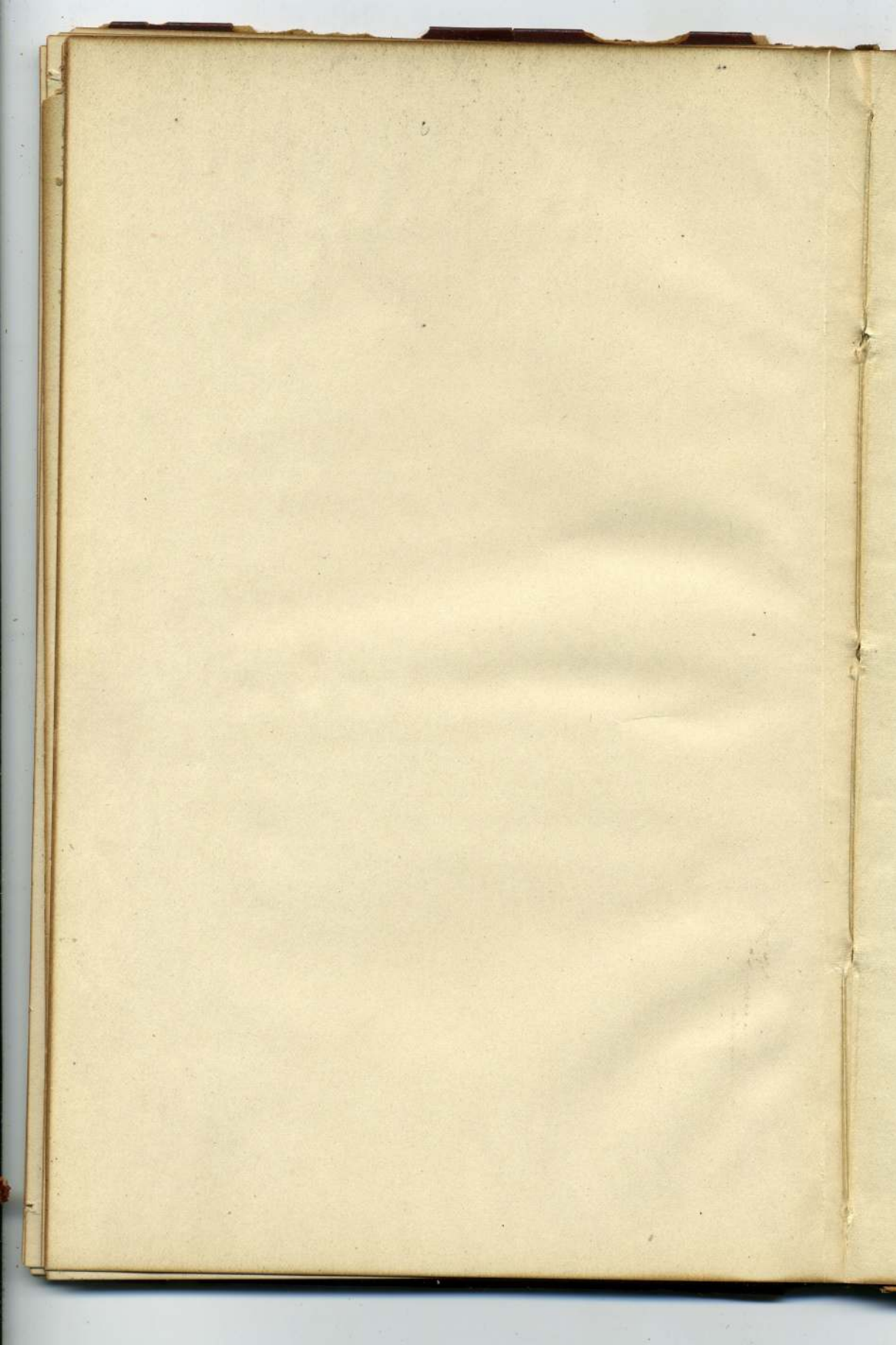
It is admitted this bill, if enacted, will yield the greatest benefits to the White Mountain and Appalachian regions and those States traversed by the rivers that have their sources in the elevated valleys, plateaus, and mountains of those regions, and which carry the commerce of many States upon their broad bosoms.

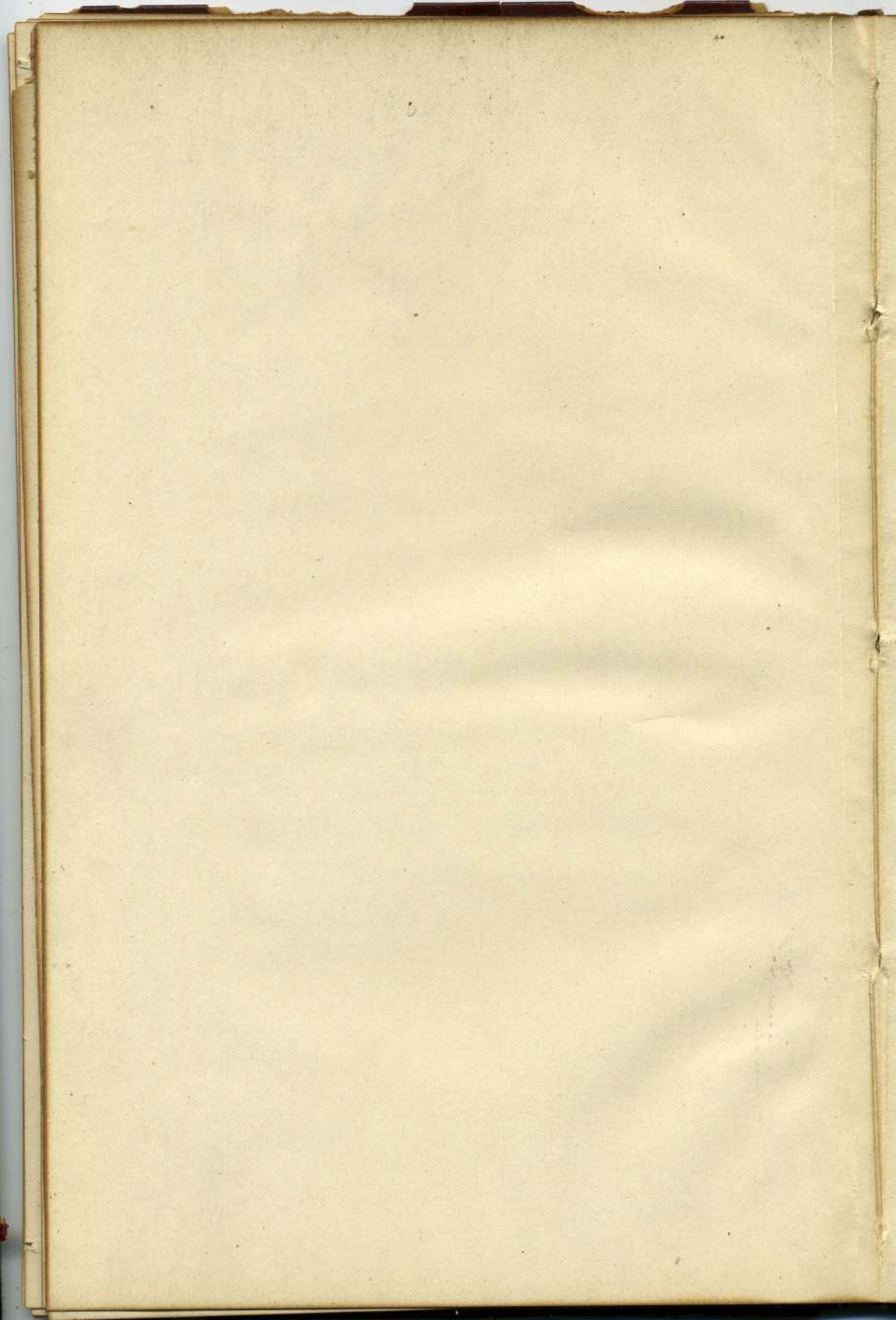
Great schemes of forest reserves have been created west of the Mississippi River by withdrawing the public lands from private entry. The great West has been highly benefited by appropriations of millions of dollars for irrigation and reclamation of the arid lands of that region. For all those improvements the East has cheerfully voted millions of money in the interest of our common country. We now ask reciprocity of aid in support of the bill under consideration, because of the community of interest which the Middle West and West have in the general welfare of the whole country, though the chief beneficiaries will be the New England States, New York and Pennsylvania, West Virginia and Virginia, the South Atlantic and Gulf States, Kentucky and Tennessee, and all the States bordering on the Ohio and the Mississippi rivers and their navigable tributaries.

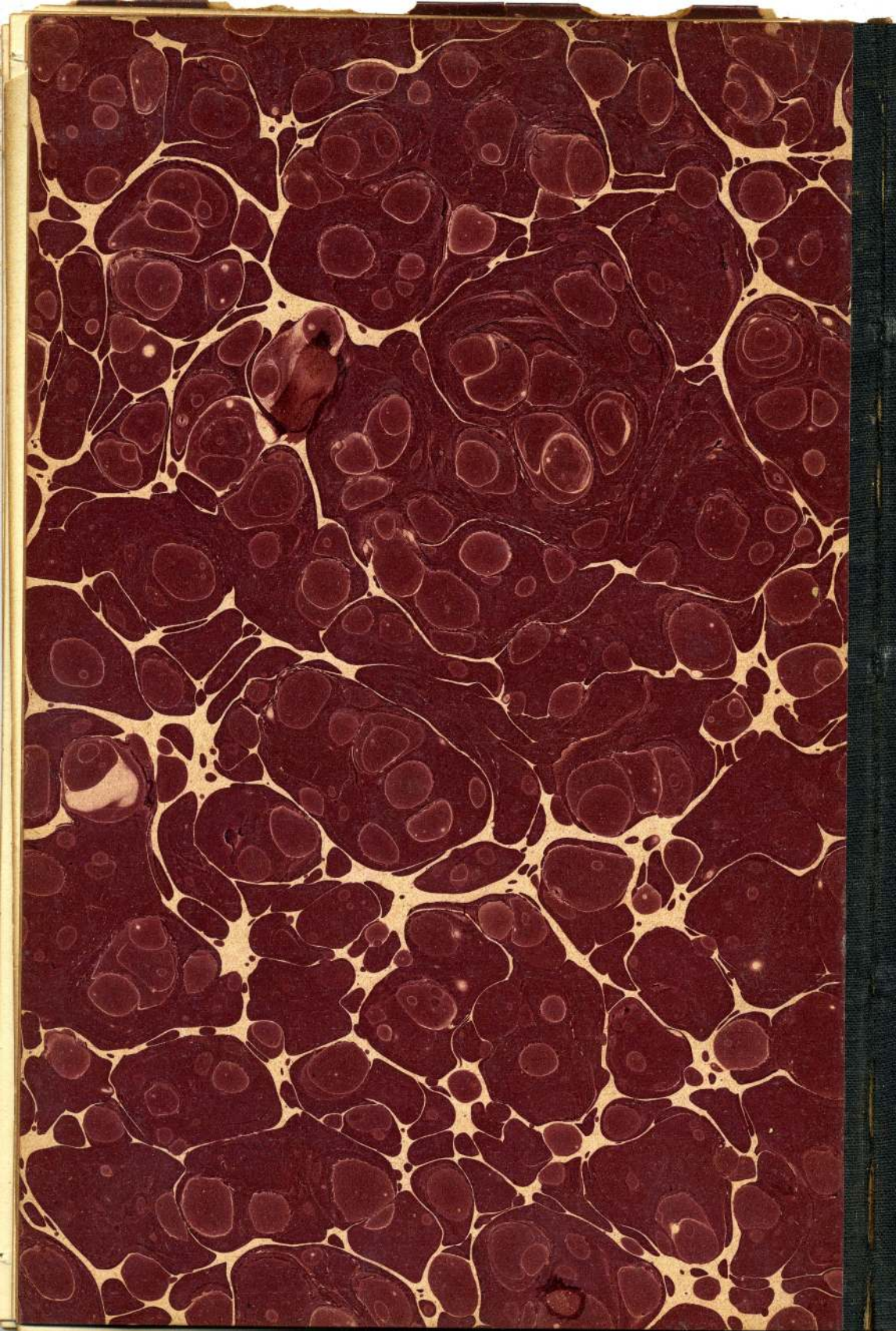
Water power vaster in the aggregate than all the steam machinery within these States will be preserved; direct losses by floods, annually amounting to over \$150,000,000, will be prevented; diseases and deaths by impure water will be greatly reduced; the cream of the soil now washed away, estimated at a billion tons a year, will be preserved to agriculture, adding millions of dollars to the value of the crops of the farmer and saving many other millions of the cost of maintaining channels, locks, dams, and harbors clear from the earth, sand, and debris brought down by the constantly increasing floods induced by deforesting these slopes, hills, and mountains. True economy requires liberal appropriations for the purposes of this bill, by reason of the savings just enumerated. How long will the Congress perpetuate the shortsighted, penny-wise and pound-foolish policy that has characterized its treatment of our forests in the past?

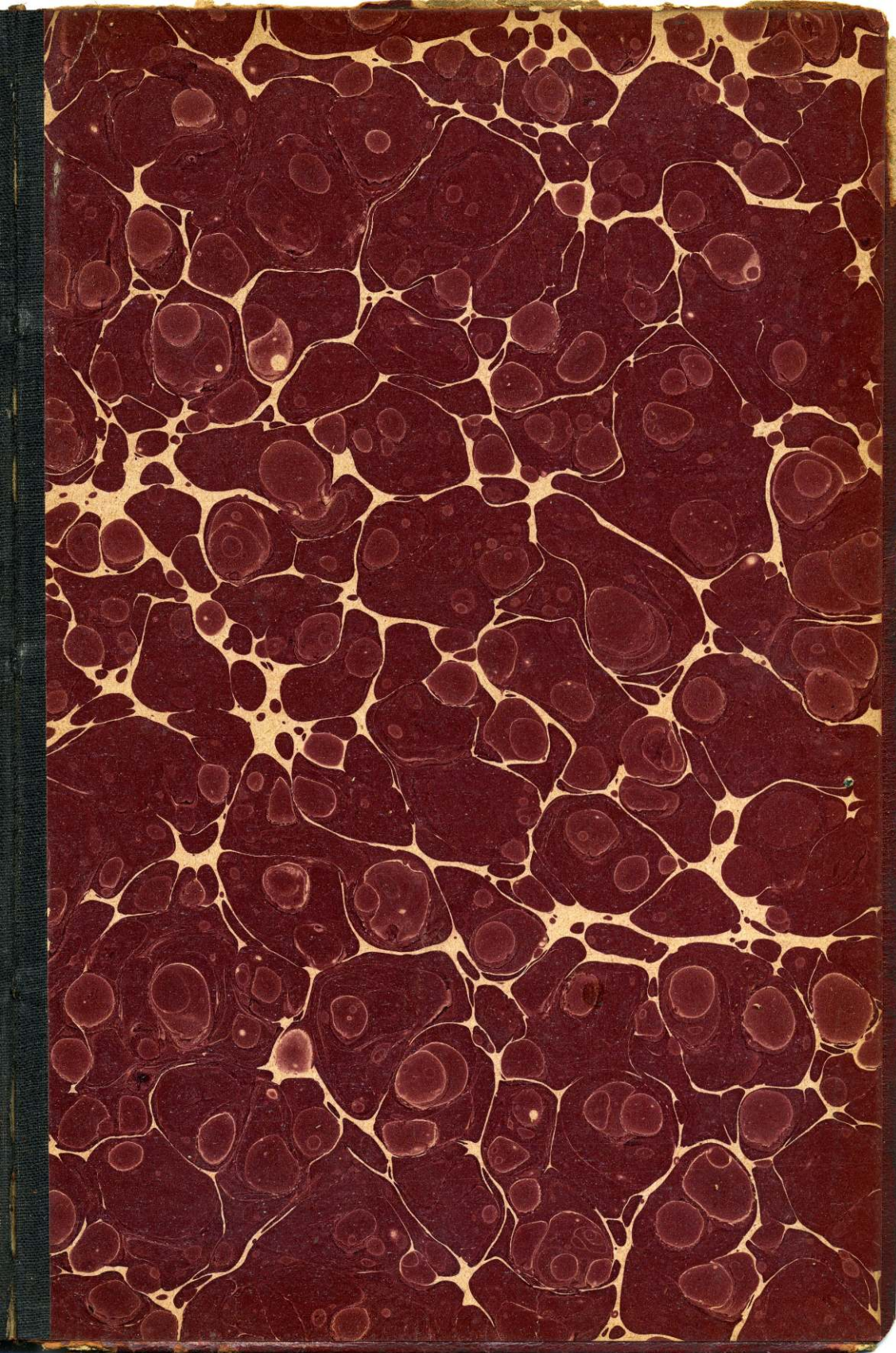


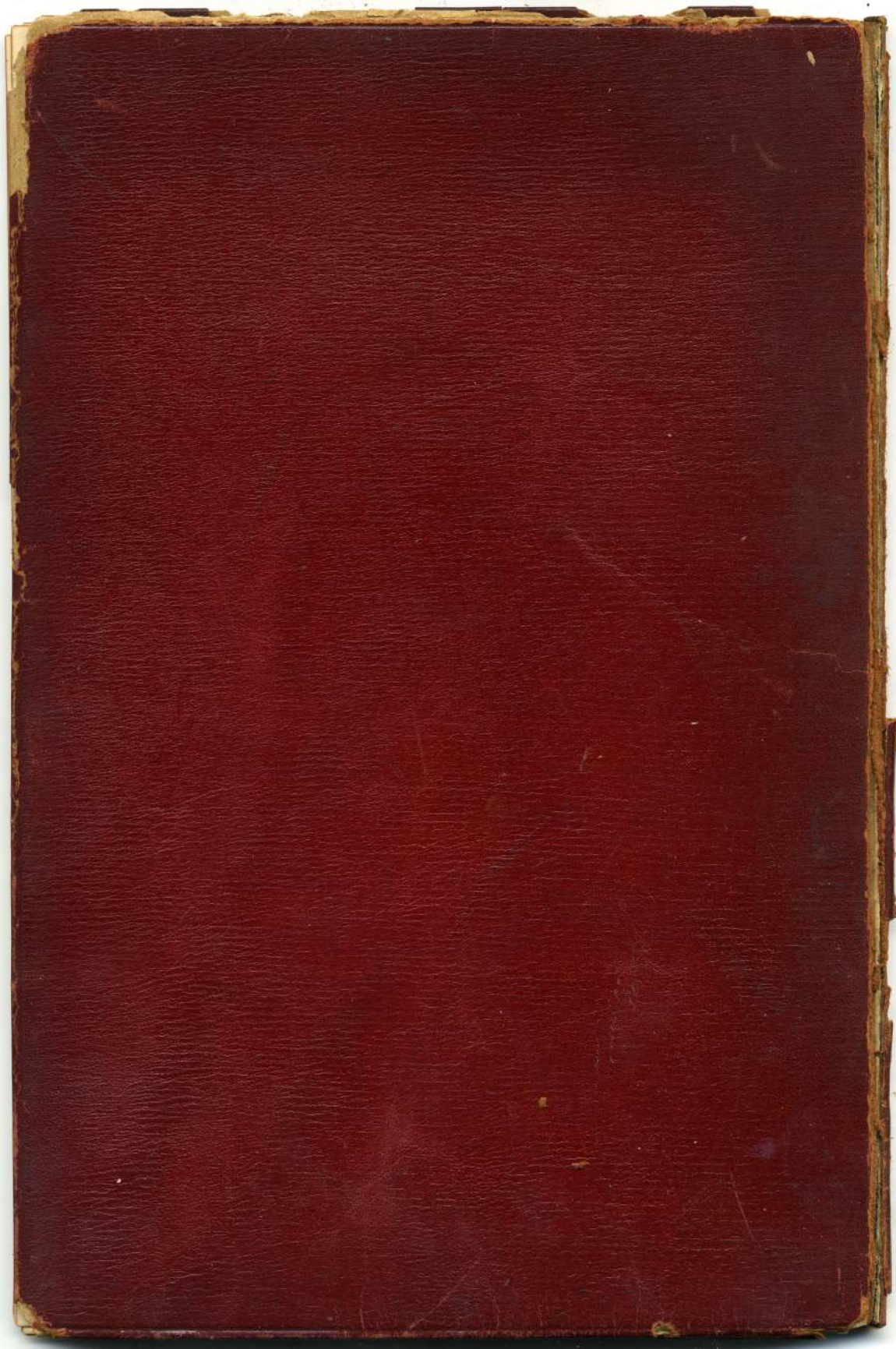












about a third flows into the sea; the remaining sixth is either consumed or absorbed.

WHAT WE USE AND WASTE.

Of the 70,000,000,000,000 cubic feet annually flowing into the sea, less than 1 per cent is restrained and utilized for municipal and community supply and related purposes; less than 2 per cent (or some 10 per cent of that in the arid and semiarid regions) is used for irrigation; perhaps 5 per cent is currently used for navigation; and less than 5 per cent is utilized for power. It is estimated that 85 per cent to 95 per cent of the volume is wasted in freshets or destructive floods.

There are in mainland United States 282 streams navigated for an aggregate of 26,115 miles, and as much more navigable by improvement; there are also 45 canals with a mileage of 2,189.05, besides numerous abandoned canals. On lake and sound routes there is large traffic, but the navigation of rivers and canals is too small for definite record. The cost of water carriage averaging about one-fourth that of rail carriage, and our railway freightage during 1906 reaching 217,000,000,000 ton-miles at an average rate of 0.77 cent, the shipping of one-fifth of our freight by water would have saved over \$250,000,000 to our producers and consumers.

The theoretical power of the streams is over 230,000,000 horsepower; the amount now in use is 5,250,000 horsepower. The amount available at a cost comparable with that of steam installation is estimated at 37,000,000 horsepower, and the amount available at reasonable cost at 75,000,000 to 150,000,000 horsepower. The 37,000,000 horsepower exceeds our entire mechanical power now in use, and would operate every mill, drive every spindle, propel every train and boat, and light every city, town, and village in the country.

The direct yearly damage by floods since 1900 has increased steadily from \$45,000,000 to \$238,000,000; the indirect loss through depreciation of property is probably greater; while the largest loss is that arising in the impediment of navigation and terminal transfers.

The freshets are attended by destructive soil erosion. The soil matter annually carried into lower rivers and harbors or into the sea reaches 783,000,000 tons. Its removal seriously reduces the productivity of upland farms and increases channel cutting and bar building in the rivers. It is estimated that soil erosion reduces farm production 10 per cent to 20 per cent, and that the annual loss to the farms alone is \$500,000,000, and that large losses follow the pollution of the waters and the diminution of navigability in the streams.

Through imperfect control of the running waters lowlands are temporarily or permanently flooded. It is estimated that there are in mainland United States 75,000,000 to 80,000,000 acres of overflow and swamp lands requiring drainage; that by systematic operations these can be drained at moderate expense; and that they would then be worth two or three times the present value and cost of drainage, and would furnish homes for 10,000,000 people.

WHAT WE NEED TO DO.

In considering the uses and benefits to be derived from the 215,000,000,000,000 cubic feet of water annually received, the paramount use should be that of water supply; next should follow navigation in humid regions and irrigation in arid regions. The development of power on the navigable and source streams should be kept subordinate to the primary and secondary uses of the waters; though other things equal, the development of power should be encouraged, not only to reduce the drain on other resources, but because properly designed reservoirs and power plants retard the run-off and so aid in the control of the streams for navigation and other uses.

The broad plan already framed by statesmen and experts and approved by the Executive should be enacted into law. It provides for a system of waterway improvement extending to all of the uses of the waters and benefits to be derived from their control, including the clarification of the water and the abatement of floods for the benefit of navigation, the extension of irrigation, the development and application of power, the prevention of soil wash, the purification of streams for water supply, and the drainage and utilization of the waters from swamp and overflow lands.

It has been roughly estimated that the inland waterways of the country could be improved in ten years at a cost of \$50,000,000 annually in such manner as to promote interstate commerce and at the same time greatly reduce the waste and extend the use of the waters. If done at the cost of the people, the burden would be \$0.62½ per capita per year, or \$6.25 in all.

It is roughly estimated that the direct benefits would comprise an annual saving in transportation of \$250,000,000; an annual saving in flood damage of \$150,000,000; an average annual saving in forest fires