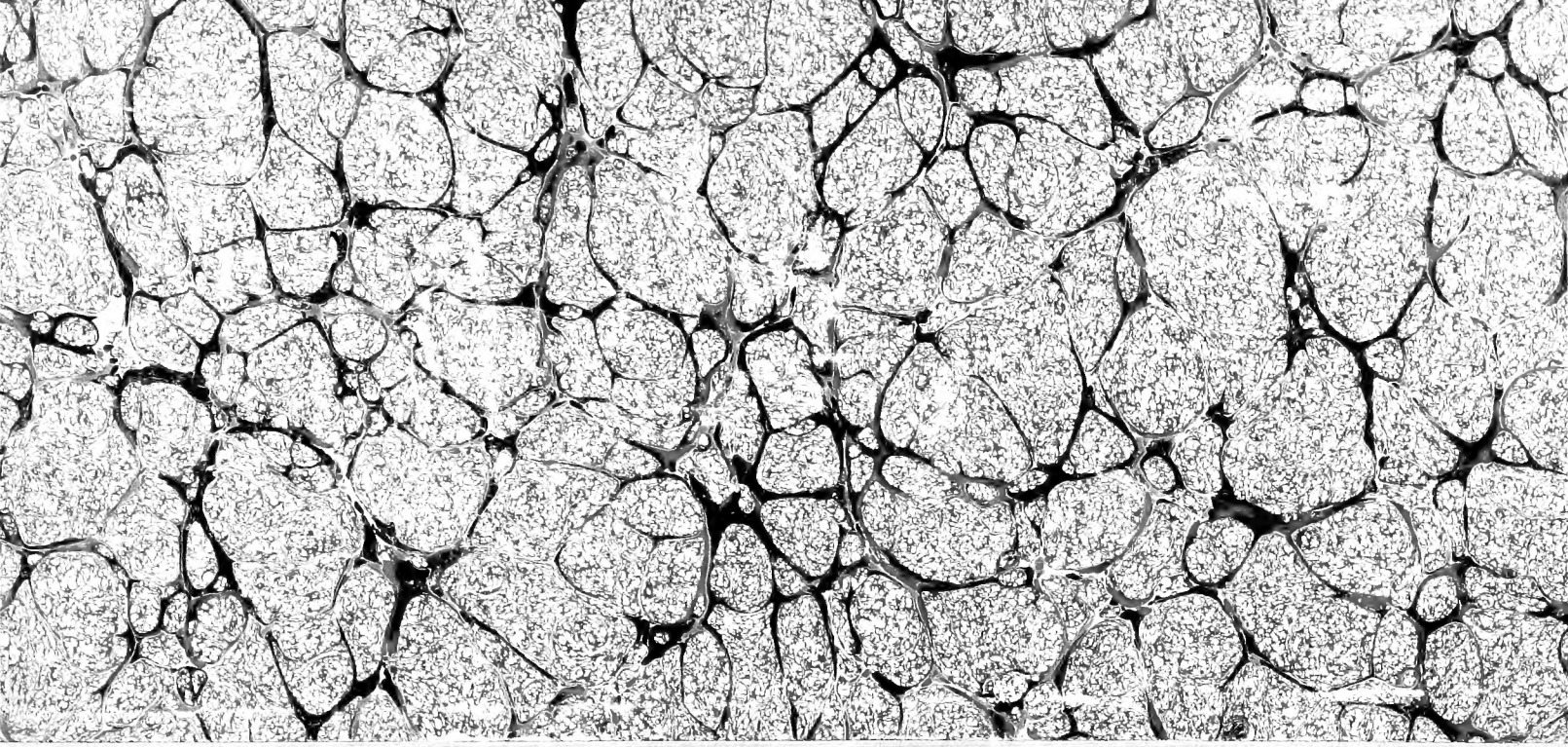

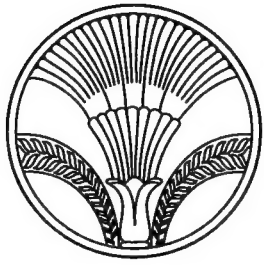

HOUSE OF REPRESENTATIVES, U. S.

# HEARINGS

BEFORE THE

# COMMITTEE ON AGRICULTURE

ON

BILLS HAVING FOR THEIR OBJECT THE ERADICATION OF THE COTTON-BOLL WEEVIL AND OTHER INSECTS AND DISEASES INJURIOUS TO COTTON,

AND ALSO

HEARINGS OF THE HON. SECRETARY OF AGRICULTURE AND CHIEFS OF BUREAUS AND DIVISIONS OF THE DEPARTMENT OF AGRICULTURE ON THE ESTIMATES OF APPROPRIATIONS FOR THE DEPARTMENT OF AGRICULTURE FOR THE FISCAL YEAR ENDING JUNE 30, 1905.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1904.

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# HEARINGS BEFORE THE COMMITTEE ON AGRICULTURE REGARDING THE COTTON-BOLL WEEVIL AND APPROPRIATIONS FOR THE DEPARTMENT OF AGRICULTURE.

## BOLL WEEVIL.

COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
*Wednesday, December 16, 1903.*

The committee met at 10.30 o'clock a. m., Hon. J. W. Wadsworth in the chair, for the consideration of the following bills: H. R. 4477, H. R. 5496, H. R. 7300, H. R. 7304, and H. R. 7646.

The CHAIRMAN. Gentlemen, the business before the committee this morning is the cotton-boll weevil question. I think Mr. Burgess, of Texas, wishes to address the committee.

Mr. BURLESON. Yes; Mr. Burgess desires to make a brief preliminary statement.

### STATEMENT OF HON. GEORGE F. BURGESS, REPRESENTATIVE FROM TEXAS.

Mr. BURGESS. Gentlemen of the committee, I shall endeavor to make a brief statement of my understanding of this whole situation and in support of the bills introduced and now pending; and I will thank the committee if they will permit me to make the statement without interruption, assuring them that when I have concluded I will gladly answer any inquiry that the chairman or any other member of the committee may desire to make with reference to any matter.

The bill which I shall advocate immediate prompt action upon by the committee, and early report and a prompt action of Congress, the number of which is 5496, is not a hasty nor ill-advised one, and perhaps the strongest argument I can make in support of it would be to give a brief statement of the steps which successfully led to its introduction by myself, by request of the whole Texas and Louisiana delegations in Congress, unanimously.

You will notice that the bill states that it was introduced by me by request. Early in the session the Secretary of Agriculture and several of his subordinates having inspected the boll-weevil district in Texas and attended the boll-weevil convention at Dallas, Tex., upon their return we had a conference with the Secretary. As the result of that conference we prepared and signed a statement made to him in the form of a petition, which the committee will find printed in the Congressional Record of the 24th of November, on page 329. That petition is signed by all the members of the Texas and Louisiana delegations and gives a statement of the magnitude of the cotton industries of the United States, of the nature and extent of the peril that

threatens them by the Mexican boll weevil, and of the methods we suggest for relief, and which we ask the Secretary of Agriculture to recommend to Congress. I will not read all of that, although I would be very much pleased if each member of the committee would take the trouble to read the whole statement, because he will find some very interesting and instructive data therein.

Mr. SCOTT. Will you give that reference again?

Mr. BURGESS. Yes, sir; it is in the Congressional Record of November 24, on page 329.

The petition is as follows:

The statement is as follows:

To the SECRETARY OF AGRICULTURE:

We, the undersigned Representatives of the States of Texas and Louisiana in the Fifty-eighth Congress, respectfully present to the Secretary of Agriculture that the supremacy of the cotton industries of the United States is imperiled by the ravages of the boll weevil in Texas, which State produces about one-third of the total annual cotton crop of the United States; and we respectfully represent that the magnitude of the interests involved and the threatened spread of the pests through all of the cotton-growing States makes the question one proper to be legislated upon by the Federal Congress.

The present distinguished Secretary of the Treasury of the United States, in a speech delivered in Boston on the 29th of last October, stated: "We grow three-fourths of the cotton fiber of the world. We export two-thirds of what we grow. That leaves for consumption one-fourth of all the cotton of the world. From this we export a little over $30,000,000 worth and import about $40,000,000 worth of manufactured cotton." An average cotton crop of the United States is about 10,000,000 bales, which at 10 cents a pound (which is less than the present price) amounts to $500,000,000, two-thirds of which, as we export that amount, brings from Europe and pours into the channel of American commerce $333,000,000 annually.

From the Abstract of the Twelfth Census it appears that in 1900 there was invested in cotton compressing, cotton ginning, and the manufacture of cotton goods, $498,000,000. There were $88,000,000 paid out by these industries in wages to employees, and the value of the products produced was $356,000,000. In addition, there was invested, in 1900, in the cotton-seed oil and cotton-seed cake industries $34,000,000, paying three and one-quarter million in wages, and paying $45,000,000 for material, and producing products to the value of $58,000,000. This is a marvelous growth since 1880, when only $7,000,000 worth of cotton-seed products were produced in the United States. This cotton-seed industry is of the greatest importance, because it aids us in maintaining our cotton supremacy in that it adds to the value of the farmers' products from 1 to 2 cents per pound in the price of the lint cotton—that is to say, that a bale of cotton, now sold for 8 cents, would bring the farmer as much money as the same bale would have brought at 9½ or 10 cents per pound prior to the present disposition of the seed, and this is one of the distinct advantages which we possess over the European countries now attempting competitive cotton growing. All of this is intensified in value by a future prospect in the markets in the Orient, superinduced by an increased prospect of an early construction of the isthmian canal.

The manufacture of cotton goods is about equally divided between the South and the East, while the cotton-seed oil and the cotton-seed cake industries are almost entirely with the South. The foregoing facts give a fair view of the magnitude of the interests involved. Now Texas produces, as we have said, about one-third of the cotton upon which all of these great industries rest. The boll weevil first appeared in the southwestern part of the State of Texas, coming from Mexico, and in a few years has spread in a northeasterly direction practically to the Louisiana line, a distance of perhaps 700 miles. If this advance of the weevil continues, but a few years will suffice to carry it across the States of Louisiana, Mississippi, Alabama, and Georgia and into the most northeasterly cotton-producing States of the Union. It is quite difficult to estimate the exact extent of the injury or the financial loss sustained in Texas this year by the cotton growers. The expert of the Agricultural Department, Mr. Hunter, some time since very conservatively estimated that it would not be less than $15,000,000.

The judgment of those of us whose names are signed hereto, and who reside in the infected districts in Texas, is that this year's loss will amount to not less than $35,000,000, and may possibly be as much as $50,000,000. This involves not only a

direct loss to the cotton planters of the State for this year, but under possible conditions it may be much greater next year, for the weevil are spreading somewhat northwesterly and southeasterly along the direction in which they have been going, and a much larger infected district is certain to appear in the State. In addition to this direct loss is the decreased land value, the decreased retail trade, the decreased bank deposits, and the narrowing of the channels of business, and the entire loss of the gold brought from Europe by reason of the cotton export trade, and, worse than all, the poverty of those who are poor, black and white, engaged so largely in cotton cultivation. All this easily suggests to the mind that if this pest spreads into the other cotton States what the effect must be upon all of the other industries depending upon it, and what must become of the cotton supremacy of America in the short space of a few years. It is clear that the most unfortunate thing that could happen to the cotton planters of the South is that reduced production by reason of the boll weevil would augment the price of cotton so as to give an impetus to foreign governments to enter upon cotton production on a large scale, and in addition to manufacturing cotton, as they now do, they would enter upon the cotton-seed oil and the cotton-seed cake industries.

The Department of Agriculture has been doing the best possible with the means in hand to deal with this difficult and troublesome matter, proceeding at first largely upon the theory that it was solely an entomological proposition. First, $10,000, then $20,000, and then $30,000 was appropriated for investigation and experiment stations, and for the discovery of methods to meet the difficulty. The investigations of the Entomological Division of the Department of Agriculture by the chief, Doctor Howard, have been far-reaching and thorough. The life history of the insect has been studied in a way that reflects credit upon that Department's work. All known methods of combating it have received attention. Owing to the habits of the insect the futility of poisons, sprays, and all such methods has been conceded. Up to this date no parasite has been discovered that would war upon this insect, nor has any disease been discovered that would be communicable and thus exterminate them. This insect seems to be the healthiest bug that Doctor Howard has met in his many researches. While these methods can and ought to be pursued further, and doubtless will be, yet by force of conditions other methods must be immediately resorted to involving cultural methods, the diversification of crops, the destruction of all infected materials, the planting of early maturing varieties of cotton, the creation and propagation of the best resistant varieties, etc.

It is now demonstrated beyond all question that the diversification of crops is highly essential. All this would be much more true of the regions east of the Mississippi River, where cotton has been the sole dependence for so many years. All of this work will entail a considerable expenditure of money and will necessitate a thorough organization in the infected districts; and while we gratefully return our thanks to the Department of Agriculture and to the Congress for what has been done in the past, we respectfully urge that much more must be immediately done if the alarming condition now obtaining in Texas is to be successfully met and the spread of like conditions in other cotton-growing States is successfully prevented. The State of Texas has enacted some legislation on the subject and is doing what it can; and the State of Louisiana has become aroused on the anticipated invasion of the weevil and will possibly shortly have a call session of the State legislature to deal with the boll weevil. The magnitude of the interests involved and the peril that threatens the cotton-growing regions and the actual conditions that exist as we know them causes us to suggest to the Congress the adoption of the following plan, which meets with the unanimous indorsement of the signers hereto, and which we briefly state, and the reasons therefor:

First. We suggest that a cotton commission be created, to consist of five members, one from the Bureau of Plant Industry, one from the Division of Entomology, and three practical farmers, two resident in the infected district of Texas and one in the State of Louisiana; that this commission be located at some accessible point within the infected territory. This plan is virtually made necessary in order to bring about any organized adequate relief. The Texas cotton convention, which recently met at Dallas, passed the following resolution:

"Recognizing the great danger confronting the cotton industry of Texas and other cotton-growing States, we earnestly appeal to the Federal Government through its Department of Agriculture to continue its liberal appropriations and to vigorously continue its efforts for the suppression and extermination of the boll weevil, bollworm, and other cotton pests."

This convention created an executive committee, which committee has unanimously requested the Texas Representatives in Congress to secure legislation providing for cotton experiment farms in every county where the county will cooperate

with the Department of Agriculture in its efforts that the pests may be thoroughly and rapidly met and remedies generally applied. It also recommended that two-thirds of the cotton seed, consisting of the quick-maturing varieties now being bought by the Government, be planted upon these experiment farms in each county, so that a large volume of the improved seed be provided for Texas planting in 1905. These suggestions are wise, we think, and could best be carried out under the plan we have outlined. The value of having Texas and Louisiana farmers on the commission is that they will bring to the work of the commission a practical knowledge of the people, climate, and crops involved, and will induce confidence in its recommendations and aid organization and uniformity of methods and cooperation by cotton planters. We further suggest that a fund, to be called "the cotton-investigation fund," of $500,000, or so much thereof as may be necessary, be set aside to be expended by the Secretary of Agriculture in furthering all the purposes contemplated herein; and in this connection we suggest that possibly the remainder of the fund of a similar amount appropriated to stamp out "the foot-and-mouth disease" might be utilized for the fund jointly, so as not to greatly increase the appropriations for the Congress.

It may be possible that the named amount may not be expended in one year, but the conditions are such that it is almost impossible to e-timate in advance and in detail what the expenditures ought to be and will be, and by far the better method is to grant this commission a sufficient sum to cover all possible phases of its work and to inspire confidence and cooperation on the part of the cotton planters. The commission properly organized could so lay out the work as to expedite it in all its phases and bring immediate returns to the fullest possible extent, and would not be hampered in the matter of specific requirements, as would be the case in one of the appropriations for the Department proper. A detailed statement as to how this money ought to be expended so as to bring practical results is difficult, but we suggest the following problems:

First. Demonstration of improved cultural methods.

Second. The location and supervision of experiment stations in counties or in districts organized in one or more counties.

Third. Work, having for its objects the production and distribution of early weevil-resisting varieties of cotton.

Fourth. Studies of cotton diseases.

Fifth. Studies of cotton insects.

Sixth. Introduction of new crops.

Seventh. Studies and experiments in connection with methods for destruction of the boll weevil and other cotton insects.

Eighth. Studies of the enemies of the insects.

Ninth. General propaganda.

Tenth. Cooperation between the States of Texas and Louisiana in methods to be devised to check and confine the ravages of the cotton-boll weevil to Texas and prevent its spread in Texas and into other cotton States.

In our judgment, possibly, the sum we have mentioned may be economically consumed in one year. It may be deemed advisable to cooperate with Louisiana in stamping out the first appearance of the boll weevil in the cotton fields of western Louisiana, and if this be deemed feasible twice the sum named could be sensibly expended annually for that purpose alone. We therefore pray the Secretary to recommend to Congress the adoption of these suggestions.

S. M. Robertson, R. C. Davey, R. F. Broussard, Phanor Breazeale, Jos. E. Ransdell, A. P. Pujo, Adolph Meyer, members from Louisiana; S. B. Cooper, chairman Texas delegation, Scott Field, Geo. F. Burgess, Morris Sheppard, O. W. Gillespie, C. B. Randell, Jno. N. Garner, Jack Beall, Jas. L. Slayden, R. L. Henry, A. W. Gregg, A. S. Burleson, W. R. Smith, Gordon Russell, John H. Stephens, members from Texas.

It will appear from that statement that we recommended unanimously—for this is signed, as you will see, by all the members of the Texas and Louisiana delegation—a plan having two points, practically. First, the creation of a $500,000 fund; second, the organization of a commission of five members under the direction and supreme absolute control, of course, of the Secretary of Agriculture, both with reference to organization of the commission, the plans, rules, and regulations which control it, and the expenditure of the fund which supports it.

Acting upon that statement, you will find in the last report of the Secretary of Agriculture a very full discussion of this matter, a very

concise business discussion of the whole proposition involved, and I wish to call brief attention to some portions of that report:

CRISIS IN COTTON PRODUCTION.

The invasion of the cotton-boll weevil has been a special menace to our cotton crop, and has done more than anything else to awaken widespread apprehension as to the future of this most important crop. The boll weevil first appeared in the State of Texas in 1894, and from that time on has been under observation and investigation by the Department through its Division of Entomology. It was not until 1902, however, that this branch of the Department was able to undertake anything like thorough and systematic work in the matter of studying this very destructive enemy of cotton. In 1903 the scope of the work was further enlarged, an appropriation of $20,000 being made in the Division of Entomology for the investigations. Aside from this work the Bureau of Plant Industry has, during the past year, been carrying on considerable work with a view to securing, if possible, early and resistant varieties by breeding and selection; and has been conducting some more or less general experiments in the matter of crop diversification at special points in Texas. It has also been engaged in distributing a considerable quantity of cotton seed of early maturing and promising sorts.

The work of the Division of Entomology has shown conclusively the value of good cultural methods, the planting of early maturing varieties, and the destruction of weevil-infested material, this conclusion having been reached only through the careful and detailed studies of the life history and habits of the insect. The demonstration work along these lines, which the Division carried on the past year, has been exceedingly promising, as it has been shown that cotton can be grown in remunerative quantity, despite the presence of the weevil. Notwithstanding what has been accomplished by the Department, however, the fact remains that the boll weevil is constantly spreading north and east, and it is probably only a question of time when it will reach all of the cotton-growing States. Thus the country is confronted with a very grave problem, as the invasion of this insect must necessarily mean a complete revolution in present agricultural methods. During a recent visit to some of the Southern States considerable time was spent in the weevil-infested district, and from the facts gathered in this way I am convinced that energetic measures must be adopted to meet the present emergency. After thoroughly canvassing the situation with representative men in Congress and with others, I am of the opinion that a cotton investigation fund should be appropriated and set aside for immediate use in connection with this most serious problem. In order to make the work comprehensive and thoroughly effective, I am of the opinion that a sum not less than $500,000 should be made immediately available for this purpose, the same to be expended under the direction of the Secretary of Agriculture, in such manner as will give the most immediate practical results. As to the problems which might be handled by the Department with such a sum available, I would respectfully call attention to the following:

RECOMMENDATIONS.

1. *Checking sporadic outbreaks of the weevil.*—It would seem highly important that some action be taken looking to the checking, if practicable, of sporadic outbreaks of the weevil in the territory immediately adjacent to that now infested. This could best be accomplished by the organization of a corps of competent entomologists and could be carried on in cooperation with the State authorities. In order to make this work thoroughly effective it will be necessary for the States interested to enact proper legislation. This is a matter that could be handled and guided by those in authority, working under the direction of the Secretary of Agriculture.

2. *Demonstration work to show the value of improved cultural methods by which farmers can produce fair crops in spite of the weevil.*—This is the most promising field for immediate relief, and owing to the fact that the weevil is so far confined to Texas, the work here outlined would necessarily be limited more or less to this State, although regions in adjacent territory should also have such investigations carried on in them in order that the people may become enlightened in advance of the insect's ravages. The object and scope of the work would be to show by actual demonstration experiments the value of better cultural methods, the value of early maturing varieties, and the value of and necessity for complete and thorough destruction of all infested material. To carry out this work thoroughly and effectively would require a corps of men familar with cultural conditions, and who have the knowledge and ability to direct the necessary specific work that might be ordered by the Secretary of Agriculture. Legislation would be required in this case, also, to enforce the destruction of infested material; but, under proper organization, this could be brought about.

3. *Work having for its object the production of new, early, and improved varieties of cotton.*—The value of early varieties has been demonstrated, but most of them have serious drawbacks in that they are poor yielders and the lint drops out easily during storms. These matters may be corrected by proper breeding and selection, and one of the important problems would have for its object the taking up of this work on a systematic scale, to the end of securing sorts which would not only be early, but would be storm proof and resistant.

4. *Studies of cotton diseases.*—While the boll weevil is mainly in the public eye at present, the fact remains that other serious pests of cotton cause great losses annually. It is natural to attribute all losses at the present time to the insect in question, whether these losses be from other insects, diseases, floods, droughts, or whatever source. Reliable studies indicate that the loss in Texas alone from the so-called root-rot disease will, in all probability, aggregate several millions of dollars annually. This and other diseases should be thoroughly studied, and corrective measures should be adopted.

5. *Cotton insects.*—What is said of cotton diseases is also true of cotton insects (especially of the boll worm) other than the boll weevil. These should all receive careful attention, and practical experiments should be carried on with a view to lessening the injury caused by them.

6. *Introduction of new crops.*—The urgent necessity for the introduction of other crops which will take the place of cotton can not be too strongly emphasized. Cotton, of course, should be grown, but the time is evidently at hand when a concerted effort should be made to bring about a change in southern agricultural conditions in the direction of greater diversification. This is recognized now as a vital question in the South. In many sections already the yield of cotton is barely profitable, so that, when the reduction due to the boll weevil and other pests is taken into account, it will be necessary to abandon cotton growing altogether; while the decreased yield in the best districts of the cotton-growing sections renders it more important that other crops should be grown. Such crops as alfalfa, sorghum, Kafir corn, and cereals of various sorts should all receive attention, not only for silage, pastures, and winter forage generally, but for green manures as well.

7. *Studies and experiments in connection with methods for the destruction and control of the boll weevil and other cotton insects.*—It would seem highly important that the Government should take cognizance of the many devices which are being placed on the market for combating the weevil and other insects. This is necessary as much for positive as negative results. Hundreds of devices and nostrums are offered to the public, and people are led to spend money for them. The Government should be in position to determine, once for all, the value or nonvalue of such devices, and thus be able to definitely and positively advise on all matters of this kind. Aside from this, the Government should take the matter of mechanical devices under thorough consideration, and should encourage, by the utilization of mechanical experts, the construction and use of everything which gives promise of practical value.

8. *Studies of enemies of the insect.*—While the studies of the enemies of the insect have had, so far, no practical result, there is no doubt that this work should be continued, and everything in the nature of enemies, whether they be predaceous or parasitic insects, birds, fungus parasites, or others, should receive careful attention.

9. *Securing and distributing seed of cotton known to have special value for earliness and ability to resist the weevil.*—Systematic action should be taken in the matter of securing from every source available seed of promising varieties and thoroughly testing them in the weevil-infested district. In addition to this there should be a systematic endeavor to bring together desirable varieties from all available sources for advance trials in the sections where the insect is likely soon to make an invasion.

10. *General propaganda.*—Under this head there should be organized a competent corps of efficient workers, who could, with the cooperation of the agricultural colleges, farmers' institutes, State boards of agriculture, and all such organized bodies, bring to the attention of planters everywhere the latest results as to methods of meeting the present emergency.

To carry out the foregoing work effectually it is believed that the best results will be secured by a separate organization. It will be seen that the two branches of the Department primarily interested in this matter are the Bureau of Plant Industry and the Division of Entomology, and their officers and men would be in a position to effect the proper organization and to direct the main features of the work. I would, therefore, respectfully recommend that if the amount already mentioned be set aside as a cotton investigation fund the Secretary of Agriculture be authorized to take such steps in the perfecting of a proper organization for handling the work as in his judgment may be best. Owing to the very nature of the investigations and the fact that they will involve most thorough and far-reaching scientific work, the management of the general plans must necessarily rest with the Department. It is believed that

the work can be strengthened by securing the advice and cooperation of one or two thoroughly practical men in the States most directly interested, viz, Louisiana and Texas. The Secretary of Agriculture, however, should have full authority to organize the work for the sole object of securing, as already indicated, the most immediate practical results.

In order to more effectually handle the problems which must necessarily fall to the work of the Division of Entomology, I have already recommended in my estimates that this important branch of the Department be made a bureau. The work that it has done in the past, especially in the field in question, certainly justifies this action; and I most earnestly recommend that this matter be given primary consideration in connection with the entire problem. It is very desirable, furthermore, that the fullest cooperation be effected by the Department with the experiment stations in the respective States where the more important work will be conducted. This is especially true of Texas, where the Agricultural College is doing everything in its power to aid in the matter, but where it is more or less handicapped by lack of proper facilities and funds.

The fund recommended to be set aside for the purposes mentioned, and used in accordance with the plans outlined, will give the Department such liberty of action as the exigencies of the case demand. An industry which brings to the country an annual income of something over $500,000,000 is threatened, and the time is at hand for energetic action. I again, therefore, most earnestly renew my recommendations for the means and authority to carry out the plans as herein set forth.

Respectfully submitted.

JAMES WILSON, *Secretary.*

WASHINGTON, D. C., *November 28, 1903.*

I take it that is a complete support of the unanimous proposition submitted to the Secretary by the Louisiana and Texas delegations, which, of itself, was not a hurried matter, but a matter that we have been thinking about for months and for years, and trying to evolve some practical business way of getting at this evil that is growing, and growing, and growing, and that threatens, if not checked, to ruin the cotton States in the South.

In passing, I say, with regret, that in the home county in which I live, a great historic old county in Texas, where the first gun was fired in the war of the Texas revolution, and where the early settlers organized the town in which I live under the Mexican colonization laws, the loss this year, I know, of my own personal knowledge, will be not less than $1,000,000 in that one county alone. That is easily told by the receipts of the bales of cotton in former years and this year in the different towns where the cotton is marketed.

When we reached this stage we had a meeting of the cotton growers of the other States, together with the Texas and Louisiana delegation. They all indorsed this plan, and a large delegation from the different States, practically all the cotton States in the Union, was raised to call upon the President of the United States, to call his attention to this matter and to suggest to him our desire that some general mention of the important matter be made in his message to Congress. That was done. The delegation waited upon the President, who received us very courteously, and discussed the matter very fully, and finally took action in the matter, the detail of which is unnecessary, and in his annual message you will find these significant words, on page 22:

> The cotton-growing States have recently been invaded by an evil that has done much damage and threatens the entire cotton industry. I suggest to the Congress the prompt enactment of such remedial legislation as its judgment may approve.

The bill was drawn by a subcommittee of the Texas and Louisiana delegation, in conjunction with the Department of Agriculture, and follows closely the lines of the statement which I have read, and the report and recommendation of the Secretary of Agriculture. It is in line with the suggestion of the President as well, and in line with all

anterior legislation of the Congress with reference to similar matters, as closely as this legislation could follow that. For instance, a thorough investigation was made of the different acts with reference to the Bureau of Animal Industry, with reference to the foot-and-mouth disease bill that was passed at the last Congress, and to the extent that this subject admitted of the phraseology of those acts it was followed in this bill. Several sections of the bill are verbatim copies of the sections in the act creating the Bureau of Animal Industry—the last one and part of the third one—and I wish now briefly to discuss the bill by sections. It is composed of four sections. The first section reads as follows:

That the Secretary of Agriculture shall organize in his Department a cotton commission, to consist of the chief of the Bureau of Plant Industry, the chief of the Bureau of Entomology, and three practical men familiar with cotton growing, two residents of the State of Texas and one of the State of Louisiana. The duties of said commission shall be to prepare and execute, under the direction of the Secretary of Agriculture, such plans for lessening the damage caused by, and controlling the spread of, the Mexican cotton-boll weevil and other insects and diseases injurious to cotton as the Secretary of Agriculture may deem best.

You will note that that section creates and defines the powers of the commission, all being subject to the absolute control and direction of the Secretary of Agriculture, as his best judgment may dictate. The number of avenues by which possible good may be brought to the people suffering from this pest are such that we conceive no way except passing legislation to invest extreme—absolute, if you will—power in the Cabinet officer of our nation who has these matters in charge, as you would with reference to quarantine; as we did with reference to the foot-and-mouth disease; as we did with reference to infectious diseases of the Bureau of Animal Industry. To do less than that would only be to possibly hamper practical and sensible business results, and we deemed it better to go the full length in the matter and trust the Secretary of Agriculture absolutely with reference to the work to be done and the money to be expended than to attempt, by any matter of detail, to put any limitations upon his power which we deemed would be injurious to practical, beneficial results.

Section 2 provides:

That in furtherance of the purposes of this act there shall be appropriated out of the Treasury of the United States from any money not otherwise appropriated the sum of five hundred thousand dollars, two hundred and fifty thousand dollars of which shall be immediately available, which shall be denominated the "Cotton fund," and which shall be exclusively applied to the purposes of this act and in the expenditure of which the Secretary of Agriculture shall have plenary and exclusive powers, as he may deem best, to accomplish the purposes of this act.

You will note that that practically gives the same unlimited power with reference to the expenditure of this fund by the Secretary of Agriculture as the first section gives with reference to the creation and management of the temporary commission; because we have no idea, frankly, gentlemen, of creating any permanent cotton commission—none on earth. We never expect to urge any such idea as that, but we urge it simply to meet the impending and threatening and terrible danger that afflicts us, and when the purpose of it shall be accomplished of course the thing will fall to the ground, as was the case in the foot-and-mouth disease bill.

Section 3 provides:

That it shall be the duty of the Secretary of Agriculture to prepare such rules and regulations as he may deem advisable in furtherance of this act, and to certify them to the executive authority of each State and Territory in the threatened region, and invite cooperation in the execution of the purposes of this act.

That is practically a copy of a section of the bill creating the Bureau of Animal Industry, having largely a similar purpose. For instance, we can not know, and human foresight can not determine, just how or to what extent the boll weevil may cross the Louisiana line and appear in the cotton fields of western Louisiana. If, when it does cross, as the Secretary and everybody else believes it will, it should appear at the time practical and feasible for the Secretary of Agriculture to cooperate with the State of Louisiana—which has now, by the way, I will pause and digress to say, a special session of the legislature going on, called by Governor Heard some ten days ago to take action on this matter, so as to create there a commission and invest them with power to condemn and to stamp out any sporadic appearance of the weevil—or with the State of Arkansas, or with the Indian Territory, or with the State, even, of Mississippi subsequently, in an effort to prevent the spread of this weevil into adjacent States and Territories, he ought to have power in the bill to act in that matter as in the other matter; and this section is necessary for that purpose and involves the same phraseology and the same purpose as the act that created the Bureau of Animal Industry, which provided, as this does, that he could adopt rules and regulations and certify them to the authorities in the State or Territory, so as to invite and induce cooperation to meet completely, in the best and most practical, feasible way, whatever might arise in the future.

There seems to be no doubt on the part of any of the thoughtful men who have looked into the matter that the danger for the future is not only to Texas by an increased spreading and an increased devastation, but the danger is that they will rapidly spread across Louisiana and Mississippi and into Arkansas and the rest of the cotton States, and that will mean ruin to us, not only temporarily, but while it may appear far-fetched to some gentlemen, the most potent thing to my mind in this whole matter is that already the increased price of cotton by the biggest bull that has ever operated in the cotton field, the boll weevil, has given an impetus never before given to competitive cotton growing by European nations, and if high prices continue by reason of the further spread and devastation of the boll weevil, we will be seriously threatened by such increased competition in the Indies and Africa and other countries under the care and guidance of European nations, as that our present cotton supremacy may be absolutely ruined. The great advantage we now have grows out of the fact not only of geographic position and cultivation and favorable climate and all that, but in addition to that we have a monopoly. If you will pardon the recent controversial expression, which will fasten the idea into your minds, we have, so to speak, a preferential of 2 cents a pound on cotton by reason of our having a monopoly of the by-products of cotton seed, cotton-seed oil, and cotton-seed cake, which absolutely control in the United States. We made last year more than $60,000,000 worth of products from the cotton seed, and paid to the planters $45,000,000 for the seed.

If much more cotton should be raised in Europe and they go into the cotton-seed industry of oil and cake, they will destroy our differential, get 2 cents a pound off the price of our cotton, competitively speaking, and get an increased impetus, so that really the matter is of vast concern; for when we consider that annually, at the present rate of bales of cotton raised and the price, $330,000,000 in gold are brought from European markets and poured out into the channels of American commerce by the fiber alone, and that $30,000,000 is brought from various South American countries and the Orient in cotton products, and about $23,000,000 from the by-products of cotton seed, and all of it is poured out in the channels of trade in America annually, we see what is threatened and what is at stake. This constitutes one of the chief imports that make the great balance of trade in our favor.

The last section is a verbatim copy of a section in the bill which created the Bureau of Animal Industry. Section 4 is as follows:

> That the Secretary of Agriculture shall report annually to Congress, at the commencement of each session, a list of the names of all persons employed, an itemized statement of all expenditures under this act, and full particulars of the means adopted and carried into effect in furtherance of the purposes of this act.

So that if mistakes are made—and it is human to err—the matter can be annually fully looked into by the Committee on Agriculture and by the Congress, and whatever amendments are necessary or whatever enactment is necessary, in the way of the extension of the fund, or anything else, it can be done intelligently and in a business way under this bill.

I do not wish to detain the committee, and I thank all of you for the close attention you have given me in the matter. If any gentleman desires to interrogate me, I will be very glad to answer him.

Mr. HASKINS. How long has this boll weevil been devastating your crops in Texas?

Mr. BURGESS. Something less than eight years. Its first appearance was in what we call the Rio Grande counties in Texas, in the extreme southwestern part of the State, and undoubtedly it came from Mexico. That has been determined by Doctor Howard's investigation in the Bureau of Entomology of the Department of Agriculture. They have chased the bug down and they know all about it. The only trouble is they find he is the most marvelously healthy bug and the most difficult scoundrel to kill that they have ever run up against in their researches. He does not feed on the leaves of the plant. If he did, this legislation never would have been sought. We worked on him long ago on that theory, but he does not feed on the leaves. He does not feed, even, on the leaves of the square; but those of you who are familiar with cotton growing will understand when I tell you that this bug comes out and he goes in the butt of the square, in under the leaves, and bores into the embryo boll, deposits his seed, and then on and attacks another square. The effect of that is that the square, which is the first process of development of fruit with cotton—the square going into the bloom and the bloom into the full-grown boll, something after the fashion of other fruits—the effect of that is that the square withers, dries up, and falls to the ground in a few days. I believe it is fourteen days, is it not, Doctor Howard?

Doctor HOWARD. Yes.

Mr. BURGESS. That is the estimate. From the deposit that larva hatches out into another boll weevil.

Mr. HASKINS. Has the State of Texas heretofore taken any action in this matter, toward eradicating it?

Mr. BURGESS. Oh, yes, sir. We have had several acts of the legislature, and we have an agricultural and mechanical college actively at work. We have some experiment stations. We offered a $50,000 reward, and organized a commission to visit different farmers and receive applications for the award and make different experiments and test different methods for the extermination of the boll weevil. Without going into the detail of it, I will just say that it panned out nothing. We found out nothing that would kill the bug, and the most that has been done, in my judgment, is due to the Department of Agriculture, and especially to the two subdivisions, the Bureau of Entomology and the Bureau of Plant Industry (and primarily to the Bureau of Entomology), in the different experiments which have demonstrated that it will be possible to lessen very greatly the ravages of the weevil by breeding resistant sorts of cotton, and peculiar kinds of cotton, and early varieties of cotton.

For instance, it is pretty well established and pretty generally accepted—and I am a rather good boll-weevil authority myself, as I have been for eight years right where they are under my nose in every field, and it is a large agricultural county I live in—that the less leaves, the less foliage, the cotton has the better; that the more rapidly and earlier the squares form and the bigger the fruit at the first bounce, so to speak, the better, the reason being that this bug comes out in the winter in not very great numbers. The first crop, as we call it, of the boll weevil does not very seriously injure the cotton crop, but they reproduce so rapidly and so enormously that the second stage of them, when they shoot in the squares and the squares fall and their young come out of these fallen squares in boll weevils, and practically devastate the fields wherever they go in, so that the earlier the foliage, the less the foliage, and the greater the cultivation the more you can make, for in addition to the facts that I have stated about them coming out in not so great numbers, it seems to be true that you can not kill the full-grown bug with heat or cold. We have frozen some of the scoundrels in a bar of ice and kept them two days and then broken the bar of ice and put them in the sun and they thawed out and flew off. That sounds like a dream, but it is a fact; and heat seem not to affect the full-grown bug, but it does affect the larvæ. For instance, if there is less foliage on the cotton and these squares fall down to the ground, and the rows have been planted wide apart and broadside with the sun's rays so that the sun falls down hot upon them, a very great many of them never hatch out. In other words, the intense heat of the sun will destroy the larvæ in the square, although it will not destroy the full-grown bug.

So that these cultural methods are now apparently the main reliance. Of course we do not want the further investigation abandoned. I understand Doctor Howard contemplates further investigation, and, I think, very wisely. He has heard of some appearance of a bug like this down in Central or South America, and he wants to keep chasing the matter down to see if we can not find there a disease that can be communicated to the boll weevil, or a parasite that will prey upon him, so that, after the manner of the Department in the scale matter in California, they can rid us of the pest in that way. We want pursued all the different avenues that offer any practical relief. That is one of

the main reasons why we regard a general bill of this sort as absolutely essential. If you attempt to make specific appropriations, you only limit the power and practical business effect of the organized effort or plan.

Mr. SCOTT. Do these weevils prey upon any other plant?

Mr. BURGESS. No; I think not.

Mr. SCOTT. Where do they harbor during winter?

Mr. BURGESS. In the stalks, under the bark of the cotton stalks, in some instances, under the bark of logs in the fields and places of that sort where they get shelter.

Mr. SCOTT. Have any experiments ever been made looking to destroying the weevil during that period of its life?

Mr. BURGESS. I think Doctor Howard and his assistants have devoted a good deal of attention to that, and are still doing it.

Mr. BURLESON. Unquestionably. There have been repeated experiments.

Mr. BURGESS. A great many experiments have been made, and a great deal of study and thought has been given to it, but I am not advised that any method has yet been discovered of striking them in that stage. I think that is a wise suggestion, and that method of procedure ought to be closely and scientifically pursued, because if these fellows can be wiped out in the winter that ends the proposition.

Mr. BURLESON. In large numbers they leave the fields in the winter aud hibernate in the woods.

The CHAIRMAN. What percentage of the crop do they destroy on the average? The entire crop?

Mr. BURGESS. Take my county, Mr. Wadsworth. That is a pretty fair illustration. I think they have destroyed 50 per cent of the crop, easily.

Mr. GRAFF. Take it in a field where they appear, do they clean out the whole field?

Mr. BURGESS. In the field they run as high as from 10 to 60, 70, or 80 per cent. To illustrate: One of the largest planters in my county plants 2,200 acres in cotton and has made as high as 1,700 bales. In that field he will make this year 103 bales.

Mr. ADAMS. Is spraying possible practically, or is it too expensive?

Mr. BURGESS. If you could catch him and spray him, that would solve the difficulty; but the trouble is he gets in under the square, Mr. Adams. Did you ever see a cotton square?

Mr. ADAMS. No.

Mr. BURGESS. Suppose this [illustrating] is the embryo boll and suppose four pretty nice leaves meet in this way. Over this embryo bloom or boll this fellow gets in under these leaves and goes on this boll.

Mr. ADAMS. He has to be somewhere else before he gets in there.

Mr. BURGESS. That is true; but he gets in there with lightning rapidity. We have tried a great many experiments on the line of spraying him. We have tried it with sulphur fumes and arsenic and Paris green and almost everything you can think of. It undoubtedly does kill some of them.

Mr. HAUGEN. About how many bales of cotton do you produce in Texas?

Mr. BURGESS. It is estimated that in Texas and in the Indian Territory together we produce ordinarily something over a three million bale crop, about a third of the total production of the United States.

The CHAIRMAN. What is the estimated loss?

Mr. BURGESS. My judgment is, Mr. Chairman, that the loss will run more than $30,000,000. It is rather hard yet to get at it accurately.

Mr. HAUGEN. What is the cotton selling at?

Mr. BURGESS. A bale of cotton now will bring about $60. I believe, undoubtedly, that all the cotton planters will agree it would be better for the country and for all concerned if cotton never was above 10 cents a pound; 9 cents would be better.

Mr. BOWIE. Is it not a fact, Mr. Burgess, that if the cotton of the South is destroyed or cut half in two, it practically destroys the milling industry not only of the South, but of the East as well, or at least destroys any power of making money in that line?

Mr. BURGESS. I want to say this in connection with that matter. That was one of the reasons why I called particular attention to the statement that is printed in the record, because I took the trouble, being one of the committee that prepared that statement, to collect from the census the absolute figures with reference to all these cotton industries. They show that about half of the manufacturing cotton industry is divided between the South and the East, and they produce nearly $400,000,000 worth of cotton products in the whole United States. Of course to decrease the raw material upon which these industries rest and to increase its price is to check and arrest their growth and development.

I see Professor Howard has a magnified model of the boll weevil on the table.

Professor HOWARD. Yes.

The CHAIRMAN. Mr. Burleson, this matter at the last meeting was left somewhat in your charge, with regard to the cotton interests you represent. What arrangements have you made as to the order of speaking?

Mr. BURLESON. I suggest now that Doctor Galloway or Doctor Howard, either one of them, be heard.

The CHAIRMAN. Very well.

## STATEMENT OF PROF. BEVERLY T. GALLOWAY, CHIEF, BUREAU OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE.

Mr. GALLOWAY. Mr. Chairman and gentlemen, I shall not take any time in going over the same ground that Mr. Burgess has gone over. He has covered that subject pretty thoroughly. I would also refer you again to the Secretary's report, on page 88, where he discusses the general proposition. My object shall be wholly to take up the lines of work which are suggested in the Secretary's report and to explain somewhat in detail the investigation that the Department believes should be put in operation in order to bring about the results that are desired.

In the first place, I want to emphasize that this is a matter that concerns not only the State of Texas, but the entire South. Anything that has anything to do with the cotton crop affects every industrial operation in the South, so that it is, considered from that point, a question for all the cotton-growing States, and especially in view of the fact that sooner or later this evil will invade the adjacent territory.

There is one other matter that I wish to emphasize at this time. That is, that like all similar invasions of this nature, pretty nearly

everything that happens to cotton now is attributed to the weevil. There are a great many other things that are destructive. Of course the cotton-boll weevil is the thing that is now in the public eye, but there are such things as storms, and floods, and similar things, and any injury, any damage, is generally attributed to this particular thing.

Taking up, therefore, the lines of work that are enumerated by the Secretary in his report, there is reference on page 88 to the first line of work, "checking sporadic outbreaks of the weevil." Dr. Howard will talk on this subject, and I only wish to say a few words in passing. In the matter of the expenditure of money in this field alone, the entire amount could probably be used, but it is a grave question whether the Department should take any action to that end. It is a question whether the States themselves can not, if it is deemed wise to do so, act in the matter, and it is merely a question of detail whether or not the Department should spend $10,000, $20,000, or half a million dollars in attempting to check sporadic outbreaks. I do not by that mean that efforts should not be made to check sporadic outbreaks, because I think efforts in that direction could be well put into operation.

The CHAIRMAN. Have any sporadic outbreaks occurred?

Mr. GALLOWAY. Yes, sporadic outbreaks have occurred and are occurring on what is called the wave of the evil.

The CHAIRMAN. It is absolutely by contact from the diseased or affected portion of the country, is it not?

Mr. GALLOWAY. Sporadic outbreaks, of course, would come in that way; but the point I had in mind was where a sporadic outbreak would be of such a nature that to stamp it out would not require a great expenditure of money. The question of the expenditure of money that I wish to speak about is whether or not the General Government should take action with reference to reimbursing cotton growers for crops that are destroyed. That is where the expenditure of money might be run to any limit. That method, of course, was followed in the case of the foot-and-mouth disease, where the Government actually reimbursed, to a certain extent, owners of cattle who had such cattle destroyed. But those things Doctor Howard will discuss more fully, and I shall leave them in that shape.

Mr. SCOTT. You have alluded to a sporadic outbreak. If it would not interrupt you to ask the question now, I would like to inquire whether this boll weevil has inflicted anything like as much damage in other cotton-growing countries as it is now inflicting upon our country.

Mr. GALLOWAY. I think not. We have suffered more than any other country.

Mr. SCOTT. And whether some other countries have had a visitation from it, and it has then, after a period, passed away.

Mr. GALLOWAY. I think not. The thing is existing in Mexico and and doing as much damage there as it ever did.

The CHAIRMAN. Do they continue to raise cotton there?

Mr. GALLOWAY. They raise cotton in certain sections where the weevil does not exist or can not exist owing to climatic conditions. There are certain elevated portions of Mexico where I understand they can grow cotton, but we do not have any such climatic conditions in this country.

Mr. BURLESON. They were forced to abandon the culture of cotton in the infested districts of Mexico.

Mr. SCOTT. Do you know whether, after the culture has been abandoned in a certain district for a number of years, it can then be resumed?

Mr. BURLESON. They attempted to resume it after a lapse of ten or twelve years, and the weevil destroyed the first crop, just as it had destroyed the last.

The CHAIRMAN. The wheat weevil attacked our wheat in 1857 and we had to abandon the raising of certain kinds of wheat; but we introduced what was called the red Mediterranean bearded wheat, which was a resistant, and we got rid of the weevil in that way.

Mr. BURLESON. I would be glad if Doctor Galloway would direct attention to one sporadic outbreak or manifestation of the weevil in Louisiana and the steps that were thought necessary to take in order to destroy it.

Mr. GALLOWAY. In company with the Secretary, when we visited the Louisiana Experiment Station, we were informed by Doctor Stubbs, the director, that there had been an outbreak of the weevil, or the weevil itself found, in the cotton growing on an experiment farm. It was pretty generally shown, I believe, that this was an artificial introduction brought over for probably speculative purposes. There was some argument between Doctor Stubbs and a gentleman living in New Orleans about certain matters pertaining to cotton. Doctor Stubbs made the statement that the weevil did not exist in Louisiana. This gentleman asserted that it existed right under the nose of the director, and that he did not know it. He made the statement that it was there, and Doctor Stubbs made the statement that it was not. This other gentleman went out and found the weevil right in the place. Then Doctor Stubbs took radical measures for eradication. He destroyed every stalk of cotton he had on the place. He had the roots dug up, and all the stalks and roots piled together and burned, after being covered with oil. Then he treated all the ground with crude petroleum or oil. Then he let in the Mississippi River and flooded the whole thing for a couple of feet and let it stand for a week or ten days. He said that if there were any weevils there, he wanted to be sure they were destroyed, and he abandoned cotton growing on that particular plot of ground.

Mr. LEVER. How far east has the boll weevil gone?

Mr. GALLOWAY. It is still confined to Texas, but it is within 25 to 40 miles of the Louisiana line, as I understand it.

I will simply say a word in regard to the second line of work proposed. That is, "demonstration work to show the value of improved cultural methods by which farmers can produce fair crops, in spite of the weevil." This is the line of work that gives the best promise of good results. It has been put into operation by Doctor Howard, especially the last year, and has for its object, first, the demonstration of the fact that by planting early maturing varieties, by good cultural methods, by the destruction of all infested material, cotton crops can be grown regardless of the weevil; and just in that connection I wish to emphasize what seems to me to be the necessity for establishing quite a number of these demonstration farms. That is, it is not so much a question of the relation of these farms to certain types of district, or certain geological formations, as it is to make actual object lessons so that the farmers themselves, who are conservative and who will not act unless the matter is brought strictly to their attention,

may have an actual demonstration. For this reason I think the demonstration work could be considerably extended, not only in the region where the weevil exists, but in the region outside of that, so as to be working in advance always of the work of the insect.

The question has been raised, and recommendations have been made by the Dallas convention, that one of these demonstration farms might very well be put in every county in the infected districts. About 100 counties are affected now. There are two hundred and some counties in Texas. This is perhaps more than would be required, but I believe the work should be so organized as to have demonstrative experiments of this kind, and it would be economy to have a considerable number at the start, because the results that are wanted can be secured quicker in that way than by having a few and having the effects of the work spread gradually over the State.

So that, as an estimate, $50,000 could very well be spent, probably, in this work, but that is a matter Doctor Howard will more fully discuss, and the experience of this law will show what he has accomplished in that direction. But at the same time it seems to me that the size of the area devoted to this sort of work might be considerably limited so that we would not have too large tracts of territory to cover and look after, and, furthermore, that a considerable portion of this work will not necessarily cost the Government anything except the mere supervision.

Mr. GRAFF. I notice you stated that $40,000 or $50,000 would be necessary to operate 100 of these stations located in the different counties. That would only be about $400 or $500 a station.

Mr. GALLOWAY. The main expense in connection with that work will be supervision and necessary demonstration of the fact that cotton not handled by the methods advocated by the Department would not give a crop. You have got to have "before taking" and "after taking" right together, and the arrangements can be made so that the crops can be made remunerative by following the Department's directions, but you will have to have a portion of the ground in cotton that will be nearly an absolute loss; and to meet that you will have to in some way reimburse the owner.

Mr. GRAFF. Then you think it will only cost $400 or $500 for each station?

Mr. GALLOWAY. That altogether depends on the number of stations, but I do not think it would necessarily cost more than that if you limit the area to 25 or 30 acres, which seems to me all that is required.

I shall pass now to the next line of work, "work having for its object the production of new, early, and improved varieties of cotton and the general improvement of the seed." This is work that would come properly under the Bureau of Plant Industry, and is based on the fact that these early maturing varieties are valuable, but they all have objections, from the fact that they are not as good yielders as other sorts that are not early. They have objections furthermore from the fact that they are easily blown out, as the expression goes, by storms—that is, the cotton is blown out, and in many cases the foliage is of a type that is undesirable. So that in the matter of breeding resistant or storm resistant sorts and early types an important line of work is possible. This would necessitate the careful investigation of cottons growing in other sections, the bringing together

of desirable strains that would be required for securing the necessary hybrids, and in fact all that line of work which has to do with bringing the necessary forces together to make or create exactly what is wanted in the way of early maturing sorts and good yielding sorts.

The CHAIRMAN. And that, of necessity, would be a slow process.

Mr. GALLOWAY. Necessarily a slow process. In addition to that line of work, one of the most important I think in the entire field would have to do with a better method of securing by selection and development stock seed for planting. It is a well-known fact that the cotton seed that is used for planting is more or less constantly deteriorating, owing to the demand for cotton seed in the production of oil and for other purposes. I believe that, taking the matter of seed selection alone, the cotton crop of the country within a reasonable time, with seed selection and good cultivation, could be doubled. I do not think that is an exaggerated statement. I believe that if attention should be given to the breeding up of what might be called stock seed—and I do not think it is a function of the Government to continue that work any longer than simply to demonstrate the fact that it can be done—that we could secure results which would develop the output of cotton fully one-half; that is, instead of having 10,000,000 bales we would have 15,000,000 bales.

The CHAIRMAN. That would reduce the price, would it not?

Mr. GALLOWAY. I do not think it would. I think the demand for cotton is increasing.

Mr. BOWIE. Three years ago we thought it would be a calamity to have as many as 10,000,000 bales. Now it is regarded as a calamity not to have that many. That is the way the conditions have changed.

Mr. GALLOWAY. There seems to be a world-wide demand for more cotton.

The CHAIRMAN. You think the use of the seed for meal and cake has resulted in the deterioration of the seed used by the planters, do you, Doctor?

Mr. GALLOWAY. I think it has.

The CHAIRMAN. That is natural.

Mr. GALLOWAY. Because there is a constant demand. The seed is rushed right to the mills, and you can hardly find a farmer who is giving the attention to the selection of his stock seed that he ought to give; and the evidence that we have as to results procured in the matter of breeding, by selection, high-yielding types of corn is valuable in that connection. That work is now being carried on by private firms in Illinois and other places; but the feasibility of it was demonstrated by experiment-station workers and others. It has shown an increase in production in many cases of 25, 30, and 40 per cent. That is true, things being equal.

So that in the matter of securing these high-grade or high-yielding types of cotton, the average yield this year of cotton lint is about 174 pounds to the acre. We find many instances in the South where they get 600 and 700 pounds in individual cases. There is no reason why you could not develop the average yield by the selection of seed, because it is largely a question not so much of soil and surrounding conditions as it is badly selected and impovished seed.

The CHAIRMAN. Has it been the custom for the planters to use a seed raised by themselves continually on the same land?

Mr. GALLOWAY. A great many do that. Many go outside and bring in seed. A great many go to the gins and take it just as it comes from the gins.

We have estimated for this breeding work the expenditure of $25,000. That includes the hybridization work, the breeding of the early and prolific types, and this matter of demonstrating the value of improved seed. That is, our idea is that that work could be carried on just as the sugar beet study work has been conducted.

The CHAIRMAN. That would be under your Bureau?

Mr. GALLOWAY. That would be under the Bureau of Plant Industry. We have made out the plan in detail, and I think that would be a reasonable expenditure for the year. The idea of this whole scheme is——

The CHAIRMAN. Have you taken some steps along these lines already, Doctor, under your general appropriation.

Mr. GALLOWAY. We have some work going on in that direction now, but it has been limited owing to lack of funds.

Now the next point: "Studies of cotton diseases."

The CHAIRMAN. You do not need any new legislation to enable you to continue those?

Mr. GALLOWAY. No.

The CHAIRMAN. It is covered by the general act?

Mr. GALLOWAY. It is covered by the general act, and it would be covered by this act here because under that general clause of limiting the damage caused by the cotton-boll weevil and other infective diseases, we could take it up under this bill. That was considered in connection with the bill.

The CHAIRMAN. This Burgess bill?

Mr. GALLOWAY. Yes, sir; the matter of diseases is an important one. One thing particularly that I wish to mention is the so-called root rot, which in many cases in Texas this year will destroy, I am sure, one-fourth of the crop. There are other diseases, such as the anthracnose, root-knot, and similar maladies, all of which could be taken up, thoroughly investigated, and relief from them secured either by direct application of remedial measures or by securing of resistant types, just as we have done in the case of the sea island cottons along the Atlantic coast. Five years ago we entered into that field where the sea-island cotton industry was practically at a standstill on account of diseases, and in five years we have been able to secure, by breeding and selection, a resistant type, and the whole industry has been established. We are now distributing that seed to other sections, where this same form of disease exists.

We have estimated for this work $25,000.

The studies of cotton insects Doctor Howard will discuss.

The next point is "Introduction of new crops." This we consider one of the most vital of the points at stake, because what the cotton grower needs now is not only information and instruction that will enable him to secure cotton crops if he can, but if he can not, to grow something that will take its place. This means the taking up of the general question of diversification of crops in the South.

The CHAIRMAN. Would not this more particularly come under the hearing which we will give you on your items of the appropriation bill?

Mr. GALLOWAY. No, sir; it belongs right in here it seems to me, because all these matters will have to be considered in connection with this work.

Mr. BOWIE. This extra appropriation?

Mr. GALLOWAY. This extra appropriation. We had contemplated using part of the funds for the introduction of diversification of crops, the rotation of crops as a means and method for meeting the injuries and damage caused by this weevil.

Mr. BOWIE. In the infected districts?

Mr. GALLOWAY. In the infected districts, and to a certain extent outside the infected districts, because if we confine ourselves to the infected districts, as soon as the infection would spread we would have to go right over the same ground there, whereas if we take it up in advance the people would be familiar with methods of rotation, methods of diversification, and other such methods which would be of value.

Mr. LEVER. Do you think, unless it is prevented, the boll weevil is bound to spread?

Mr. GALLOWAY. I think it is bound to spread anyway. I think it is going to spread, and we might as well make up our minds that it is going to be with us, and make up our minds to meet it in every way we can, either in showing how cotton can be grown despite it, or in enabling cotton growers to grow something else in place of cotton.

The CHAIRMAN. That was practically done with the wheat weevil.

Mr. GALLOWAY. Yes, sir.

Mr. LAMB. The cotton growers will pretty soon find that out, will they not, about diversified crops?

Mr. GALLOWAY. They will hang to cotton as long as they can.

I will cite you one or two examples of this diversification in Texas. Some of the Texas farmers are going extensively into alfalfa. They find that they can grow alfalfa and make just as much money as they can by growing cotton, and the cost of handling the crop is not more than half the cost of handling cotton. One of the gentlemen in north Texas has put 800 acres in alfalfa, and this year he made about three tons to the acre, and when we were at his place he was getting $15 a ton for his crop. He had abandoned cotton entirely.

Mr. LAMB. But we must kill the boll weevil in order to take care of New England.

Mr. HAUGEN. Doctor, are we to understand that part of this money is to be used to pay for the crop destroyed by the cotton-boll weevil?

Mr. GALLOWAY. That is a matter I discussed at the outset.

Mr. HAUGEN. I was out at the moment and I did not catch what you said.

Mr. BURGESS. Not to pay for any part of the crop that is destroyed.

Mr. GALLOWAY. Not to pay for anybody's crop that is destroyed; but if, in cases of sporadic outbreak, it is found necessary or desirable to stamp out comparatively few acres of cotton, it might be proper for the Department to——

Mr. BURGESS. In order to prevent the spread.

Mr. GALLOWAY. To consider the question of reimbursing the grower for his cotton in order to prevent the spread of the weevil.

Mr. BOWIE. What you mean by that is, when a particular field is destroyed, such as you refer to in Louisiana?

Mr. GALLOWAY. Yes. There are precedents for that. For example, in the State of Michigan, where they have a peach yellows law, the trees are taken out and destroyed, and where it is necessary to destroy trees that do not show infection the owner is frequently partially reimbursed on the recommendation of a board that acts on the matter

and determines the value; but that is done entirely by the State. In the case of the foot-and-mouth disease, I think something like one-third of the assessed value of the animals was paid by the General Government.

The CHAIRMAN. I think the report of the Secretary of Agriculture shows 70 per cent.

Mr. GALLOWAY. Perhaps it was 70 per cent.

Mr. ADAMS. Let me ask you right there. Is cotton an exhaustive crop?

Mr. GALLOWAY. Very.

Mr. ADAMS. In the fertility of the soil?

Mr. GALLOWAY. In the fertility of the soil. It is one of the robbers of the soil, and the whole agricultural practice of the South has been a species of land robbery. That is one of the things that is now causing this crisis in cotton production. There has been little attention paid to rotation of crops, little attention paid to bringing in green manures and things of that kind; but more attention has been paid to them in recent years than in former years.

Mr. ADAMS. Is it exhaustive, as far as the cotton crop is concerned, or does it exhaust the general fertility of the soil?

Mr. GALLOWAY. It exhausts the general fertility of the soil, because the soils of the South, generally speaking, are of such a nature that a crop grown like cotton and then taken off and left standing, as is generally the case in the South, leaches the land very severely; and while other crops can be put back and brought up quite readily with green manures, the general fertility is exhausted.

We have estimated as a conservative figure here $25,000 for this matter of the introduction of new crops, diversification of crops, rotation of crops; but that could be extended if it were desirable to do so, and we could spend $50,000; that is, by going into other sections.

Mr. BOWIE. Let me ask you a question right there, if it does not interrupt you.

Mr. GALLOWAY. Certainly.

Mr. BOWIE. You are separating the different expenditures that could be made. This bill proposes to consolidate the entire fund in the hands of the Secretary of Agriculture, and to let him make the separation as he sees fit. For instance, if you are too low there in some places and too high in others, he will make the adjustment.

Mr. GALLOWAY. I am just giving a tentative outline of a plan, and Droctor Howard will give a tentative outline of a plan, and then the two will be combined, and it will show you how much can be expended in one year of this $500,000.

Mr. BOWIE. That is not intended to be a separate appropriation for each of these things?

Mr. GALLOWAY. No, sir. This is simply a tentative estimate for the work that could be done under this bill and the amount of money that would be required to do it in one year. We have limited ourselves to one year.

Mr. BOWIE. I understand.

Mr. GALLOWAY. The next two points, "Introduction of new crops" and "Studies and experiments in connection with methods for the destruction and control of the boll weevil and other cotton insects," will be discussed by Doctor Howard.

The next point, "Studies of enemies of the insect," will also be discussed by Doctor Howard.

"Securing and distributing seed of cotton known to have special value for earliness and productiveness and ability to resist the weevil." On this particular item the views of the Secretary are very pronounced. He believes that the Department should not undertake the mere distribution of seed, so far as replanting of infested areas is concerned, but he does think it would be wise to distribute such seed as might be developed by these breeding and selection experiments, in so far as it would result in demonstrating that particular kind of seed, and then stop.

The CHAIRMAN. Of course you can not produce any seed now from your experiments, can you?

Mr. GALLOWAY. We can not produce any seed, but we can find through the South high-grade types of cotton which might be very valuable for experimental purposes.

The CHAIRMAN. I see.

Mr. GALLOWAY. And the idea of this plan was to use about $10,000 in the purchase and distribution of such things as might prove promising in these particular regions.

Then the last item, "General propaganda," which is explained quite enough, probably, by the statement which the Secretary has made himself, that the idea would be to bring into cooperation the agricultural colleges, the State boards of agriculture, and all organized bodies where it is practicable to do so, to the end of giving a better understanding to the people of what is being done and what is being accomplished in this general work of meeting the emergencies of the case by lectures, by combining with farmers' institutes, by the distribution of pamphlets, and in every other way bringing to the attention of the people the necessity for a diversification, the necessity for destroying infested material, the necessity for planting early maturing sorts, and the other questions that have been outlined.

Taking that as an entire proposition, the money involved amounts to about $90,000, and adding the $50,000 that was suggested there merely as a tentative suggestion in the matter of demonstrating the value of early maturing sorts and varieties, would make $140,000 for these separate lines of work.

Of course I offer that simply as a suggestion, because Dr. Howard, who is more familiar with that line of work than I am, and who has already made up his tentative estimate, will discuss that when the time comes.

If there are any questions that I have not touched upon, any points that you wish made plain, I would be very glad indeed to explain them to the best of my ability.

Mr. ADAMS. Mr. Chairman, I would like to recur to the question I asked, and follow it up a little. You propose to investigate the subject of this weevil, and in connection with that you gather and spread information in reference to other crops that can take the place of cotton, which is given up because of the existence of this weevil. Is it not likely to be true that you can make a demonstration so complete that a man who is successfully growing cotton will be inclined to change his business because of the exhaustion of the soil and the inferior crops?

Mr. GALLOWAY. That is very true; and, if it is accomplished, it

would be one of the best things the Department has ever done for the South, because it will bring about a complete change in the agriculture in the South.

Mr. BURLESON. If you will permit me, I think I can answer Mr. Adams to his complete satisfaction. For a period of six years the most influential newspaper in our State—a paper that is most widely read—has been most earnestly advocating diversification, and it has made comparatively little progress in that direction. Texas is essentially a one-crop State, and it has been from the very beginning of its occupation by Americans. That crop is cotton, and it is going to be the most difficult matter to induce the farmer to abandon the culture of cotton, notwithstanding the small profits that will arise on account of the boll weevil.

I will say, in connection with the statement with reference to the exhaustion of the soil, that Texas is a peculiar State, as far as soil is concerned. I know farms in Texas that have cultivated cotton continuously for forty years, and the last year before the manifestation of the boll weevil they made one bale of cotton per acre—the average amount of cotton produced when the farm was in a virgin state.

Mr. ADAMS. Without manure?

Mr. BURLESON. Without manure. Such a thing as fertilization as an incident to general farming in Texas is unknown; and, owing to the fertility of the soil, I do not believe it ever will be generally practiced in Texas.

Mr. GALLOWAY. I would like to emphasize this matter of demonstration work. This year we had three or four demonstration farms in Texas, and they were conducted at very little expense to the Department because in most instances the citizens of the respective places themselves guaranteed the funds that were necessary; but the only guaranty that was required was that in case of a yield below the average crop the farmer who undertook the demonstration work under a plan of management that was submitted by the Department would be reimbursed. We had one such place at Terrell, Tex. The farmer there put in 100 acres of cotton, and the entire question at issue was one of properly fertilizing the soil. A dozen citizens of Terrell raised sufficient funds to guarantee him an average crop, but he raised and sold $700 more than an average crop; and as a result of that work there will be there this year 15 or 20 men right around him who will take up the same line of work, and who have already ordered several carloads of fertilizer to make the plan complete in its detail as it was outlined in its first year.

That is the general line of demonstration work that has been carried on—of course, in a very small way. In other cases we have brought in the question of diversification—alfalfa and other crops, such as Kaffir corn—and endeavored to secure results which would appeal to those in the immediate vicinity; and in all such instances it is much easier to secure results—much quicker than sending out by publications, preaching and lecturing, and things of that nature. It is an actual eye-opener, so to speak, and it has effect. In most cases it would prove more economical to make the demonstration work than to spread it out many years and bring about results in other ways.

The CHAIRMAN. You remember that last year we passed a bill making an appropriation of $500,000 for the purpose of stamping out the foot-and-mouth disease. How would it do to make an appropriation this year, giving the Secretary such a lump sum of money for the pur-

pose of stamping out the cotton-boll weevil as in his judgment might seem best?

Mr. GALLOWAY. That is the object of this bill, as I understand it.

The CHAIRMAN. Why not pass a little bill, just as we did last year in regard to the foot-and-mouth disease, without going into any detail or without hampering him in the least, leaving it entirely with the Secretary and his corps of assistants in the Department?

Mr. GALLOWAY. Of course I can not speak for the Secretary, but I do not see that there would be any objection to that.

The CHAIRMAN. And provide, as we did in that case, that the money shall be used for this purpose and no other. You remember we put that language in the bill which was passed for the purpose of stamping out the foot-and-mouth disease.

Mr. GALLOWAY. It is not so much a question of stamping it out——

The CHAIRMAN. The language applying to the entomological investigation reads in this way:

Including the investigation into the ravages of the codling moth and of the cotton-boll weevil and boll worm, with a view of ascertaining the best methods of their extermination.

Is not that language, "the best methods of their extermination," broad enough?

Mr. GALLOWAY. No; I do not think it would be, because under that clause the diversification of crops, the rotation of crops, and the substituting of other crops would not be considered at all, and that is vital. You might appropriate $10,000,000 for the stamping out of the thing, but I do not believe it would do any good.

Mr. BOWIE. You mean you do not believe it would be absolute.

Mr. GALLOWAY. Yes. You can not handle it like you can the matter of the foot-and-mouth disease.

The CHAIRMAN. Do you think this Burgess bill, so called, covers your point?

Mr. GALLOWAY. I think it does.

The CHAIRMAN. In what clause?

Mr. GALLOWAY. Section 2, I think.

The CHAIRMAN. The first section reads, in part:

The duties of said commission shall be to prepare and execute, under the direction of the Secretary of Agriculture, such plans for lessening the damage caused by and controlling the spread of the Mexican cotton-boll weevil and other insects and diseases injurious to cotton, as the Secretary of Agriculture may deem best.

Section 2:

That in furtherance of the purposes of this act there shall be appropriated out of the Treasury of the United States, from any money not otherwise appropriated, the sum of five hundred thousand dollars, two hundred and fifty thousand dollars of which shall be immediately available, which shall be denominated the "Cotton fund," and which shall be exclusively applied to the purposes of this act, and in the expenditure of which the Secretary of Agriculture shall have plenary and exclusive powers, as he may deem best, to accomplish the purposes of this act.

Mr. BURLESON. Right on that point, Mr. Chairman, I have a communication from the Secretary of Agriculture, wherein he uses this language:

It would seem to me that line 6 might be made stronger by taking out the words "practical men" and substituting "advisory members." Line 9 might also be made stronger by adding, after the word "direction," the words "and approval."

* * * * * * *

In reference to the clause defining the duties of the commission, it seems to me its wording is broad enough to enable me to do whatever is best in my judgment. The

question of diversification of crops, the production of new varieties of cottons by breeding and selection, the improvement of cultural methods, and such other lines of work, will be covered by the plans which will be prepared and executed under authority given in the bill.

If the committee should reach the conclusion that the authority given in the bill is not broad enough, I am satisfied we will find some member here who is sufficiently adept in the use of the English language to make it broad enough to cover anything the Secretary might want to do along the line suggested by the chairman.

The CHAIRMAN. I have always found that a brief bill, giving the Secretary plenary powers in these matters, is most efficient in the end.

Mr. BOWIE. The Secretary seems to think he would be the man to construe it, and he construes that it gives him all the power he wants.

Mr. HAUGEN. What is the special object of this commission? You are creating a commission here.

Mr. BURLESON. It is an advisory board, a board to give the Secretary the benefit of any suggestions that it might see fit to make. As a matter of fact, if you look at the wording of the bill, authority and full power to act is finally lodged exclusively in the Secretary.

Mr. HAUGEN. Then I see no reason for the condition.

Mr. BURLESON. That is a mere matter of detail.

The CHAIRMAN. Perhaps we have not yet reached the point where we ought to discuss that.

Mr. HAUGEN. Perhaps not.

Mr. GALLOWAY. I have completed the details, Mr. Chairman. If there are any other questions I shall be glad to answer them.

Mr. BURLESON. If the Chairman pleases, I should like for you to hear Doctor Howard this morning, because I know he has engagements which will prevent his attendance to-morrow. Then Colonel Field, another representative from Texas, who is a practical farmer on an extensive scale, would like to make a few suggestions to the committee, and I should be glad if you would give him an opportunity to do so at the conclusion of Doctor Howard's statement.

The CHAIRMAN. Certainly, we will do that.

Mr. GALLOWAY. I have prepared some remarks which I submit.

The paper referred to is as follows:

*A statement relative to H. R. 5496, entitled "A bill to lessen the damage caused by and control the spread of the cotton boll weevil and other insects and diseases injurious to cotton."*

The honorable Secretary of Agriculture in his report to the President, just issued, page 88, has given the essential facts in reference to the necessities for work in the direction of improving agricultural conditions in the South, particularly with reference to cotton production. He has pointed out that owing to the recent invasion of the cotton boll weevil a grave menace has been presented, involving not only questions relative to cotton and cotton production, but other agricultural crops as well. It is unnecessary, therefore, to dwell on this phase of the subject in the light of the statements which have been made by the honorable Mr. Burgess, who introduced the bill and who is familiar with all of the important statistical matters pertaining to the subject. My object is especially to outline a plan of work which could be carried on by the Department under authority given by such a bill as the one Mr. Burgess has introduced, dwelling particularly on those subjects which would properly come within the scope of the Bureau of Plant Industry.

Before taking up the lines of work themselves, I wish again to particularly emphasize the fact that this subject is one which concerns the entire South. While Texas is more especially directly interested at the present time, it seems, from all the evidence at hand, that it will only be a question of time when the cotton-boll weevil will extend into other States, and that to meet this grave emergency immediate action

must be taken. With the constantly increasing demand for cotton and cotton products, grave industrial conditions are likely to be brought about unless some means can be devised for meeting the emergency. The cotton-boll weevil, of course, is not the only factor to consider in this matter. It is a grave menace, it is true, but, omitting it from the proposition entirely, the fact would remain that, owing to lack of proper agricultural practices in the South, the supply of cotton has not been keeping pace with the demand. The work, therefore, on this subject will have to be viewed from the standpoint of the entire South where cotton is grown, but at the same time special effort will have to be devoted to the territory which has been invaded by the boll weevil.

The honorable Secretary, in his report already referred to, gives brief reference to ten lines of work that might be carried on in connection with this subject. I shall now briefly refer to them, dwelling only incidentally on those which relate more strictly to another branch of the Department, and which will be discussed by Doctor Howard. In outlining this work I shall, of course, have to omit a considerable portion of the detail, but will endeavor to present the matter in such a way as to show in what manner it is proposed to use the money authorized by the bill.

1. *Checking sporadic outbreaks of the weevil.*—This subject will be discussed more fully by Doctor Howard. I only wish to remark, in passing, that it would seem practicable to at least restrict the spread of the insect by properly organizing a corps of entomologists and taking radical steps to stamp out sporadic outbreaks of the weevil outside of the general wave of infection. This is a matter which would have to be worked through the cooperation of the State authorities, and brings up the question of proper State legislation which will enable the National Goverment to aid in the work. The Texas legislature is soon to meet, and the Louisiana legislature will probably be called in extra session at an early day. The Mississippi legislature also meets at an early date. A uniform pest law in these three States would do much to aid in this work outlined, and it would be proper for the Department to aid in bringing about this legislative action. If it was considered advisable for the Department to act in this matter along lines pursued in combating the "foot-and-mouth disease," for example—that is, the reimbursement of cotton growers where their crops were destroyed—a great deal of money could be used. It is a question, however, whether the National Government should go extensively into this work. Probably $50,000 could be expended to good advantage in work of this kind, but this is a matter that Doctor Howard is more able to speak upon definitely than I am. The sum, as already indicated, practically would have no limit, for if the Government entered upon the work with the expectation of reimbursing cotton growers wherever their crops were destroyed, half a million dollars would soon be required.

2. *Demonstration work to show the value of improved cultural methods by which farmers can produce fair crops in spite of the weevil.*—The Department, through the Division of Entomology, has already pointed out the great value of this work. Demonstration farms have this year been conducted in several parts of Texas and, in most cases, the results secured have been very satisfactory. There is, in my judgment, an urgent necessity for more of these demonstration experiments. The question is not, I believe, one which should be considered from the standpoint of showing the value of the work with particular reference to certain types of soil, certain geological formations, etc. It appeals to me in a very much different way. Cotton growers are especially conservative. They are slow to take hold of any new propositions and no amount of argument or literature has the effect of an actual demonstration experiment conducted in such a way that the evidence of success is apparent to anyone who wishes to use his eyes. For these reasons it would seem to me highly important and necessary to increase the number of actual demonstration experiments in such a way that a direct impression would be made upon a large number of cotton growers extending over a large area of country. I do not believe there is any necessity for having these demonstration farms as large as they have been in the past. Twenty-five or 50 acres is ample and, if the work is properly conducted, the main expense will be in the matter of expert advisers and assistants to look after the investigations in general. The object and scope of the work would be to show by actual demonstration experiments the value of better cultural methods, the value of early maturing varieties, and the value and necessity for a complete and thorough destruction of the infested material. The work should not only be carried on in the region where the weevil at present exists, but should be inaugurated elsewhere, so as to bring to the attention of practical farmers the value of the work in advance of the threatened invasion of the insect. To carry out this work in a thoroughly practical manner, over an extensive territory commensurate with the importance of the subject, would require the first year an expenditure of $50,000. This line of work has already been pretty fully developed by the Division of Entomology, and Doctor Howard will dwell

more in detail upon it. I simply wish to point out some of the important phases of the subject as viewed from the standpoint of the plant culturist.

3. *Work having for its object the production of new, early, and improved varieties of cotton and the general improvement of the seed.*—The value of early maturing cottons has been already pretty thoroughly demonstrated by Mr. Hunter in his work in Texas. The King cotton and the Parker cotton have proved exceedingly valuable, chiefly on account of their earliness. There is much left yet to do, however, in the matter of securing more vigorous, more productive, and better storm-resisting types. This is a work which involves the question of breeding and selection, in order to secure and fix the types desired. It is well understood that cotton seed brought from the north is earlier, but that this earliness begins to disappear after the first season. The work would involve careful selection and breeding, carried on over a considerable extent of territory, in order to get the best results. In other words, the entire object of this work would be to secure varieties of early and more prolific cottons than those now in existence, better able to resist storms, and adapted to the climatic conditions to which they would be subjected. Plants of open foliage are less subject to injury than ordinary ones and standard early sorts having the habit of open foliage should be produced. Varieties of all sorts should be tested as to their possibility of resistance and used in breeding where desirable.

One of the most important lines of work in this connection would be the inauguration of thoroughly systematic work in the matter of selection of high-grade seed. The average yield of cotton in the United States is only about 190 pounds of lint per acre, while on many large tracts it is not uncommon to secure a yield of from 500 to 800 pounds per acre. Unquestionably a great deal of the deterioration in cotton production is due to the fact that little attention has been paid to a systematic selection of stock seed. Probably the two factors which to-day have more to do with the present condition of cotton production in the South are the improvement of the stock seed and an improvement in tillage and fertilization of the soil. It is believed that with proper attention to these two lines of work the cotton crop could be doubled on the same acreage as now grown. To conduct this work properly, to inaugurate lines of investigation which would demonstrate the value and point out the methods for improving stock seed, carrying on the breeding work, etc., would require an annual expenditure of $25,000.

4. *Studies of cotton diseases.*—It is pointed out in the Secretary's report that, while the boll weevil is mainly in the public eye at the present time, the fact remains that there are serious pests of cotton which cause great losses annually. One of the most serious of these diseases is the so-called root rot, which occurs over a large extent of territory in the South and is particularly destructive in Texas. It is not uncommon to find, throughout the entire cotton-growing area of Texas, farmers who have lost from one-eighth to one-half of their crop through this trouble. There are other diseases, such as cotton wilt, anthracnose, root knot, almost equally destructive. These diseases should be thoroughly investigated and efforts made to remedy them, either through the direct application of remedial measures or through the securing of resistant types by breeding and selection. Already very promising results have been obtained in this field in other sections of the country, especially in the Sea Island region, where the crop has been brought back to its original standard by securing resistant types. It is estimated that $20,000 would be required for this general work on cotton diseases.

5. *Cotton insects.*—These will be spoken of by Doctor Howard.

6. *Introduction of new crops.*—Throughout the entire South the urgent necessity for the introduction of other crops which will take the place of cotton is recognized. Cotton will, of necessity, have to be grown, but the time is at hand when an urgent effort should be made in the matter of the rotation and diversification of crops. In many sections the yield of cotton is now barely at the margin of profit, so that when the reduction due to the boll weevil and other pests is taken into account it will be necessary to abandon cotton growing altogether and secure something in its place which will give immediate returns. These new crops will be alfalfa for hay purposes, sorghum and Kaffir corn for silage, and fodder crops for hay; rape as a winter-soiling crop, and crimson clover, hairy vetch, bur clover, winter barley, etc., for winter pastures and green manures. Tobacco, furthermore, is a promising crop for certain sections of the South, as has been demonstrated by the work in connection with the soil surveys. For the securing of seed, the necessity for the demonstration work, the establishment of suitable demonstration farms, and the general propaganda work in this direction, it is estimated that $50,000 could be expended annually. More could be spent if the area to be covered were extended. This work would also cover demonstrations in the matter of crop rotations, and, in short, would have for its object the bringing about of such changes in agricultural practices as would make the Southern farmer more independent than he is at present.

7. *Studies and experiments in connection with methods for the destruction and control of the boll weevil and other cotton insects.*—This is a subject that will be fully discussed by Doctor Howard.

8. *Studies of enemies of the insect.*—This subject will be fully discussed by Doctor Howard.

9. *General propaganda.*—It is believed that the work of the Department can be made effective not only throughout the region infected by the boll weevil, but in adjacent sections as well by a thoroughly organized effort in the matter of bringing before the public the results of work accomplished. This can be done through cooperation with the agricultural colleges and experiment stations in the respective States, the State boards of agriculture, farmers' institutes, and other similar associations. General efforts should be made to distribute quickly the results of any important discoveries by means of leaflets, small bulletins, and in other ways. It is believed that $10,000 annually could be well expended in this work.

10. *Securing and distributing seed of cotton known to have special value for earliness and productiveness.*—It is not believed that the Department should go into any extensive distribution of seed. The seed secured as a result of breeding and selection should be handled by the Department purely in an experimental way. No effort should be made by the Department to simply furnish seed for replanting plantations. Whatever seed is distributed should be sent out with the object of demonstrating its value, either for earliness or some other desirable characteristic. In other words, the distribution should be purely for experimental purposes. Ten thousand dollars, it is believed, would be sufficient to conduct this work generally through the regions most directly interested.

The work here outlined involves an expenditure of $215,000, not including the problems which will be referred to more fully by Doctor Howard. Some of these items will, undoubtedly, in actual field practice run larger and some may run smaller. It is difficult in laying out plans of this kind to always foresee emergencies that may arise. An exceedingly unpromising proposition may, as the work develops, prove the contrary, and would then warrant the expenditure of more money in this direction.

The CHAIRMAN. We will now hear Doctor Howard.

## STATEMENT OF PROF. L. O. HOWARD, CHIEF OF THE BUREAU OF ENTOMOLOGY, DEPARTMENT OF AGRICULTURE.

Mr. HOWARD. Mr. Chairman, I really do not know what there is for me to say.

The CHAIRMAN. I will say to the new members of the committee that last year we made an appropriation of $30,000 for Doctor Howard, and the language is this:

> Including the investigation into the ravages of the coddling moth and of the cotton boll weevil and boll worm, with a view of ascertaining the best methods of their extermination.

You might talk to us along those lines, Doctor, and tell the committee what you have done under the appropriation, the condition of things in Texas, what experiments you have made, and what success and what failure you have had.

Mr. HOWARD. Very good. As you have learned already from Mr. Burgess, this is absolutely the most difficult problem in economic entomology that the whole world has ever had to handle. The boll weevil is an insect which is very prolific; which has many generations in the course of a year; which lives during the critical part of its life entirely enclosed in the boll, where it can not be reached by any insecticide, and it can not be reached by any natural enemy insect which we have been able to discover:

We have studied the subject for several years, ever since the weevil came into Texas, with the greatest care. We know absolutely every stage in its life history, every possible chance for every variation in

the course of its life. We know exactly how it lives all the year round and under exactly what conditions. We have experimented with every suggested remedy and everything that our own experience in fighting other insects has suggested.

The CHAIRMAN. What does it live on in the winter?

Mr. HOWARD. It does not feed in the winter. It hibernates, stowed away in old corn stalks left standing on the field and in the old cotton stalks which are also left in the field, under the bark of trees, under logs, at the roots of tufts of grasses, and particularly along the edges of woods where cotton fields approach them, as they do in a great many places throughout Texas and other Southern States.

The CHAIRMAN. Can they be carried in bales?

Mr HOWARD. They are carried in bales of cotton to the gins. They are carried from the country gins in the bales which go to the compress. After the cotton has gone through the compress the weevils are utterly destroyed, but the carriage of bales which have not been compressed is a source of danger and infestation of the crop.

On account of this great diversity of places of hibernation there seems to be nothing very practical which can be done toward destroying the insect during the winter. It is possible, of course, to cut down and burn the cotton and corn stalks. In that way a great many of them would be killed, but there would be still enough surviving along the edges of woods and along the roots of old grasses to infest the cotton crop the following spring.

We have tried the application of insecticides. We have tried sprays of all possible kinds. We have tried poisonous sprays. Of course those are expensive, to begin with, and they are not efficacious. The weevil itself feeds very little. It lays its egg in the boll, penetrating it with that beak you see in front of its head, and the grub works inward and not outward, so that no poison can reach the grub. It was supposed that at one time in the early spring, before the cotton bloomed, it would gnaw holes in the leaves and stems and in that way would dig up some of the poison, but in our experiments, extending over two years, we have shown that it is peculiarly resistant to all poison. It can eat a leaf which is immersed in paris green solution, and it will not be killed by that dose. It is as bad as the gypsy moth in Massachusetts.

Then we have tested all sorts of machinery, not only for the application of dry poison, but for the collection of the cotton squares as they fall to the ground, collecting them by suction. Several machines have been invented and tried, but it seems to be an impracticable remedy. As I say, everything that could possibly be conceived of has been tested.

We have made a thorough study in the way of search for natural enemies. We have gone to the original home of the insect in Mexico and studied it carefully there. We have gone as far down as Yucatan, and have searched also in Cuba, where the insect also lives, and we have as yet found no natuaal enemy which could be introduced to advantage.

The CHAIRMAN. The insect is in Cuba, is it?

Mr. HOWARD. It is in Cuba.

Mr. BOWIE. Does it affect anything but cotton.

Mr. HOWARD. Nothing but cotton. We have found nothing that it feeds upon but cotton.

Mr. BURLESON. As a matter of fact, it has been conclusively demonstrated that it will starve before it will eat anything but cotton.

Mr. HOWARD. You are quite right.

A question was asked in regard to the existence of the insect in Mexico. In certain parts of Mexico it has caused the utter abandonment of the culture of cotton. When, however, after a lapse of years, they began to cultivate cotton again, the weevil again appeared, and they had to abandon it again. That would not occur in Texas. If cotton were abandoned in Texas, the probability is these insects would starve out and there would not be a new introduction except from Mexico; but in Mexico the cotton grows wild, and the result is that the insect is always there.

Mr. BOWIE. Let me ask you there, on that point, this question. Suppose this year a field is attacked with the boll weevil and next year it is planted in corn or in hay, and there are two or three crops of corn or hay. Then could cotton be safely planted the third or fourth year?

Mr. HOWARD. It depends on the proximity of other cotton very largely. The weevil will live for many months without food. It will continue to live until it gets an opportunity to live on cotton. It might possibly go through a whole year in that way; but, you see, the weevil flies. It has spread every year since its introduction to Texas to the north and east at the rate of from 50 to 75 miles a year. Its principal spread is in the month of October, when it has become very numerous through the constant reproduction in geometrical increase. At that time of the year there is a prevailing southerly breeze, and it is thus spread from 50 to 75 miles a year.

Mr. LAMB. How does it travel?

Mr. HOWARD. It travels by flight from one field to another. It is carried in the cotton to the gins, and it is carried in many ways from the places of hibernation. It might crawl into a freight car which is sidetracked alongside a cotton field. That freight car might the next year be in Georgia and alongside a cotton field; in which case the insect would be introduced in that way.

Mr. HAUGEN. If a cotton field is abandoned for a year, the weevil is practically starved out, is it not?

Mr. HOWARD. I think so. That is practically what I advised when it was restricted to a very small area in southeastern Texas, but the State did not see it in that way, and they would not even go to the point of cutting down the cotton in October, which would have destroyed the great majority of them. They could not afford the slight money loss.

As I say, we have tried the application of insecticides. We have found that wanting. We have tried the use of machinery. We have found that wanting up to date. Some machine may yet be found which will have some practical effect.

The CHAIRMAN. A machine along what line?

Mr. HOWARD. A machine for taking up the square. The insect first attacks the square. The square, when it is attacked, falls to the ground, and in the square on the ground the weevil still develops if the ground is shaded. They have invented a machine for drawing these squares up by suction. Other machines have been invented for crushing them, and so on. Then we have tried the introduction of natural enemies. That, so far, has not succeeded, but we have, through the intimate knowledge of the natural history of the insect, developed this system of culture changes, which has, in a measure, saved the situation.

Let me describe the whole process. We take northern seed, the plant of which matures much more rapidly than the Texas seed. We plant it as early as possible. We plant the rows wide apart, because the weevil prefers shade.

The CHAIRMAN. How far apart?

Mr. HOWARD. Three or four feet, because the weevil prefers shade and breeds most abundantly in shaded conditions. Then we cultivate it if we can. If we can not we let it alone, and thus get an early maturing crop from which we can pick a fair remunerative crop by the middle of October. Then we cut down every stalk of cotton in the field, let it dry and burn it up, thus destroying all weevils that remain in that particular patch of cotton. The following year the number of hibernating weevils is very greatly lessened.

This year we have conducted demonstration farms at seven localities in Texas. Those farms have from 50 to 250 acres of land under our supervision. By following out this particular cultural method, which depends, as I say, only upon an intimate knowledge of the fact that the insect breeds in a certain way, and develops with a certain degree of rapidity, we have upon one of those demonstration farms of 100 acres raised 103 bales of cotton, an average of a little over a bale to an acre; whereas in surrounding territory the crop was from one-eighth to one-fifth of a bale per acre, which showed that it can be cultivated in spite of the weevil. But we want to do something further. We want to be able to call upon a certain sum of money for the checking of sporadic outbreaks, by which I mean outbreaks far away from the immediate danger of natural spread.

The CHAIRMAN. Have those occurred?

Mr. HOWARD. The one at New Orleans is the only one.

The CHAIRMAN. At the experimental station?

Mr. HOWARD. At the experimental station. We have heard of one in north Louisiana in the last few days, and one of our men is now investigating it.

Those things are liable to occur. The weevil is already within 25 miles of the Louisiana boundary, at several points. It may be carried across in ginned cotton, or it may be carried in cotton seed. It may be carried in baled cotton which has not gone through the compress. It may be carried in hay for bedding for cattle in cattle cars. It may be carried in a freight car, as I have said. The Department ought to be in a position to stamp that out. That is what I mean by checking sporadic outbreaks. We want money enough to do that in case it becomes necessary. We wish to continue our demonstration of the cultural methods because they have been of great value to the citizens of Texas. Many of the most intelligent planters have gone and done likewise this past year, and the result is that some men have raised good crops in spite of the weevil.

Mr. HAUGEN. How much money will you need for that?

Mr. HOWARD. For that particular item I have estimated it would be well to have in reserve for this question of checking sporadic outbreaks $25,000. I have not estimated for the demonstration experiments any amount. It depends on how many it is thought desirable to have, not only in Louisiana, but in Texas. We have had seven this year.

The CHAIRMAN. That is, under your $30,000 appropriation?

Mr. HOWARD. Under our $30,000 appropriation.

Mr. HENRY. That has been ample for the work so far, has it?

Mr. HOWARD. That has been ample for the work, so far.

Mr. HENRY. You answered, as I understood, that $25,000 would be sufficient for the checking of the sporadic outbreaks?

Mr. HOWARD. I think that would be sufficient for that purpose, yes.

Mr. HENRY. In your opinion do you need this whole $500,000?

Mr. HOWARD. Oh, no.

Mr. HENRY. How much is your estimate?

Mr. HOWARD. I think the amount I could expend the first year to advantage, barring something very unusual, would be from say $90,000 to $120,000. I think that would answer admirably all we could expend to advantage on the entomological side of the thing. Of course Doctor Galloway has told you about these other matters.

Mr. HAUGEN. Is that what you estimated?

Mr. GALLOWAY. Just about the same as Doctor Howard.

Mr. BOWIE. This bill provides for only $250,000 to be immediately available. Your estimate was $125,000 for the things you estimated for, and Doctor Galloway's $125,000 would make $250,000. Is that what I understand?

Mr. HOWARD. That is about right.

Mr. GALLOWAY. Emergencies might arise which would necessitate drawing on the $500,000.

Mr. BURLESON. Some unforeseen emergency might arise, and evidently the Secretary feels that he ought to have the money accessible if he wanted to utilize it.

Mr. HENRY. Right there, what do you regard as an unforeseen emergency?

Mr. GALLOWAY. This matter of sporadic outbreaks.

Mr. HOWARD. That is the only one. There might be twenty of those this year.

Mr. HAUGEN. That is included in his estimate of $125,000.

Mr. BURLESON. With Doctor Howard's permission, I will say on that point that never in the history of cotton has there been as much excitement over the fluctuation of the price of cotton as there has been this year on the cotton exchange among the speculators in that staple.

Mr. BOWIE. Nor among the cotton mill men.

Mr. BURLESON. One of the present factors which was used to bull the price of cotton was the sporadic outbreak of the weevil in Louisiana mentioned by Doctor Galloway and Doctor Howard; and if it became necessary in the future, unscrupulous speculators could, by the distribution of this weevil in four or five different places in Louisiana and Mississippi, bull the price of cotton from 60 to 100 points; and knowing the speculator from the farmers' standpoint as I know him, he would not hesitate a minute to resort to that expedient if he thought he could accomplish his purpose.

The CHAIRMAN. That is true, but how can you legislate against him?

Mr. BURLESON. In the event this amount is allowed and the Secretary of Agriculture feels that to save this great industry by stamping out a sporadic outbreak of the weevil in Louisiana or Mississippi he could act at once. The mere fact that he has this money will tend to deter the speculators from attempting the practice I refer to. The probabilities are it would not be used, but if it is needed he would want the money in hand for prompt action.

Mr. HAUGEN. Why should we not be armed, then, with the same

weapons against speculation in wheat? We have the chinch bug and the grasshopper in the West.

Mr. BURLESON. Because it is not so devastating.

Mr. HAUGEN. At times it has been. Only a few years ago we were threatened with grasshoppers.

The CHAIRMAN. The weevil destroyed the wheat crop of the Genesee Valley, but we found a resistant wheat.

Mr. BURLESON. Permit me to suggest that there are other places where wheat could be grown, but if the agriculturist is driven out of the cotton business in the South, it will have just as injurious an effect upon the commercial interests of this entire country as it will upon the South, especially the cotton manufacturing interest of New England.

Mr. HENRY. There is no doubt about that.

The CHAIRMAN. I do not think there is any disposition on the part of the committee to cheesepare on this thing at all. I would advocate giving the Department what it can judiciously expend. There is an emergency it will have to meet, and it is a question for the committee to decide what is the best way to meet it.

Mr. BOWIE. I simply made my interruption there for the purpose of calling attention to the fact that while the bill appropriates nominally $500,000, only $250,000 of it is immediately available, and I was endeavoring to bring out from Doctor Howard the fact that when you add together his recommendation and that covered by Doctor Galloway it makes $250,000, or approximately the sum that this bill fixes to be immediately available. The other $250,000, which is recommended by the Secretary of Agriculture, is simply money that he can use if he sees fit.

Mr. GRAFF. I understand that simply $250,000 is available on the passage of the bill, but the whole $500,000 would be available during the whole fiscal year. Is that right, Mr. Chairman?

The CHAIRMAN. Yes; that is right.

Mr. GRAFF. There is a marked difference between this bill and the provision which we passed in the foot-and-mouth disease bill. There we appropriated a definite sum, but we added "so much thereof as is necessary." Here the whole $500,000 is separated. It is made a cotton fund, and it can not be utilized and is not available for any other purpose.

Mr. BOWIE. Does it not say "so much thereof as may be necessary?"

Mr. GRAFF. No; it does not.

Mr. BURLESON. I will say to the gentleman from Illinois that that is also a mere matter of detail.

The CHAIRMAN. We have not yet reached that point. We will let Doctor Howard finish his remarks.

Mr. HOWARD. I have very little more to say except that the question of the continued work on the possibility of a remedy is a very important one, and we should be able to use a very considerable sum of money in that work the coming season, just as we have in the past. We want to experiment with every new idea that comes up. We want to make still further search for natural enemies. I have a man in Cuba engaged in that line. I want to send a man to South America in the spring to look up a reported enemy in some of the barrens in the lower Andes, where cotton is growing and where they say the weevil exists, but is not very injurious. That means, obviously, the presence of

something that keeps it in check. I want to send a man down there to see what it is. Investigation of this character we should be able to carry on.

The CHAIRMAN. You continue to do that now under your present appropriation?

Mr. HOWARD. Yes.

The CHAIRMAN. You will not stop your investigation at all?

Mr. HOWARD. No, I think not. I think we have enough to carry us through until the close of the fiscal year, unless we go into this extension of the cultural demonstrations, and that would be in the spring.

The CHAIRMAN. So you would not need that money until April?

Mr. HOWARD. We ought to have it about the 1st of April, I should think. But these are the general headings, and the sum total is the one which I expressed to you a few moments ago, that I think we could at the outset use to advantage from $100,000 to $125,000 this coming fiscal year, with the proviso that we shall have this emergency fund in reserve.

The CHAIRMAN. You would want that right there in excess of your regular appropriation?

Mr. HOWARD. I would very much like that regular appropriation just as it is.

Mr. BURLESON. Doctor, if through your employees you have received any estimate of the damage which has been wrought in Texas during the current cotton year I would be glad if you would give it for the benefit of the committee.

Mr. HOWARD. Mr. Hunter, my chief man down there, who has gained in his three years' work on this subject very intimate knowledge not only of the cotton-boll weevil, but of the cotton crop and conditions generally down there, estimates the shrinkage of the crop at 600,000 bales, of which he places 300,000 to the credit of the cotton-boll weevil, and the others as due to late planting, early frosts in north Texas, and the root-rot disease, which comes under Doctor Galloway's scope. He therefore estimates the actual loss in cotton by the cotton-boll weevil at $15,000,000.

The CHAIRMAN. That is, 300,000 bales?

Mr. HOWARD. Three hundred thousand bales.

The CHAIRMAN. In the one State of Texas?

Mr. HOWARD. In the State of Texas. That is the only State in which it exists.

Mr. BURLESON. I will ask you, also, whether it is not a fact Mr. Hunter is a cautious, conservative man?

Mr. HOWARD. Most conservative.

The CHAIRMAN. I think it is estimated that Iowa loses $15,000,000 a year in hog cholera alone.

Mr. BOWIE. In the case of hog cholera you have means with which to treat it. There seems to be absolutely no known method of handling this question.

Mr. HOWARD. Fifteen million dollars in actual loss of course means a great many hundred thousand dollars' damage to other industries dependent on this one.

The CHAIRMAN. How do you figure that loss; on the value of the cotton bales or the money expended in cultivation?

Mr. HOWARD. The actual loss on a bale of cotton.

The CHAIRMAN. The worth of the cotton after being baled?

Mr. HOWARD. Exactly.

Mr. BURLESON. Mr. Chairman, Col. Scott Field, who represents in Congress one of the rich agricultural districts of our State, is here, and I hope you will hear him.

The CHAIRMAN. We shall be glad to hear Colonel Field.

## STATEMENT OF HON. SCOTT FIELD, REPRESENTATIVE FROM TEXAS.

Mr. FIELD. Mr. Chairman and gentlemen of the committee, the time was when a southern member would hesitate to go to the Government asking relief, even though the damage was exceedingly great. I believe it was stated by Bob Toombs that he represented Georgia twenty years and he never drew a dollar out of the National Treasury. Times have changed, and we have modified our views. We do not come to the National Government as petitioners, but we come looking for aid that will be cheerfully extended, when it will be beneficial to a very large number of the citizens of the country.

When you consider the calamity that threatens this great industry of the South, a crop which brings into the Government more than a million dollars for every working day, and supplies employment to so large a number of our people, North and South, when a great industry of this sort is threatened, I believe the representatives of this great Government will respond liberally if we can show that benefits will result.

It is difficult to conceive of the damage that is being done or the danger that threatens by asking the question, What percentage of the cotton crop of Texas, or the South, has been destroyed? Texas, with her immense domain, with the little aid she receives from the Indian Territory, produces one-third of the cotton crop of this country. The damage from the boll weevil has not extended itself all over the cotton-growing section of Texas, although it has invaded 101 counties of the 200 organized counties of the State; but it is very much worse in some sections than in others. When it strikes the river bottoms, the Brazos, the Colorado, the Trinity, and all those rivers there, it is almost total destruction. Far out on the prairie lands where the droughts prevail to some extent the injury is much less, and so when you come to the percentage, it is not so very great, not sufficient to excite the alarm of people looking at it as the amount that is destroyed in the State of Texas or in the South at large; but I want to call attention to the very great damage which has resulted in the particular localities.

I take my little town and the county in which I live upon the Brazos River, and I am appalled at the results that this destructive agent has produced there. Not only that, but I know that it will extend itself, because that is the experience of practical men and scientists, and I look to the very grave damage that will result to all the southern country, taking these particular places along the rivers as an index of what it will do.

The town in which I live is accustomed to ship from 20,000 to 24,000 bales of cotton. This year we will not receive 5,000 bales. In connection with my brother we plant 800 acres, certainly expecting a a return of 600 bales. We will not get 100 bales. When you think

of that, a partial destruction of a crop does not bring ruin. Men survive partial losses, but when it comes so that every man looks into the face of his neighbor and is alarmed at his own condition, and knows full well that he can not discharge the obligations which the law has created, when the bank is locked like a frozen river, when no man is able to discharge the obligation that is incurred to his neighbor, when business is suspended, when land values are such that you can not get money to make another crop and the moneyed men of the east stand in fear to invest a single dollar upon as fine real estate as there is in Texas, you begin to realize the gravity of the situation.

That is the condition of things where this destructive agent is at its worst. I was talking but a few days ago to a gentleman from Connecticut, known to members of this committee, who has been accustomed to loan money in my State, with a view of seeing whether money could be had in this section of country, and they fear it like a man would fear a house when the yellow flag of the smallpox hospital is displayed. No man will invest a dollar even upon real-estate securities while this curse has come upon the land, as terrible as the afflictions in the days of Pharaoh.

This is not only the case there, but it is increasing year by year. Starting upon the Mexican border, it has extended itself more than 300 miles, and stands now separated from Louisiana and the great Mississippi Valley only by the "Father of Waters." The home of the weevil will be in the valley of the Mississippi. Wherever the cotton grows rank, there it flourishes, and now is the time, it seems to me, for the nation to make a supreme effort to protect the people against this threatened injury. We are not Mexicans. The inventive genius of this country is not to be thwarted by an insect, with all the science turned upon it. My experience is that already great benefit has been done by the Government, by object lessons in cultural methods all over the land, by the scientist applying himself to the study of the evil, by every man using this means and that, some with partial results, some with failure; but the mind of the people is aroused, and I firmly believe that they will be able to meet the emergency that has arisen.

Now, what amount should be appropriated? I know not, nor do the nembers of this committee, I take it. We do not want to waste the money. When the Representatives from our State consulted together, in deference to a very great demand in the State of Texas, there was, of course, a diversity of opinion as to the character of legislation to be agreed upon; but this bill which we present for the consideration of the committee was the consensus of the best judgment of the members of the Texas delegation and of the Louisiana delegation, and more than that, we went to the Secretary of Agriculture. These were the suggestions which he made. This bill is outlined after careful consideration with the Secretary of Agriculture and with the heads of the different Departments. We went to the President, and he viewed and understood the matter just as we did, and suggested that appropriate legislation be granted in this instance.

Gentlemen of the committee, we do not care, of course, to have an amount beyond what may be necessary; but we do think, in view of the character of this injury, the danger, and the unknown fields that ought to be trodden, that the Department ought not to be hampered for the use of means.

The stamping out of sporadic cases has already been touched upon. It would not only be necessary, of course, while the flames are destroying one place, that you should go and endeavor to stamp them out at once, but if in a great conflagration a spark should fall miles away, common prudence would require that you rush there at once, and stop another fire, and it would be folly not to do so. If the weevil appears in Louisiana in sporadic instances, stamp it out, even though it costs the Government considerable money. It saves in the long run.

So as to the experimental stations. I tell you a great benefit would result. Our people would be guided by the demonstrations that would be made there. Already we are sending off for cotton seed. One man will tell us the King seed is the best, another that the Truitt seed is the best, another that the Shiner seed is the best, another that the big-boll Russell is the best. The result is there is confusion among the people, all seeking to better their condition. The Government could come in with its experimental farms, and in a little while demonstrate that this cotton would be adapted to the particular section, and another cotton to another section, and thus the Government would be teaching people and leading them out of the confusion that now prevails.

Gentlemen of the committee, the matter has already been presented from the technical standpoint of Doctor Howard and his associate. It has been referred to by Mr. Burgess, and I believe it is unnecessary to do more than touch upon this one point. Occasionally inquiry is made about diversification and changing our crop. That is not practicable. Could the people of Dakota abandon the growing of wheat? Could the great Middle West cease growing corn? Could southern Louisiana and Texas abandon the rice and the sugar culture? No more could we in Texas cease the cultivation of cotton. The only thing that has promised anything in the way of rotation is, as suggested by Doctor Galloway, alfalfa. We are all growing a little alfalfa, increasing it as we can; but here is the reason that no change in methods can be adopted. Cotton is a money crop. Men have got to get advances to make a crop on. Alfalfa is an uncertain crop. The rains come and destroy it. They are not prepared to put it under the houses, and it is a little crop. But they advance money upon a cotton crop, and when the poor man comes in to give a mortgage it is put down "50 acres in cotton and 10 acres in corn," and a little alfalfa or pea vines or something is included in the security on which he is able to get the advances to make his crop. There can be no change as long as the rays of the sun come as they do and as long as the seasons of Texas remain as they are. There may be small changes, but that is the crop that nature's God provided for Texas, and I think the efforts of man ought to be made to maintain it as the great crop of the South, because it is the crop that is profitable to us and beneficial to the nation at large.

Mr. HAUGEN. Colonel, what has the State done for your experiment stations?

Mr. FIELD. The State has done nothing more than a small work at the agricultural college. It has offered a reward of $50,000 for the discovery of some remedy for the total destruction of the weevil.

The CHAIRMAN. Then, naturally, there are a good many people at work on it.

Mr. FIELD. They are at work on it; but I tell you a great thing this Department could do. This large reward has developed all the

cranks there are in Texas, and there are a good many there. Every fellow who knows how to put two pieces of paper together is trying to get up some plan to destroy the boll weevil and get the $50,000. If we had intelligent supervision there, a man could come and say, "This is not good," and discard it. There are lots of idle people going over the country thinking they have discovered a remedy for the boll weevil. But there is some advantage resulting. I know from my own use of it and practical experience that this blower that is referred to by Doctor Howard is a good thing.

The CHAIRMAN. A blower?

Mr. BURGESS. It is a machine that sucks up the square.

Mr. FIELD. It sucks up the square. It is recommended by the Department that squares in which the egg is deposited be picked up and destroyed, but it is a very tedious process, going around and picking up squares that have fallen to the ground. This man comes in with what we call a blower, a suction machine——

The CHAIRMAN. Something like a carpet sweeper?

Mr. FIELD. Yes; on the same principle. It passes between the rows, and it knocks the stalks on their sides, which causes the squares to fall that are not quite ready, and then this suction just takes up all those in the middle of the road, and it saves a great deal of labor in the picking up of squares. It is a very good thing. Somebody else will find something still better, and I think in time we will be able to accomplish something on that line in the destruction of the weevil; but I know that very great good will be accomplished by collateral methods.

Mr. BOWIE. Judge, I want to ask you a question. Is it not true that in your country, as well as in other sections, the common people, the general run of people, have a great deal of confidence in the work that is conducted by the General Government?

Mr. FIELD. Yes, sir.

Mr. BOWIE. When the work is done by the General Government, they give it more weight and pay more attention to it than they would otherwise?

Mr. FIELD. I think so; and there is another feature of this commission. The chairman suggested, why not commit the whole matter to the Secretary of Agriculture? His idea was that he could work in that way better than in any other form.

The CHAIRMAN. That is, the Secretary of Agriculture?

Mr. FIELD. The Secretary of Agriculture. He suggested that idea of the commission, and we acted upon it, and there is this advantage about it: You take two good practical men in Texas and one in Louisiana, well-known men, practical farmers, men who are known throughout the States, and I believe there will be some advantage in their suggestions and advice to the Department of the Government. The scientist often, if you will excuse the expression, looks through a goose quill. He is very intense, like the sunglass, but sometimes you are not able to concentrate the rays right on the subject, and the practical man of affairs, reaching out, seeing it every day, looking at it, sometimes from the outside, is able to furnish very good suggestions to the scientist. For that reason I think it well to have associated with them men practical in affairs.

Mr. HAUGEN. It is evident your State does not fully appreciate the importance of studying this boll weevil.

Mr. FIELD. Let me tell you about that. We have an iron-bound

constitution in Texas. We just simply can not appropriate money for that purpose.

Mr. HAUGEN. But you can appropriate money for your experiment station there. How much money are you appropriating each year?

Mr. FIELD. I really am not able to inform you of the amount that is appropriated, but the agricultural college is provided for under the constitution. We have, however, never been able to appropriate one dollar. An effort was made for the relief of the Galveston sufferers in the great calamity, but it could not be done. An effort was made to aid in the St. Louis Exposition, but the constitution stands in the way. Whether good or bad, it was passed at a time that we speak of as "the Alliance days" in Texas, when the farmer left his plow and went into the legislative halls, and the grip of that constitution, whether for good or evil, binds us close in the expenditure of money.

Mr. HOGAN. But is not this of enough importance to amend your constitution?

Mr. FIELD. It is a big thing to call a constitutional convention; and then we are afraid of one thing in Texas. The argument there against a constitutional convention is this: We have got the corporations gripped, and whenever you talk about calling a constitutional convention in Texas they say it is the corporations that are struggling, and if you ever loosen the bonds you never will get them bound again.

Mr. GRAFF. You can not quite trust yourselves on that.

Mr. FIELD. We can not trust ourselves on that; no, sir; but some of us have been advocating the calling of a constitutional convention in Texas for years.

Mr. LORIMER. Can you not amend your constitution in any other way?

Mr. FIELD. No, sir; it must be done by a constitutional convention, and just as soon as they raise the cry that the corporations are trying to get out of their swaddling clothes the convention dies. That is the trouble in Texas.

Mr. HENRY. Is it not possible to change your constitution by amendment?

Mr. FIELD. Oh, of course, we could adopt an amendment to the constitution.

Mr. HASKINS. What is the authority for the offering of the reward you have spoken of?

Mr. FIELD. I suppose it was not challenged. Perhaps it is within the present powers of the government. We can unquestionably amend our constitution. We have time and again offered amendments.

Mr. HAUGEN. If you have authority under the constitution to check this boll weevil by offering a reward, have you not also the authority to appropriate money for the same purpose?

Mr. FIELD. I rather think not. I know they have held we could not appropriate money.

Mr. ADAMS. The constitution of Texas is not peculiar in that respect. There are a number of State constitutions with the same provision, and they usually whip the devil around the stump in order to arrive at such a purpose as you are aiming at there.

Mr. FIELD. But we feel that way. We are poor people, and Uncle Sam is very rich. We do not feel that we are begging it. We feel that here perhaps is a time when some of the money that has been going in might very properly come back to us.

## ADDITIONAL STATEMENT OF HON. GEORGE F. BURGESS, REPRESENTATIVE FROM TEXAS.

Mr. BURGESS. Mr. Chairman, I want to make a suggestion with reference to my friend Haugen's questions to my colleague, Mr. Field. I suggest that the aspect of the matter presents not a State, but a Federal, question as a matter of law and duty that the Government owes to the people, and that this bill is not grounded upon precisely the same position unanimously subscribed to by this committee when it introduced and passed without objection in the House the foot-and-mouth disease bill. The idea of that bill was not to remunerate the citizens of a particular State by condemning their cattle and paying for them, but to prevent the spread of that disease into the sister States, as a Federal question and a Federal duty. So here we are not suppliants at anybody's table. If it were a mere question of taking care of our own, I am proud to say that the Lone Star State will be able to do it to the limit that any other State is; but it is a national duty to take hold of this question and prevent this threatened destruction of an interstate industry.

Mr. LAMB. That is the point.

Mr. BURGESS. There is no need of any discussion about what this or that State ought to do, or has done, with reference to the foot-and-mouth disease, or any other question.

Mr. HENRY. We are all agreed on that point.

Mr. BURGESS. The question here is that it is the duty, as I see it, of the Federal Government to take hold of this matter and to prevent, if possible, by the expenditure of quite a considerable sum of money—if necessary $10,000,000—the spread of this destructive agency. Ten million dollars would be a modest sum to spend if you could prevent for twenty years the spread of this boll weevil into the other cotton States, even if it destroyed the industry in Texas. Undoubtedly that is true, and an effort ought to be made to do it. My idea personally, so far as my own defense goes, for clamoring for an appropriation of $500,000 is that to create a larger fund does not mean that a cabinet officer of our Government, if he is not of my party, will fool the money away, or spend it foolishly, or squander it in any way, any more than he did in the matter of the foot-and-mouth disease. But we do not know what contingencies may arise. We do not know what the extent of expenditures may be necessary in a week or in two weeks during the cotton season when these boll weevils may spread and threaten not only Louisiana but Arkansas and the Indian Territory. They may appear in Mississippi, whether from speculative evil purposes or by possible conveyance from the methods of commerce, and certainly it is undoubtedly not only the privilege of the National Government but it is its solemn duty to protect these others States against this injury, and an abundant fund ought to be provided with which to do it. To have a large fund will create confidence, inspire cooperation, and produce beneficial results, even if all of it is not expended.

I thank the committee.

Mr. HAUGEN. Mr. Chairman, I do not wish to be placed in the attitude of opposing any appropriation that can be judiciously expended. I voted most cheerfully for this appropriation last year.

Mr. BURGESS. I hope the gentleman will vote for it this year.

The CHAIRMAN. What do you think of the diversification of cotton in the South, as Doctor Galloway proposes? Do you think that would be kindred to the foot-and-mouth disease case?

Mr. BURGESS. Yes; for this reason, Mr. Chairman: We can not determine now whether the opinion of the Secretary, and of practically every scientist who has touched this problem, will be ultimately vindicated—that these weevils will spread in spite of everything that can be done in these other States. Assuming that may happen, that the expected and scientifically predicted may occur, it would be of importance as a Federal question that experiments may be made now, and all these methods of diversification may be in order so that they may be applied as Federal exigencies arise. I trust I make myself clear. If we should know that the weevil would not spread out of Texas, and if it were a mere internal State matter, then I would oppose much of what would be sought to be done under this bill, not only as a Democrat, but as a believer in all proper theory of government. But we can not determine what will occur, and we ought now to take the initial step to protect not only Texas but the Indian Territory and Arkansas and Louisiana and Mississippi, if that does happen which is anticipated and predicted by every scientist who has touched the problem and all those who have addressed you to-day.

The Secretary of Agriculture says straight out in his report that he believes that, in spite, perhaps, of all that can be done, the weevil will spread all over the Southern States, and work a revolution in agricultural matters. That is the opinion of Doctor Galloway, the opinion of Doctor Howard, the opinion of Mr. Hunter, the opinion of the State entomologist in my State, the opinion of the State entomologist in Louisiana; and they are making strenuous efforts now to quarantine against cotton seed and against cotton, and to do everything they can to prevent the invasion of the boll weevil into Louisiana. If it spreads, these different problems that will have been worked out under this appropriation in Texas will inure to the benefit of all the States thus affected, and upon that ground alone can be justified, in my opinion.

Mr. HAUGEN. I did not quite finish my statement, Mr. Chairman. I said I did not oppose the appropriation. My position is this: That the State should cooperate with the Federal Government, and should at least pay a part of the expense. It appears here from the statements made before the committee that the State of Texas has done nothing except to offer a reward of $50,000. If this is of the importance which has been pictured by the gentleman here, and he has certainly drawn a very splendid picture, it seems to me the State of Texas should do something toward paying a part of this expense.

Mr. BURGESS. Did the States cooperate where the animals were destroyed in the foot-and-mouth disease extermination?

Mr. HAUGEN. I think so.

Mr. HASKINS. Our New England States all cooperated.

Mr. HAUGEN. I understand they cooperated.

Mr. HENRY. But the cattle were partially paid for by the United States Government.

Mr. BURGESS. That is it exactly. We anticipate that we will cooperate. The resolutions of the Cotton Boll Weevil Convention at Dallas, which you will find incorporated in this statement, specially required that the Federal Government be authorized to locate experi-

ment stations in every county in the infected district where the county authority would cooperate with the National Government, and we anticipate under this bill that the land will neither have to be purchased nor leased by the National Government to conduct a single one of these different experiment stations; and we hope to have a great many of them, because it is just like educating the nation. The more schools you have and the more equipment, the more widespread the knowledge.

The CHAIRMAN. Is there anything further, Mr. Burleson?

Mr. BURLESON. Mr. Chairman, I would like to suggest this: That the State of Texas make an appropriation each year of a given sum of money, $5,000 I think, to be expended in connection with the $15,000 appropriated by the General Government, which is denominated the Hatch fund, at the State experiment stations. I will furthermore state that a reward of $50,000 has been offered by our State, and further, that the ingenuity of every man in Texas who is interested in the growth and culture of cotton has been taxed to the utmost to discover some means of relieving the distressful conditions which have resulted from this pest. We come here in order to enlist the continued services of scientists beyond the limits of our State. That is one of the objects and purposes of this measure. The State authorities, through the agricultural college, stands ready and will cooperate to the limit of their ability with any efforts that the Secretary of Agriculture may make looking to the discovering of a means of destroying this pest or lessening the damage which the pest has wrought in the State.

I desire now to make this motion: A number of bills relating to this subject have been introduced and will be referred to this committee. I move that all bills relating to the cotton-boll weevil and cotton diseases and demonstration farms for Texas which have been introduced be referred to a subcommittee, of which the chairman of this committee shall be the chairman, and that this subcommittee report back to the full committee next Saturday at half past 10 o'clock the result of its deliberations.

The CHAIRMAN. Do you mean this coming Saturday?

Mr. BURLESON. This coming Saturday. My purpose in that is this, that if we can determine upon a line of action now, I am confident that we can secure the time on the first day of the session after the holiday recess, which will be January 4, for the consideration of the measure. If we determine on Saturday the action we are to take, then in the meantime the necessary report can be prepared, and the chairman of the committee can bring the matter to the attention of the House immediately upon the reassembling of Congress after the holidays.

Mr. Chairman, before you put this motion I have made, I would be glad to have the benefit of any suggestions from any member of the committee.

The CHAIRMAN. A committee of how many, did you say; three?

Mr. BURLESON. I will say three or five. The smaller number can work more expeditiously.

Mr. ADAMS. Mr. Chairman, I am in sympathy with this bill, and I wish to say that there is no hesitation so far as I am concerned to let it go up now with certain modifications; but the purpose of this commission is defined here:

"The duties of said commission shall be to prepare and execute,

under the direction of the Secretary of Agriculture, such plans for lessening the damage caused by, and controlling the spread of, the Mexican cotton boll weevil."

The only authority given under this act for what you might call agricultural education, touching the people in Texas and the other States, to diversify their industries, is given under this clause, if it is given at all—a plan for lessening the damage caused by this weevil.

The CHAIRMAN. That is the clause under which Dr. Galloway claims he could operate.

Mr. BURGESS. That has a further clause, you will notice.

Mr. ADAMS. Yes—

And controlling the spread of the Mexican cotton-boll weevil and other insects and diseases injurious to cotton, as the Secretary of Agriculture may deem best.

Mr. BURGESS. That leaves it in his absolute judgment.

Mr. ADAMS. It gives him absolute authority to do what he can to stop the ravages of this weevil.

Mr. GALLOWAY. Lessening the damage is a different thing from stopping the ravages.

Mr. ADAMS. There is one thing the committee and Congress should consider, that if the Secretary of Agriculture finds, upon the expenditure of $50,000 or $100,000 or $125,000, that all work in that direction is ineffective, he would be empowered under this construction to spend the remainder in the cause of agricultural education. We do not want to overlook that. Understand, I look it squarely in the face, and am rather in sympathy with it; but——

The CHAIRMAN. I think that interpretation would be a little too broad. It specifies "lessening the damage caused by, and controlling the spread of, the Mexican cotton-boll weevil."

Mr. ADAMS. It can be so construed. It is capable of a double construction. A close construction of that language would not permit the interpretation which I have placed upon it, but the gentlemen here defending this bill seem to place that interpretation upon it.

Mr. BURLESON. And so does the Secretary of Agriculture.

Mr. GRAFF. It seems to me the committee ought to broaden that language, if they intend it to have that scope, so that there may not be any question about it. I think it is very decidedly doubtful whether the Comptroller of the Treasury would hold that money, used for the diversification of crops, would be for the lessening of the damage done by the boll weevil. I think it is too remote.

Mr. GALLOWAY. It has been submitted, not to the Comptroller, but to our attorney, who put the exact interpretation upon it that has been put on it by the Secretary—that under that authority he would be empowered to diversify crops if he deemed it best.

Mr. LORIMER. I am quite sure he would not.

Mr. GALLOWAY. The point raised by the Secretary is that it gives the Secretary larger discretion if the language is ambiguous than if it is specific.

Mr. ADAMS. Here is a law directed at a certain specific thing, to stop the ravages caused by the boll weevil, and an appropriation, and these words "lessening the damage" are supposed to apply to the action of the boll weevil upon the cotton plant.

Mr. GALLOWAY. It has been suggested that after the word "cotton" on line 12 of the bill, cutting out the word "such" in line 10, it be made to read in this way:

Such as the diversification of crops, the improvement of cultural conditions, and such other lines of work as the Secretary of Agriculture may deem best.

Mr. ADAMS. That would remove all question.

Mr. LAMB. I second the motion of Mr. Burgess.

The CHAIRMAN. I suggest that a subcommittee of three would be better than five, as the smaller the subcommittee the better the chance of getting together.

Mr. BURLESON. Very well, sir; I accept that suggestion.

The CHAIRMAN. Gentlemen, you hear the motion of the gentleman from Texas, that a subcommittee of three be appointed to take this matter up and report to the full committee on Saturday next at 10.30 o'clock.

The motion was carried.

Mr. BURLESON. Mr. Chairman, I should be glad to hear any other suggestions along the lines made by Mr. Adams or Mr. Graff.

Mr. LORIMER. Mr. Chairman, I have only this suggestion to make. I have had a good deal of trouble with the Comptroller. We passed an appropriation bill about six years ago for the improvement of the Chicago River, and it was ambiguous, and when we came to collect the money—that is to say, when the contractors came to collect the money—the Comptroller would not pay them, and it was carried over for a year and a half until Congress amended the bill. Now, if we are going to make an appropriation here for diversification of crops, we ought to say so. Then there will be no doubt about it. It is not necessary that we should call on the Comptroller to construe this law. Let us fix it so that he will have simply to pay on it.

The CHAIRMAN. So that it construes itself?

Mr. LORIMER. Yes.

The committee thereupon adjourned until Friday, December 18, 1903, at 11 o'clock a. m.

# AGRICULTURAL APPROPRIATION BILL.

SUBCOMMITTEE ON APPROPRIATIONS OF THE
COMMITTEE ON AGRICULTURE,
HOUSE OF REPRESENTATIVES,
*Washington, D. C., January 6, 1904.*

The subcommittee met at 10.30 o'clock a. m., Hon. J. W. Wadsworth in the chair.

## BUREAU OF ANIMAL INDUSTRY.

The CHAIRMAN. Gentlemen, we have met according to agreement this morning to commence hearings of the Bureau chiefs of the Department of Agriculture; and Doctor Salmon, of the Bureau of Animal Industry, is here.

### STATEMENT OF DANIEL E. SALMON, CHIEF BUREAU OF ANIMAL INDUSTRY.

The CHAIRMAN. Doctor Salmon, we notice in your appropriation you have asked for an increase over last year of $150,000, and we would like you, in your own way, to tell the committee the needs of this increase, and in what particular direction your work has increased so as to demand it, and to give us any other information which you think will be valuable and will enable the committee to form an opinion on the matter.

Mr. SALMON. Mr. Chairman, and gentlemen of the committee, the reason we have asked for the increase in expenditures is because the work has been growing in all directions. There is not very much that is special that we anticipate doing different from what we have been doing; but the number of animals in this country is increasing, the commerce of the country is increasing, the demands for meat inspection are increasing all the time, and there has been a general growth of the work, which requires larger appropriations in order to do it properly.

The CHAIRMAN. Have you some figures with you showing the increase in the exports?

Mr. SALMON. No; I have not made any figures showing the increase, but I drew off some figures showing what we had been doing with the money. For instance, the Bureau has inspected during the year 1903, 292,888 imported animals. That requires an inspection service along the Canadian frontier and along the Mexican frontier and along the seacoast.

The CHAIRMAN. Has that increased any over last year or the year before?

Mr. SALMON. I have not the figures for last year. I did not have time to look them up. In fact, it did not occur to me that I should

put the figures of last year in connection with these. The exported animals which are inspected reached 494,000, very nearly 500,000, and it is necessary that they should be inspected in the stock yards. We think they should be inspected when they are loaded, and that the vessels should be inspected, and that we should see that they have proper room on board for them, the proper ventilation, the proper amount of feed, and the proper number of men to take care of them.

Mr. SCOTT. Is it necessary, Doctor, to have a certificate of inspection from your Department go with every cargo of animals?

Mr. SALMON. With every cargo of animals.

Mr. SCOTT. In order to have them received in the country to which they are consigned?

Mr. SALMON. Yes; and we have inspected and cleared 634 ships during the last year. That means, of course, that we saw that the fittings were right.

The CHAIRMAN. You do not know offhand, I suppose, whether the export cattle last year increased over the cattle imported?

Mr. SALMON. The export cattle did not increase, no; they decreased slightly, but not enough to make any difference in the inspection.

The CHAIRMAN. Was there an increase in hogs, do you know, or of meat products generally?

Mr. SALMON. I could not tell you about that. The hog inspection—that is, the microscopic inspection—has been very low for two or three years. For instance, last year we inspected about half a million carcasses by microscopic inspection.

The general export trade does not make very much difference to our work, in fact no difference, because we inspect all the animals that are killed in the large abattoirs, whether they go into interstate commerce or for export.

Then our inspection for contagious diseases has been pretty heavy. We inspected of cattle going out of the Texas-fever district under supervision last year 1,620,000. Of course, it is necessary that those animals should be put in cars which have bills on them to show that they carry infected cattle. It is necessary when they are unloaded that they should be inspected by our men and put in the pens that are set apart for them. Then it is necessary that we should see that the cars are disinfected. This made it necessary that we should safeguard and disinfect 66,000 cars. I mention this to show you the extent to which the work has gone.

The CHAIRMAN. The Government does not do the disinfecting?

Mr. SALMON. We supervise it. We have to have men to see that it is done, otherwise it is not done. Then there is a large district along the Texas quarantine line, above the line, but which is more or less infected, that we put in a temporary quarantine, but let animals out on inspection, and it was necessary to inspect out of that district last year 389,000 cattle.

Then we have been endeavoring to lessen the amount of sheep scab in the country. It got to be such a destructive disease that it almost ruined the sheep industry in some of the western States. We began by making regulations prohibiting the shipment of diseased sheep from one State to another. We thought that would lead the States to clean it up, but it did not have much effect. The infected sheep were still shipped. They went into our stock yards and infected the sheep for export. This led to the prohibition of our sheep going into Great Britain.

The CHAIRMAN. Why could you not stop them just as much as you could stop the cattle? You stopped infected cattle.

Mr. SALMON. The only way we stop infected cattle is to keep supervision over them to see that they do not go out.

The CHAIRMAN. Can you not say to the inspectors that they must watch the sheep trade too?

Mr. SALMON. It would take a tremendous force of inspectors to watch the sheep trade, because they are all over the western States, the range States, the Rocky Mountain regions, and clear to California. In order to have enough inspectors there to stop diseased sheep going from one State to another it would take twice as many inspectors as we have.

Mr. GRAFF. There is a wider area of sheep raising than there is of cattle raising.

Mr. SALMON. There is a wider area of disease amongst the sheep. The sheep scab is all over the range country.

The CHAIRMAN. There is practically no inspection of cattle above the quarantine line?

Mr. SALMON. Practically no inspection at present.

Mr. SCOTT. Why could you not stop them at the seaboard, as you would infected cattle?

Mr. SALMON. We could when they showed the disease, but they would be infected in the stock yards. As long as the stock yards are infected and these sheep must go through them and come in infected cars, they carry the infection, and our inspectors are unable to detect the disease at that stage when they get to the seaboard, but when they reach the other side they show plain cases of scab.

But our work during the last two or three years has reduced the amount of scab in exported sheep very materially.

The CHAIRMAN. Was your work in that direction crippled for lack of means?

Mr. SALMON. It has not been nearly as extensive as it ought to have been, partly because of lack of means and partly because we were not able to build up our force fast enough. Of course we are trying to keep the force growing to meet the demands of the country as nearly as we can.

For this sheep scab last year we inspected sixteen and a half million sheep in the stock yards and over the range country, and we had dipped under our supervision 2,167,000, and 394,000 of these were dipped twice. I will say that the disease, sheep scab, increased to such an extent that we made arrangements with some of the western States, Wyoming and Utah in particular, to go in there and help them supervise dipping the sheep to cure the sheep, and get it cleaned up. There did not seem to be any hope of stopping the shipment of diseased sheep in any other way. That accounts for the large number that were dipped. Wyoming was pretty well cleared of sheep scab last year. I think another year's work will practically clean it out of the State.

The CHAIRMAN. Are you using that same dip you sent up to me?

Mr. SALMON. Yes, we use two dips. We use a lime and sulphur dip and a tobacco and sulphur dip.

The CHAIRMAN. Which do you find the better?

Mr. SALMON. There is not much difference. It is a matter of which is more convenient.

The CHAIRMAN. Do you not find that lime is a little injurious to the wool?

Mr. SALMON. Lime does injure the wool somewhat. It depends upon whether it is used properly or not. Then it also depends on the length of the wool at the time the sheep are dipped. If they are dipped soon after shearing, I do not think the effect of the lime is sufficient to take into account.

Mr. SCOTT. What is the cause of scab in sheep?

The CHAIRMAN. Scab is a microscopic parasite. It is large enough so that you can see it with the naked eye, but it is rather hard work.

Mr. SCOTT. If you get it cleaned out of a State, what assurance have you that it will stay out?

Mr. SALMON. Some countries have cleaned it out entirely, and it never has reappeared. Australia, for instance, cleaned it out some forty years ago.

Mr. HENRY. Do I understand there is no sheep scab in Australia at the present time?

Mr. SALMON. That is what they claim, and have claimed for thirty or forty years.

The CHAIRMAN. I think that is a most wonderful result, driving it out of Australia, where there are those immense flocks.

Mr. BOWIE. I suppose it is understood generally what you mean by dipping, but I do not understand the process. Of course, I have an idea from the use of the word; but would you mind explaining what your method of dipping is?

Mr. SALMON. A large dipping vat is constructed, which is sufficiently wide and perhaps 100 feet long, and deep enough so that a sheep can be put entirely under the liquid.

Mr. BOWIE. Head and all?

Mr. SALMON. Head and all. They are driven in one end of it and allowed to swim through it, and somewhere, during the course of the swim, the head is put under. They come out at the other end of the vat.

Mr. BOWIE. They are required to go through the whole 100 feet?

Mr. SALMON. They are required to go the whole length of the vat.

The CHAIRMAN. They remain in about a minute, do they?

Mr. SALMON. About two minutes.

Mr. BOWIE. It takes two minutes to go from one end of the vat to the other?

Mr. SALMON. Yes; and, of course, there is a string of them in all the time.

The CHAIRMAN. They dip cattle the same way?

Mr. SALMON. The same way.

Mr. BOWIE. Except, of course, that cattle require much larger vats, I imagine.

Mr. SALMON. A larger vat, but it is the same principle. That is one direction in which we will have to increase our force somewhat for the handling of cattle scab, which was introduced two or three years ago, and is spreading all over the range country and also getting into the farming States.

Mr. HENRY. Is that conveyed from sheep to cattle?

Mr. SALMON. No.

Mr. HENRY. It is a different disease, is it?

Mr. SALMON. It is about the same disease.

The CHAIRMAN. It is a parasite.

Mr. SALMON. It is a parasite which belongs to the same species, but it is not transferred from cattle to sheep. It is a different variety, but it produces the same sort of disease in cattle. It pulls them down so in their flesh that in the western country when bad weather comes on in the winter they lose a great many.

The CHAIRMAN. When did this cattle scab make its appearance? I never heard of it until this year.

Mr. SALMON. It made its appearance in northern Dakota. That is the first I heard of it.

The CHAIRMAN. When?

Mr. SALMON. Three or four years ago.

The CHAIRMAN. As long ago as that?

Mr. SALMON. That was the first time they had any outbreak there that has been at all serious.

Mr. SCOTT. Where is it supposed to come from? Where is it generated from in the first place?

Mr. SALMON. I do not know where it is generated in the first place, but it came in from Canada, probably. Where they got it I do not know.

The CHAIRMAN. I suppose Canada says it came in from the United States.

Mr. SALMON. Very likely. It is a more virulent form of cattle mange or cattle scab than we have ever had in this country before. It seems to spread more rapidly and affect cattle more seriously than any other. Really, in some of the States out there it is an extremely serious matter. They say in North Dakota that if we shut in the diseased cattle they will not be able to market any another year, and we must go up there and cooperate with them in some way in the treatment of these cattle in order to get them out to market.

Mr. BOWIE. Is this mange you speak of something like the dog mange?

Mr. SALMON. It is something of the same nature, and while when it first starts it does not seem to be very serious, it progresses until it almost ruins the cattle.

The CHAIRMAN. Can you dip them in winter?

Mr. Salmon. We can not dip them in that country in winter. It is too cold up there; but we will probably introduce toward spring a treatment of spraying or brushing material over them so as to treat those that are not very severely affected, and then later we will have to dip the ones where the disease has spread.

The CHAIRMAN. Does it occur all over the body.

Mr. SALMON. It starts along the back and in the root of the tail, and it spreads; and after they have had it awhile it goes all over the body.

The CHAIRMAN. It starts generally in the root of the tail?

Mr. SALMON. In the root of the tail or along the spine.

Mr. HENRY. Is the disease fatal?

Mr. SALMON. It is not usually fatal of itself, but it weakens the cattle so that in the winter time the loss is very much increased; and then really a badly infected animal is not fit for market. They look bad and they are in bad health.

The CHAIRMAN. Naturally they would carry no flesh.

Mr. SALMON. No; we have had urgent requests from the Dakotas and some of the other Western States to come and help them, and unless we do it looks as though their marketing of cattle will be stopped.

The CHAIRMAN. When you go on a man's range for the purpose of treating this infection, what share does the Government propose to bear?

Mr. SALMON. We will probably only bear the expense of supervising—putting in inspectors to tell them what to do and how to do it.

The CHAIRMAN. After a man is once shown how to do it, he can take care of it himself?

Mr. SALMON. Yes; then we will have to increase our inspection force a little to keep the disease from spreading out. Of course we have regulations that a man shall not ship a diseased steer or diseased sheep from one State to another, but they are doing it all the time; and when we get a lot of sheep the man says he did not know it. The law says if he ships them knowingly, he is guilty of a violation of the law and subject to penalties. If he does not ship them knowingly, he is not subject to penalty.

Mr. HENRY. He never does it knowingly.

Mr. SALMON. It is very seldom indeed they know it. The only time they know it is when some inspector has seen the animals and told the owner the animals had the disease; but it is very seldom you get a man it that situation. So that really the only way to keep the disease from spreading is to have inspectors enough there.

The CHAIRMAN. Were you not rather deterred from taking hold of this thing with the energy you desired on account of the foot-and-mouth disease? If you are relieved of that, can you not take hold of it?

Mr. SALMON. We have got that force scattered over the country now, but we have not inspectors enough for this purpose.

The CHAIRMAN. What did that force do before it went to eradicate the foot-and-mouth disease?

Mr. SALMON. Some of them were on meat inspection, some were on sheep scab inspection, and some were on Texas cattle inspection.

The CHAIRMAN. Therefore I say you had to temporarily divert that force to the foot-and-mouth disease?

Mr. SALMON. Yes.

The CHAIRMAN. That being gone, will you not be able to put these men back there?

Mr. SALMON. They are back now.

The CHAIRMAN. Will not that give you force enough?

Mr. SALMON. No; because we just had enough force to carry on that work comfortably before. Of course, when this emergency arose we took off men, we made some men do double duty, and we neglected the work in some places because we could not do it.

The CHAIRMAN. You have to do those things in the management of any business.

Mr. SALMON. Of course, when an emergency arises in that way, like the foot-and-mouth disease, we would put the force in the field even if we were obliged to stop these other things.

Mr. HENRY. Right there, Doctor, it is said that the foot-and-mouth disease in New England has been stamped out. That is true, is it? You have succeeded?

Mr. SALMON. We have not had any cases there since last May, except the one which occurred where they vaccinated a herd of cattle this summer.

Mr. HENRY. In that case it was thought it might be foot-and-mouth disease.

Mr. SALMON. It was thought so.

Mr. SCOTT. Do you know how much of the $500,000 appropriated by Congress was used for that specific purpose?

Mr. SALMON. About $300,000.

The CHAIRMAN. Then it did not cost you very much, considering the work done and the danger.

Mr. SALMON. No; we always do our work economically. That is what we pride ourselves on doing. Really it did not cost as much as I supposed it would.

The CHAIRMAN. I think that was done more economically than the average work of the Bureau.

Mr. SALMON. I do not think so.

The CHAIRMAN. I mean according to the results.

Mr. BOWIE. Is it not a fact that the Department of Agriculture work is more economical than anything else?

Mr. SALMON. I can speak for the Bureau of Animal Industry. I am satisfied that is conducted as economically as if I were running it out of my own private funds, but I always look to that side of it, and when I spend money I like to see it go where it will accomplish something.

We inspected in the meat inspection last year in the slaughter houses at the time of slaughter 37,183,000 carcasses. That, you know, is a tremendous number, and it is necessary for a man to be there and see all those carcasses and see the internal organs and look at them and see whether they are healthy or not. As the result of that inspection there were 114,198 carcasses condemned and taken out and destroyed.

The CHAIRMAN. Cattle and sheep together?

Mr. SALMON. Cattle, hogs, and sheep; yes.

The CHAIRMAN. Mostly hogs?

Mr. SALMON. Mostly hogs—more than half of them hogs. The total inspections which we are obliged to make in the stock yards amounted to over 59,000,000—that is, of live animals. Of course those are large figures, and I go over them because I want the committee to realize as nearly as it can how much work is necessary to be done in order to supervise the animal trade of this country now. Of course it is a big country, and we are doing a lot of business. The internal commerce of the country is greater than it has ever been before, and is growing all the time. No one realizes how large a country it is until he has tried to cover it with an inspection force and keep his men moving around to answer the demands of people who want animals inspected for a market where the regulations require inspection.

Mr. BOWIE. Did I understand you to say 59,000,000?

Mr. SALMON. 59,000,000 were inspected in the stock yards.

Mr. BOWIE. In one year?

Mr. SALMON. In one year.

The CHAIRMAN. Sheep, cattle, and hogs.

Mr. HAUGEN. How are these inspectors paid; by the month?

Mr. SALMON. When the inspectors are first put on they get $1,200 a year. They must all be veterinarians and they must all, in addition

to passing their examination at their veterinary colleges, pass a veterinary examination of the Civil Service Commission. They are put on at $1,200 a year and at the end of three years they are promoted to $1,400.

Mr. WRIGHT. Are they deterred from doing other work as veterinarians?

Mr. SALMON. Yes, sir.

Mr. HAUGEN. Are they appointed from the locality where the inspections are being conducted?

Mr. SALMON. No; the register for our veterinarians is a general register for the whole country. They pass the examination and go on a general eligible list, and we take them according to their standing on that list. They must go wherever we happen to need them.

Mr. LAMB. You get them through the Civil Service Commission?

Mr. SALMON. Yes.

Mr. HENRY. Some time ago you spoke of difficulty found in securing expert help.

Mr. SALMON. We have found difficulty in getting men fast enough. The Civil Service Commission has not been able to get men through the examinations fast enough.

Mr. HENRY. Has it not been your habit, as in other bureaus, to take young men from agricultural colleges and train them up in your work?

Mr. SALMON. They all have to be veterinarians.

The CHAIRMAN. They have to take that post-graduate course—the veterinary course?

Mr. SALMON. Yes.

Mr. HAUGEN. Is this inspection free of charge to the packing houses?

Mr. SALMON, Yes, sir.

Mr. GRAFF. How many of these inspectors are there?

Mr. SALMON. We have about 400 now.

The CHAIRMAN. Now, Doctor, to establish a quarantine line, is it absolutely necessary to have a veterinarian?

Mr. SALMON. Well, it is necessary to have a veterinarian to inspect the stock to see whether they are diseased or not.

The CHAIRMAN. Take the case of sheep. Any farmer knows scab when it is in its active stage, of course; but when it first begins to break out and they begin to lose the wool, few would immediately recognize it.

Mr. SALMON. Of course if the scab is very far advanced anyone can tell it, but then that is not the usual order of things.

The CHAIRMAN. You could not tell it unless the wool had loops in it?

Mr. SALMON. When an inspector sees a lot of sheep in the stockyards with the wool loosening in spots and the sheep biting themselves, that is an indication that they may have scab. He has got to go and determine whether that is scab or not. He has got to take his microscope and scrape off the skin and know how to examine it and find the scab mite and then he must know the scab mite when he finds it. It does not do to guess about those things. A man must be absolutely certain in his diagnosis of the disease. You may have an eruption from sheep being out in a cold rain. That will sometimes cause an eruption of the skin. Sometimes irritants of various kinds start up an irritation which a superficial examination would perhaps make one think was scab; but it would be an injustice to the owner of those sheep if it was not scab to hold them up and make him dip them, and

so on. So our men have to know the insect and have to know how to find it.

Then those same sorts of questions come up with every disease. It is the same way with the Texas fever. There is a whole lot of ticks on the cattle in that quarantine district. We generally diagnose the infected cattle by the tick which carries Texas fever.

Mr. LAMB. Doctor, have you had any of these inspectors in southern Virginia and eastern North Carolina, where that tick predominates?

Mr. SALMON. We keep a man in Richmond and a man in Norfolk, and we have two men in North Carolina on the transportation routes.

Mr. LAMB. Right in that connection, is that tick trouble abating there since you have been operating in that neighborhood?

Mr. SALMON. In some places it is.

Mr. LAMB. I want to keep that quarantine line from coming north.

Mr. SALMON. So far our quarantine line has gone southward. That is, a great deal of the district which was infected at the time we started has been freed from it.

Mr. LAMB. I know. I saw you about that once.

Mr. SALMON. Just there I would like to say this. Of course we have been investigating the disease from a scientific point of view. In fact, when we began work with Texas fever there was nothing known about it except that cattle from somewhere in the Southern States coming north would spread a disease that would kill the cattle they came in contact with, but they did not know what districts they came from. They did not know how they spread it or how to prevent its spreading. We took up the disease, made a scientific investigation of it, and found a parasite in the blood which caused the disease. We found that parasite was carried from animal to animal by this tick, and we worked out the habits and natural history of the tick, so we knew what kind of regulations to make to control the disease. We have been trying for ten years to find something to kill the ticks.

The CHAIRMAN. Will not that dipping process kill these ticks?

Mr. SALMON. It was a long time before we could get anything that would kill the ticks. We thought two or three times we had something that would do it, and that would mean a good deal, because if we could dip the cattle in that quarantine district and kill all the ticks before they went out, then they could go anywhere without restriction. It would relieve our work a good deal and it would relieve the people who raised the cattle.

The CHAIRMAN. I have heard of an oil that was put on them to kill these ticks.

Mr. SALMON. During the last year we have found a crude petroleum which comes from the Beaumont district in Texas that has a very large proportion of sulphur in it, and it actually kills the tick without damaging the cattle. It is the only thing we have discovered that will do it. That will be used very largely this year.

Mr. LAMB. What is the technical name for that?

Mr. SALMON. It is the Beaumont crude petroleum.

Mr. HENRY. The properties of that petroleum are different from the Pennsylvania petroleum, are they?

Mr. SALMON. Yes; it has a very large proportion of sulphur dissolved in it. When we began dipping we used a petroleum product and tried to dissolve sulphur in it, but we were not able to dissolve any to amount to anything, and the Standard Oil people (who are sup-

posed to know all about petroleum) told us they could not dissolve sulphur in petroleum; but we have found since that this natural crude petroleum from Texas has a large quantity of sulphur already dissolved in it, owing to some peculiar properties of the oil.

Mr. HENRY. A process you have not been able to discover?

Mr. SALMON. A process we are not able to duplicate; but it is already there, and it is very cheap. The oil can be bought for about 3 cents a gallon.

The CHAIRMAN. That kills the ticks, does it?

Mr. SALMON. Yes; we experimented with it at our experiment station at Bethesda.

The CHAIRMAN. Will one dipping kill them?

Mr. SALMON. One dipping; yes, sir. Then late in the season we experimented in Texas with it, and in both places it killed all the ticks and did not damage the cattle.

The CHAIRMAN. How much did it cost to dip a steer? Have you any figures on that?

Mr. SALMON. With that oil it did not cost very much.

The CHAIRMAN. About how much?

Mr. SALMON. It costs 3 cents a gallon, and about a gallon of oil is taken out of the dip with the steer. Then, it is necessary to count the interest on the plant, and so on, but if they are dipping a large number it will not amount to much.

The CHAIRMAN. About 5 cents apiece?

Mr. SALMON. About 5 cents apiece. When we started in it was costing from 50 to 75 cents an animal, and they were very anxious to have them dipped at that price; but with this oil it will certainly be inside of 10 cents and possibly inside of 5.

Mr. SCOTT. You killed a good many animals in the beginning of these experiments, did you not?

Mr. SALMON. Well, some, and some were damaged more or less.

Mr. SCOTT. And the owners suffered the loss?

Mr. SALMON. Yes; they were willing to take the chances, you know. They were so anxious to get their cattle out.

Mr. LAMB. Have you any bulletins on this, Doctor?

Mr. SALMON. I have not written up the dippings yet; no.

Mr. LAMB. When you do I wish you would send me some.

Mr. SALMON. I will be very glad to do so.

Mr. WRIGHT. In these various experiments do you send the inspectors wherever there is an infected flock?

Mr. SALMON. Now we are sending inspectors to central shipping points to inspect the sheep that are to be shipped.

Mr. WRIGHT. Seaboard and shipping points?

Mr. SALMON. And in the interior also. For instance, in Wyoming we have certain places where our inspectors are stationed on the railroads.

Mr. WRIGHT. Suppose a man had a large herd of dairy cows; you would not send an inspector to look them over?

Mr. SALMON. No; we do not do anything with dairy cows.

Mr. SCOTT. Doctor, with regard to this inspection in Wyoming that you have spoken of, is not that State doing anything along that line?

Mr. SALMON. Yes, sir; they are cooperating with us. They have a sheep sanitary board, and they have made the regulations and helped to enforce them.

Mr. SCOTT. Ought they not to be more and more able to do the whole business?

Mr. SALMON. They will, of course, as soon as the great burden of stamping out the disease in the first place is through with. They will be able to control it, because all they will have to do then will be to keep out scabby sheep, and we will do that by our supervision over interstate traffic.

Mr. SCOTT. I know I have been called upon several times by farmers near my home to know what they should do on account of certain diseases that have appeared among their stock, and I have always simply called upon the State veterinarian board, and they have sent a veterinarian there and attended to the business. It never occurred to me to call on the United States.

Mr. SALMON. States always attend to those things that have no special bearing on interstate trade, but where it comes to a widespread contagious disease like sheep scab, it is more than the State can handle. In the first place, there are very few of the State authorities that have the nerve and backbone to enforce the regulations with sufficient stringency to accomplish anything.

Mr. BOWIE. Then they have not the trained men either, have they?

Mr. SALMON. They do not usually put trained men on those boards. They do sometimes, but oftener they do not, and the men they do put on seem to lack the nerve to enforce the regulations. In fact, they are too well acquainted with the people, and the influence of the people who own the sheep can be brought to bear upon them too strongly.

The CHAIRMAN. I see your increases have been as follows: In 1897–98 you had an increase of $26,000. I am giving these in round numbers. In 1898–99 you had $227,800 increase; in 1899–1900, $60,590 increase; in 1900–1901, $84,000 increase; in 1901–2, $25,000 increase; in 1902–3, $93,000 increase; in 1903–4, $40,000. That, of course, does not include the $500,000 emergency fund for the foot and mouth disease; but in that bill of last year you were authorized, I think, to buy some real estate for quarantine stations. That has been accomplished, has it not?

Mr. SALMON. No, we have not bought that.

The CHAIRMAN. You bought the one back of Jersey City?

Mr. SALMON. Well, that was bought three years ago, I think. Yes; there was a small addition there.

The CHAIRMAN. There was $20,000 for enlarging Bethesda out here.

Mr. SALMON. That has been done. The one I was speaking of was $10,000 for a quarantine station in Baltimore. That we have not expended. I do not know whether we will be able to get that or not. The work naturally grows every year. I suppose there ought to be, to keep the work on a good basis, an increase of something like 10 per cent a year. I think that is the natural growth.

The CHAIRMAN. The export, the interstate commerce, you might say, in meats does not grow 10 per cent a year, does it?

Mr. SALMON. It does not; but the meat inspection grows more than 10 per cent a year.

The CHAIRMAN. I notice in your reasons for asking an increase you mention the increased demand for inspection. What does that come from?

Mr. SALMON. We have four or five places at Kansas City now asking for inspection.

The CHAIRMAN. What places are they? What are they?

Mr. SALMON. They are places over across the line in Kansas. They claim they are unable to sell meat. They want to sell their meat in Missouri, and under the law they are not allowed to ship meats across from Kansas to Missouri unless they are inspected. We have pending now 38 applications for meat inspections that we are unable to grant.

Mr. HAUGEN. What arrangements are made for the inspections at these smaller packing houses?

Mr. SALMON. There is no special arrangement unless they are killing from 50 to 75 head of cattle and 200 or 300 hogs a day. We do not give them inspection because we think it is not worth it.

Mr. HAUGEN. They are, then, at a disadvantage, are they not?

Mr. SALMON. They are at a disadvantage.

Mr. GRAFF. Do you keep any inspectors at the distilleries in Illinois where they raise fattened cattle?

Mr. SALMON. No; only at the slaughterhouses and stockyards. I went over our expense account yesterday, and I want to say I had not looked at the estimates and did not know how much the Secretary had asked for. I requested him to ask for somewhat more than he did, but I just took our monthly expense account and averaged it up, and I find that during the last few months our expenses for meat inspection had been about $75,000 a month. The export cattle inspection has run about $5,000. The inspection of imported animals runs about $4,000; then the sheep scab inspection about $10,000, the Texas fever inspection about $5,000; our dairy products inspection runs about $3,000, and miscellaneous expenses about $3,000. It makes altogether $112,500 a month, and that comes to just $1,350,000 a year.

I reached that conclusion before I looked at this, and went to see what the Secretary has asked for. He has asked for just exactly the amount that I arrived at by going over the monthly expense accounts yesterday.

Mr. BOWIE. Right in that connection, I understood you to say yesterday you have about 400 inspectors now.

Mr. SALMON. Yes, sir.

Mr. BOWIE. How many will you expect to have if you get this increase of $100,000?

Mr. SALMON. Well, I do not know, of course.

Mr. BOWIE. Would it all go to inspectors or would it be partly applied to something else?

Mr. SALMON. It would go for inspectors and the expenses of inspectors and miscellaneous expenses which naturally come up in connection with such a matter.

Mr. GRAFF. These inspectors are allowed their traveling expenses, of course?

Mr. SALMON. Yes.

Mr. GRAFF. But not their maintenance while there?

Mr. SALMON. Except in special cases where they are sent to a place for just a few days. Every man must have a home station.

Mr. GRAFF. Where the most of his work is done?

Mr. SALMON. Where the most of his work is done, and when he is there he must maintain himself.

Mr. BOWIE. Doctor, could you give me an estimate approximately of the number of additional inspectors you think it would be wise to put on?

Mr. SALMON. I could not, very well.

Mr. BOWIE. Or is it on a deficiency basis now?

Mr. SALMON. I could not tell until we actually put them in the field to see how many it takes to cover the territory. For instance, this cattle scab is going to require an increase of expenses. Our expenses now are about $500 a month.

The CHAIRMAN. Five hundred dollars or $5,000?

Mr. SALMON. Five hundred dollars, and the expenses of the sheep scab are $10,000. I have no doubt this cattle scab will take $8,000 or $10,000 a month this summer to control it.

Mr. BOWIE. That is, the Texas cattle.

Mr. SALMON. No, not the Texas cattle. The Texas cattle inspection will be about the same as it has been, but the cattle scab will require considerably more expense.

Mr. BURLESON. Where is that disease prevalent?

Mr. SALMON. All over the range country, but probably most in the Dakotas and Wyoming.

Mr. BURLESON. In the colder country?

Mr. SALMON. It was worse there because it was introduced from the north. I do not think cold has so much to do with it.

Mr. BOWIE. How much has the Texas inspection cost for the Texas fever?

Mr. SALMON. The Texas fever inspection is costing $5,000 a month.

Mr. BOWIE. And it would be about the same?

Mr. SALMON. It would be about the same. That will not vary.

The CHAIRMAN. Doctor, in view of the fact that you can not get a suitable station on the water at Baltimore, I presume you will keep the old station and do your work there?

Mr. SALMON. We will keep the old station; yes, sir. We may be able to get a few acres below Baltimore on the river. I am in hopes so, because we are having cases of animals coming in from countries where they have more or less disease, and we have not a quarantine station now that is safe. They are all inland. We are obliged to take the stock over the railroads. At Baltimore it is 12 or 14 miles, at New York it is 25 miles, and at Boston it is 25 or 30 miles.

The CHAIRMAN. Inland?

Mr. SALMON. Inland. We do not feel safe in letting animals in from a country where they have any dangerous disease, so we shut them out. There are people now who want to bring in Angora goats from South Africa. The Secretary thinks it is not safe, and I doubt myself if it is safe; but if we had a quarantine station on the water front where we could take the animals from the ship on a lighter and put them into the quarantine station, we could handle them safely.

Mr. HENRY. You made an effort in New York to secure a quarantine station on the water front?

Mr. SALMON. Yes; we tried very hard.

Mr. HENRY. And you found it impracticable?

Mr. SALMON. Absolutely impossible to get land for a quarantine station around New York within a reasonable distance.

Mr. HENRY. And you went back to New Jersey?

The CHAIRMAN. It would be better to have these stations on the water, but you have never had an outbreak from animals after they have left quarantine.

Mr. SALMON. We have not, but the Canadians have. They brought over pleuro-pneumonia.

Mr. BURLESON. At what points do you conduct this inspection of meats intended for export trade?

Mr. SALMON. At all the large packing centers. There are fifty or sixty different centers where we have them.

Mr. BURLESON. The bulk of the money expended for meat inspection is for the inspection of dressed meats, is it not?

Mr. SALMON. Yes; the inspection at the time of slaughter.

Mr. BURLESON. What percentage of it is for the inspection of dressed meats?

Mr. SALMON. About $75,000 a month is for the meat inspection.

Mr. BURLESON. That is all for dressed meats?

Mr. SALMON. Yes, sir.

The CHAIRMAN. I think the doctor does not understand you, Mr. Burleson. Not dressed meats, but canned meats and everything.

Mr. SALMON. Of course we inspect all the animals slaughtered, no matter what the meat goes for.

Mr. HAUGEN. It is inspected for interstate commerce, too.

Mr. SALMON. Yes. I believe you were going to ask me a question, Mr. Wright?

Mr. WRIGHT. I was asking where your quarantine for the port of New York is; at Garfield?

Mr. SALMON. At Athenia, N. J. It used to be at Garfield, but we had to give up that station and we went to Athenia, 2 or 3 miles from Garfield.

The CHAIRMAN. Are you going to have a deficiency this year.

Mr. SALMON. No, sir; we are not going to have a deficiency; but we have got to put some work on contagious diseases—sheep scab, and so on—on that $500,000 which you appropriated last year for contagious diseases.

The CHAIRMAN. For the foot-and-mouth disease?

Mr. SALMON. Yes, sir.

Mr. BOWIE. It would be a deficiency as against the $1,200,000?

Mr. SALMON. It would be a deficiency against that; yes, sir.

Mr. BURLESON. There would be $250,000 of that diverted for the cotton-boll weevil. You have considered that, have you?

Mr. SALMON. Yes, sir.

Mr. BOWIE. That was really a million-dollar appropriation. We called it a $500,000 appropriation, but it was really a million dollars.

Mr. SALMON. Two $500,000 appropriations; yes. The dairy inspection will cost a little more than it has cost, but not very much. The inspection of renovated butter, you remember, was put under the Bureau of Animal Industry, and last year, which was the first year, there were 82 factories inspected and put under supervision, and the total output of renovated butter was 50,000,000 pounds. Out of this we inspected for export 1,312,000 pounds.

Mr. BOWIE. I would like to know something about the result of that renovated-butter inspection. You probably found the renovated-butter people were guilty of some things they were accusing the oleomargarine people of.

Mr. SCOTT. That is res adjudicata.

Mr. SALMON. We found some pretty bad lots of renovated butter. I admit that.

Mr. BURLESON. It was a very wise action on the part of Congress to require an inspection of renovated butter, was it not, Doctor?

Mr. SALMON. I should hate to intimate that Congress ever does anything that is not wise.

Mr. HENRY. I might say the internal-revenue officials claim that the receipts, of a quarter of a cent a pound tax, pay the expenses.

Mr. BOWIE. Yes; it goes into the general treasury and we have to make an appropriation.

Mr. HENRY. I understand; but it pays. There is no loss to the Government in that supervision.

Mr. BOWIE. Of the renovated butter?

Mr. HENRY. Of the renovated butter.

Mr. BURLESON. What amount of money is asked for this year for the distribution of blackleg?

Mr. SALMON. Nothing special. All our work comes out of this one appropriation.

Mr. BURLESON. It is a lump sum, is it?

Mr. SALMON. Yes.

The only thing I have to say in addition, Mr. Chairman, is that I believe $1,350,000 is needed to do our work properly and economically. Of course, if the committee in its wisdom thinks that is too much money to spend for this purpose we will get along with less. It does not make any difference to me personally. I will do the best I can with the money you give me, but these things are urgent matters. Neglect of the service causes a great deal of loss to the stock raisers of the country; and to allow these diseases, like cattle scab and sheep scab and glanders, and so on, to spread all over the country means a very heavy loss.

The CHAIRMAN. You see you still have that $500,000 of last year intact, or $450,000 of it. You used $300,000 for the foot-and-mouth disease, leaving $200,000. Now we have appropriated $250,000 for the cotton-boll weevil. That leaves $450,000 still available.

Mr. SALMON. That is all right for the current year. This appropriation you are talking about is for another year, beyond that.

The CHAIRMAN. When does that emergency appropriation die by law?

Mr. SALMON. That dies the 1st of next July.

The CHAIRMAN. Was it treated exactly like all other appropriations? Was it not made exceptional?

Mr. SALMON. No, sir.

The CHAIRMAN. Available until used?

Mr. SALMON. No, sir; I think not. It has always been held over in our Department that the first appropriation of $500,000 expired the 1st of last July and the second appropriation of $500,000 expires the 1st of next July, out of which I expect to take the deficiency for the present year by paying for this part of the sheep-scab work.

The CHAIRMAN. Then you contend there is only $250,000 left of that appropriation after the cotton-boll weevil is taken from it?

Mr. SALMON. We will not have to take as much as $100,000 out of it. I do not know how much it will amount to; probably $60,000 or $70,000.

Mr. GRAFF. For what purpose?

Mr. SALMON. For this contagious disease, sheep scab and cattle scab, and so on. So that so far as this year goes, we will get through by using that, but it is a question about the next fiscal year.

Mr. BOWIE. Doctor, you ask for $150,000 more, and you say on the cattle scab you are now spending $500 a month, and you ought to spend several thousand dollars. How many thousand dollars did you state?

Mr. SALMON. I said I thought it would cost $5,000 or $6,000 a month.

Mr. BOWIE. That would be an increase there of approximately $50,000 for that single purpose that you regard as necessary?

Mr. SALMON. Yes; but we are running behind this year some $60,000.

Mr. BOWIE. I say that accounts for $60,000 of the increase that you ask for right there?

Mr. SALMON. Sixty thousand dollars of the deficiency this year, and $65,000 or $70,000 deficiency on the cattle scab next year, makes about $125,000 or $130,000.

Mr. BOWIE. And there is pretty nearly all of your increase right in those two items?

Mr. SALMON. Pretty nearly all, yes, sir; and of course the expenses naturally increase from year to year more or less.

The CHAIRMAN. Do you think you can get along with your work without the $150,000?

Mr. SALMON. I do not think we could, unless there is some other fund we can draw from.

The CHAIRMAN. It is as broad as it is long as far as the Government is concerned. You would have to cut out some of your work if you did not get an increase?

Mr. SALMON. Certainly.

The CHAIRMAN. Or else go to the deficiency bill?

Mr. SALMON. Yes.

The CHAIRMAN. I can not understand where this increase of inspection comes from, in view of the fact that we are not exporting much.

Mr. SALMON. The expenses in the inspection of export animals is really a small part of the expense, you see. It is only $5,000 a month now.

The CHAIRMAN. That is $60,000.

Mr. SALMON. Sixty thousand dollars a year. Still, it is only $5,000 out of $112,000 a month. Of course, when we started in a few years ago we had all small-salary men—$1,200 men—and it is necessary after they are on three years to increase their salaries a little. You can not always keep a force of the lowest grade of men and keep up your force; and with the salaries we are paying we are not able to get men as fast as we need them.

The CHAIRMAN. Our country is just flooded with poor veterinarians.

Mr. SALMON. We are trying not to get that kind.

The CHAIRMAN. Half of them do not know their business.

Mr. SALMON. Of course there is not more than one in three of the men who take the civil-service examination who pass, although they graduate from a veterinary school.

Mr. BURLESON. Mr. Chairman, this emergency appropriation of last year is even broader than we thought it was. It is to cover "foot-and-mouth disease and other contagious diseases of animals."

Mr. BOWIE. Is that the new deficiency bill?

Mr. BURLESON. Yes; that is what is going into the deficiency bill.

Mr. BOWIE. To cover the boll weevil?

Mr. BURLESON. Yes.

The CHAIRMAN. It reads this way:

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That so much of the act entitled "An act making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and four," approved March third, nineteen hundred and three, as relates to the emergency appropriation to enable the Secretary of Agriculture to stamp out and eradicate the foot-and-mouth disease and other contagious diseases of animals, to be used for no other purpose, be, and the same is hereby, amended to read as follows:

"Emergency appropriation: To enable the Secretary of Agriculture to stamp out and eradicate the foot-and-mouth disease and other contagious diseases of animals, and to meet the emergency caused by the ravages of the Mexican cotton-boll weevil and other insects and diseases affecting cotton, and for no other purposes, five hundred thousand dollars: *Provided*, That of this sum not to exceed two hundred and fifty thousand dollars may be expended by the Secretary of Agriculture in such manner as he shall deem, best in cooperation with State experiment stations and practical cotton growers, if the Secretary of Agriculture shall deem it advisable, to meet the emergency caused by the ravages of the Mexican cotton-boll weevil and other insects and diseases affecting cotton, and the remainder of the five hundred thousand dollars herein appropriated (not less than two hundred and fifty thousand dollars, however) shall be used exclusively to stamp out and eradicate foot-and-mouth disease and other contagious diseases of animals."

Mr. BURLESON. That just takes the place of the old law—"to be amended so as to read as follows:" The old law carried $500,000, and it simply diverts $250,000 of it to be used for the Mexican boll weevil, but says the other $250,000 shall be expended for stamping out the foot-and-mouth disease, and then it broadens the scope and says "and other contagious diseases."

Mr. GRAFF. Will that be available after the 30th of June?

The CHAIRMAN. I think we can get the Committee on Appropriations to put in there "and this appropriation shall be available until used," or something of that sort, or have it extended another two years if it is contrary to law to make it available until used. I think I have seen appropriations made available until used. Haven't you, Doctor, in the course of your experience?

Mr. SALMON. I never have in an appropriation for Department use.

Mr. SCOTT. I think it is doubtful if that would be admitted.

The CHAIRMAN. This deficiency appropriation would be available for two years, would it not, or for one year?

Mr. SALMON. I think that is only available until the 30th of June, 1904.

Mr. GRAFF. That is an amendment of the old law and would not be available any longer than the original act was available.

Mr. BURLESON. It was not intended to change the old act at all except to divert $250,000 of that money.

The CHAIRMAN. It was not intended as far as the boll weevil was concerned. It was to let them have that for a full year or more.

Mr. BURLESON. They would make contracts against it, you understand.

The CHAIRMAN. We can get that without any trouble so that it will be available from the 1st day of July, 1904, to the 1st day of July, 1905.

Mr. SALMON. You could in your appropriation bill reappropriate the unexpended balance of that.

The CHAIRMAN. We can do it in this way and that would make it immediately available for you for any work you are doing now. I do not know whether that can be made to apply to another fiscal year or not in that deficiency act. I doubt very much if it can. Now,

Doctor, if we can make this emergency appropriation available for use until the 1st day of July, 1905, that will answer your purpose?

Mr. SALMON. Well, I doubt if it will altogether, because there is only $250,000 left there.

The CHAIRMAN. You are only asking for $150,000 increase, and there is available $250,000.

Mr. SALMON. That is for two years.

The CHAIRMAN. Yes; for the balance of this year.

Mr, SALMON. For the balance of this year and for next year.

The CHAIRMAN. At that rate you will get more than $150,000. It will be for eighteen months. You can not do much in the sheep scab in this weather out West.

Mr. SALMON. We have our inspection force out inspecting all the time. That expense is going on.

Mr. SCOTT. You are not expecting your increase of $150,000 to begin until the 1st of next July?

Mr. SALMON. No.

The CHAIRMAN. So that you are really better off under that act than you would be under the regular appropriation. As Mr. Scott suggests, this increase of $150,000 would not be available until next July. This would give you what you might call an emergency fund to meet this emergency right now.

Mr. HAUGEN. This will give $100,000 more than you are asking for.

The CHAIRMAN. Almost. The law, however, is that he is only to use it for this purpose, for the foot-and-mouth and other contagious diseases of animals. We avoid in that way incorporating it in the regular appropriation. This is an emergency. It may die out next year and you may have nothing to do with it, and if you once incorporate it the appropriation will never go down.

Mr. SALMON. Well, of course the sheep scab and cattle scab are not going to go down in a year anyway.

The CHAIRMAN. No, it may not, but you can not tell. If you go at it with the vigor with which you went at the foot-and-mouth disease, you will probably stamp it out.

Mr. BURLESON. What affect does scab have on cattle, Doctor?

Mr. SALMON. It reduces their flesh, and if it is allowed to go far enough, it makes them unfit for slaughter, and a great many of them are lost in the winter time. These parasites burrow under the skin and set up inflammation.

Mr. BURLESON. I never heard that cattle were subject to that disease.

Mr. SALMON. They are.

Mr. BURLESON. We do not have any cattle scab down in Texas.

Mr. SALMON. Yes, they are getting it now.

Mr. BURLESON. Is that coming from the North?

Mr. SALMON. Yes.

Mr. BURLESON. Do you not think you had better quarantine against Northern cattle coming down there and giving it to us?

Mr. SALMON. Well, we have quarantined them. Our regulations prevent the shipment of diseased cattle, but making the regulation does not stop it.

Mr. BURLESON. That is true.

The CHAIRMAN. Now, Doctor, if that can be arranged in the way I have suggested, the committee understand that will be satisfactory to you.

Mr. SALMON. I do not see any reason why it would not be.

The CHAIRMAN. I think it is really more satisfactory than your own plan, because it makes it immediately available. You have got it from now on. If you have any important work you want to do to-morrow, you can do it, or at least as soon as the bill passes.

Mr. BOWIE. He has already checked on this $250,000.

The CHAIRMAN. Yes, he understands that; but there is $250,000 of that appropriation left. Of course, if between now and the adjournment of Congress there is any serious outbreak of foot-and-mouth disease, he can take care of it.

Mr. SALMON. There is nothing on this second $500,000 appropriation except that there may be a little run over that was not settled in the last year, but there has been nothing expended in this year.

Mr. HAUGEN. That practically gives you $100,000 more than you asked for?

Mr. SALMON. Yes, practically.

Mr. HENRY. I did not understand you a while ago, Doctor; at least it seems I did not. I got the impression a while ago that your deficiency for this year, between $50,000 and $60,000, and extra expenses incurred in stamping out the cattle scab were being made chargeable against this $500,000 appropriation.

Mr. SALMON. They would have to be; yes.

The CHAIRMAN. No, not now, Doctor. I think you do not understand. You are not charging the scab against this emergency appropriation.

Mr. SALMON. We will have to take some out of it.

The CHAIRMAN. You will have to, but you have not yet.

Mr. SALMON. We have just commenced.

The CHAIRMAN. I doubt very much whether you had the authority to do that, had you?

Mr. SALMON. It says "for contagious diseases of animals."

The CHAIRMAN. Yes, that is so—"foot-and-mouth disease and other contagious diseases of animals." That is right.

Mr. BOWIE. And your deficiency has been to some extent coming against that fund?

Mr. SALMON. We have paid all our expenses up to the 1st of January out of the regular appropriation, but from that time we will have to begin to charge this sheep scab and contagious disease work up against that other appropriation.

Mr. BOWIE. So that the whole sum of $250,000 will not go over into the new fiscal year?

Mr. SALMON. Oh, no.

Mr. BOWIE. I mean the new one, beginning July 1 next.

Mr. SALMON. There may have been also some foot-and-mouth disease expenses charged up against this year. I do not know that until I look in the disbursing office about it, because while our work was finished up there practically in May, we kept the force there, and some of the bills came in probably after the 1st of July. I do not know how much, but of course there was only about $300,000 expended altogether. How much of that would come out of this year I do not know until I see how the bills came in. I do not imagine there was very much, at any rate. I think there would be enough; but counting $60,000 this year to be charged to that $250,000, and then $150,000 next year, that would make $210,000, and would leave $40,000 to cover any expenses that might have been charged this year on that foot-and-mouth disease work.

Mr. BOWIE. That would be ample margin?

Mr. SALMON. I think that would be ample.

The CHAIRMAN. Does any member of the committee wish to ask the Doctor any further questions?

Mr. GRAFF. Do you know, Doctor, whether there is a cattle book that has been prepared for publication, for distribution?

Mr. SALMON. The revision is not yet quite finished.

Mr. BOWIE. What time do you expect it to be finished?

Mr. SALMON. In a very short time. Nearly all of it is finished. I think only one article is not yet finished.

Mr. GRAFF. Is it simply a revision of the old work or is it largely new?

Mr. SALMON. A great deal of it has been rewritten.

Mr. BURLESON. It is being brought up to date, is it?

Mr. SALMON. Yes, sir.

Mr. BOWIE. Doctor, how about my hog book?

Mr. SALMON. I hove not been able to take up the hog book yet.

Mr. BURLESON. Hogs are subject to only about two diseases.

Mr. BOWIE. He told me he was working on some experiments on that.

The CHAIRMAN. He had some immune hogs up here at Bethesda station.

Mr. SALMON. We will have that worked out in the course of time, but we can not do everything at once.

The CHAIRMAN. He has some hogs there that have been exposed to all the hog diseases under the sun and that have come out from under it free, and from those hogs they are going to breed a disease-resistant variety.

Mr. SCOTT. Did those hogs take the diseases and get well of them?

The CHAIRMAN. Doctor, did these hogs get well?

Mr. SALMON. They got well.

The CHAIRMAN. They had the disease and got well?

Mr. SALMON. Yes.

The CHAIRMAN. I thought they did not take it at all.

Mr. SALMON. They all had these common diseases of hogs, I think.

Mr. GRAFF. Including hog cholera?

Mr. SALMON. Yes.

Mr. HAUGEN. Generally in every lot there are a few that survive, are there not?

Mr. SALMON. A few that survive, yes.

Mr. WRIGHT. How did you get those hogs? Did you confiscate them or buy them?

Mr. SALMON. These hogs are some we bought for experimental purposes.

Mr. WRIGHT. In case of farcy in horses, you only get just now and then a case of it?

Mr. SALMON. We have not been doing anything in farcy, but we ought to take it up. The States of Wisconsin, Illinois, Minnesota and Iowa, those States which are near the range country, are being flooded with glanders all the time by horses from the range, and they have applied to us again and again to put inspectors there to inspect the horses.

Mr. WRIGHT. When you run across it, do you condemn them—kill them?

Mr. SALMON. We have not been doing it, but we ought to do it.

Mr. WRIGHT. The owner gets no remuneration in that case?

Mr. SALMON. If we condemned horses we would have to remunerate the owner, because the Government can not take property without compensation.

Mr. GRAFF. In condemning them, the condition of the animals is taken into consideration in measuring their value?

Mr. SALMON. Oh, yes.

The CHAIRMAN. We will take a recess now until 2 o'clock, when Professor Whitney, of the Bureau of Soils, will be here, and we will hear him.

Mr. SCOTT. Mr. Chairman, I want to make this inquiry, on my own account largely: While I ought to attend all these meetings, and will do so so far as I possibly can, yet I should not like to feel as if the committee is not able to go on unless I am here. There are only at the very first meeting 10 members of the committee, and it occurred to me that it might be a very good idea for the committee to take action providing that a less number than a majority might constitute a quorum for the purposes of these hearings.

The CHAIRMAN. I propose to go on with these hearings every day, with the earnest hope that the members will be here, but if they are not here I will go on with them. I do not want you gentlemen to feel that we can go on without you. By proceeding every day, we can get through with the bill in a week. We will meet at half past 10 and sit until 12, giving an hour and a half to one of the Bureau chiefs, and then meet at 2 o'clock and sit an hour and a half or two hours in the afternoon. That will give us from 12 until 2 for lunch and to take care of the few things that may come up.

The subcommittee (at 12 o'clock m.) took a recess until 2 o'clock p. m.

AFTER RECESS.

The subcommittee reassembled at the expiration of the recess, Hon. J. W. Wadsworth in the chair.

## BUREAU OF SOILS.

The CHAIRMAN. Gentlemen, Professor Whitney, the chief of the Bureau of Soils, whom we asked to come before us to explain his items, is here.

### STATEMENT OF MILTON WHITNEY, CHIEF OF THE BUREAU OF SOILS.

The CHAIRMAN. Doctor, we will take up your salary list in the first place. Is that first item on the top of page 18 of the printed bill, "two scientists, at $1,200 each," an increase?

Mr. WHITNEY. No, sir.

The CHAIRMAN. Your first increase is one draftsman, at $1,200?

Mr. WHITNEY. One draftsman; yes, sir.

The CHAIRMAN. And one draftsman at $1,000? That is an increase of 2. Now, tell us first what is the need of the 2 extra draftsmen? Who has been doing that work heretofore?

Mr. WHITNEY. Mr. Chairman, I would say the draftsmen are in the employ of the Bureau already, but on miscellaneous rolls. It is simply a transfer to the statutory roll.

The CHAIRMAN. What are they getting on the lump sum roll now?

Mr. WHITNEY. They are getting these salaries.

The CHAIRMAN. The same salaries?

Mr. WHITNEY. There is no increase at all. It is just in harmony with the wish of the committee, heretofore expressed, that we get all of the clerks on the statutory roll, and we have all of our clerks on the statutory roll now with the exception of these two places.

Mr. BOWIE. It is just swapping from one pocket to the other, then.

Mr. WHITNEY. Yes, sir.

Mr. BOWIE. Is that true of these other increases, one additional messenger and one additional charwoman?

Mr. WHITNEY. Yes.

The CHAIRMAN. First we come to a fireman. You will see there is a fireman submitted.

Mr. BOWIE. Yes.

Mr. WHITNEY. That is simply a transfer of a fireman at the same salary. He has been with us for a number of years.

The CHAIRMAN. He is actually doing fireman's work, is he?

Mr. WHITNEY. Yes.

The CHAIRMAN. He is not a clerk in disguise?

Mr. WHITNEY. No; not at all. He looks after our engine and boiler and heating plant.

The CHAIRMAN. Where is that; over in that rented building?

Mr. WHITNEY. Yes, sir. The matter has been up before the committee before, and the committee has taken the position that as we are going to get a permanent building at some future time, this position would eventually have to be dropped, but we have had him now for eight or nine years. That is, we have had this position for eight or nine years, and there is every probability that we will have the position for four or five years longer at least.

The CHAIRMAN. Of course all those laborers and firemen will have to be rearranged when we get the new building?

Mr. WHITNEY. Yes; but in the meantime, until we get some place we will have to have a fireman, and we have been paying this salary. The object is simply to get the laborers and clerks on the statutory roll.

The CHAIRMAN. There has not been so much desire to get the laborers on the statutory roll as the clerks.

Mr. WHITNEY. No, not the straight-out laborers; but all messengers, I suppose, and charwomen and firemen, and that class of classified laborers, I understood, were to go onto the statutory roll.

The CHAIRMAN. Now, you ask for another messenger, just below that—"two messengers at $720 each (one additional submitted)." Is that 1 additional or 2 additional from the lump-sum roll?

Mr. WHITNEY. We had to take on another messenger during the past year.

The CHAIRMAN. Why do you have so much work for a messenger?

Mr. WHITNEY. We have a great deal.

The CHAIRMAN. How many messengers have you?

Mr. WHITNEY. Two. We are scattered over three buildings, and we have to communicate with them and with the main building.

Mr. GRAFF. You have no elevators, have you?

Mr. WHITNEY. No; we have no elevators. Of course we have telephones, but it keeps two messengers busy attending to the work of the Bureau.

Mr. BOWIE. In order to reach people where it is not practical to reach them over the telephone?

Mr. WHITNEY. Yes; and carry the mail and papers and publications.

The CHAIRMAN. And the charwomen, for the same reason?

Mr. WHITNEY. Yes; that is the same. We have three buildings, and we have another charwoman. It takes two of them.

The CHAIRMAN. I do not know whether we ought to transfer those charwomen and watchmen and laborers to the statutory roll, pending the erection of this new building. You get the service anyway. When we get the new building we will meet this condition, that there will be more messengers and more charwomen and more firemen than will be necessary, and some of them will have to be discharged; and if they are on the statutory roll it is going to be all the more difficult to do so, because then they will be in a way under the civil service, will they not?

Mr. WHITNEY. No. Of course if there is no work for them they will be dismissed; but I would differ with you a little as to the necessity of keeping these people after the new building is up. In the new building we shall probably have assigned to us twice as much space as we are occupying now. We have got to have it.

The CHAIRMAN. But you will be heated from a central plant. You will not need a fireman.

Mr. WHITNEY. So far as the fireman is concerned, that is true; but as for the messengers and charwomen, we will need as many and probably more.

The CHAIRMAN. Will not the building then be put under a superintendent, with a special corps of charwomen, and all that, to keep everything clean?

Mr. WHITNEY. Mr. Chairman, I think that would be done now if the miscellaneous fund of the Department justified it, but that fund has not been increased for a number of years, and there is not money enough. We have to pay these expenses, which more properly would come out of a lump fund and be under one management.

The CHAIRMAN. You are so scattered now that it would hardly be practicable to do that. There could be no supervision by one person; but where the whole Department is in one building the whole thing could be under the eye of one superintendent, just as the Capitol is under the superintending architect.

Mr. WHITNEY. Yes. It will probably be a number of years, however, before we are settled.

The CHAIRMAN. That is true, but time flies. Professor, over in a little note on page 19 you will notice a "list of persons paid from appropriation 'Soil investigations, 1904:' One expert, at $4,000." Who is that gentleman? He is paid more than you are.

Mr. WHITNEY. Yes. That is Professor King, formerly of the University of Wisconsin, whom we got two years ago to help us out in investigations along the line of soil management, soil investigation, and it was necessary to give him a salary of that kind in order to get a man of his attainments.

The CHAIRMAN. How long do you propose to keep him?

Mr. WHITNEY. Well, that is somewhat indefinite. Of course it depends on the Secretary.

The CHAIRMAN. How long will you expect to keep him at that salary? Is he not imparting his knowledge to you gentlemen?

Mr. WHITNEY. Yes.

The CHAIRMAN. In other words, you are taking a sort of post-graduate course under him.

Mr. WHITNEY. No, sir; it is not altogether that. You remember the matter came up once before in the Bureau of Soils, where we had to get a tobacco expert, and with the knowledge of the committee then the Secretary appointed an expert that we already had in our employ at a salary of $4,000, so that the precedent has been established. That was Mr. Floyd. He did not stay with us but a few months.

Mr. LAMB. Does it take that much to get that sort of a man?

Mr. WHITNEY. Yes. He was with us about seven months after we gave him that.

The CHAIRMAN. Why did he leave?

Mr. WHITNEY. He got a great deal higher salary.

Mr. BOWIE. Is he a tobacco expert?

Mr. WHITNEY. Yes, sir; we are giving the tobacco expert now, the man who took his place, $3,000. It is doubtful how long we can hold him, but still we can hold him probably until we can spare him.

The CHAIRMAN. How long do you suppose it will be necessary to employ Mr. King?

Mr. WHITNEY. Well, I can not say, Mr. Chairman. Investigations of that kind are very uncertain, very indefinite.

The CHAIRMAN. My point is this, that with the ability you have in the Bureau, is Mr. King the only man in the United States who can carry on this line of work?

Mr. WHITNEY. Professor King was not only the best man in the United States, but a man who had a world-wide reputation. He is one of the three original thinkers along the line of soil investigation that this country has produced in recent years, and it was considered very desirable to secure his services in the Bureau while we were organizing the work of soil investigation, and we have received a great deal of help from him.

The CHAIRMAN. That is undoubtedly so.

Mr. SCOTT. What special work is he engaged upon?

Mr. WHITNEY. In the line of soil management; that is, the constitution of the soil and the best methods of handling the soil to bring out the most economical results.

Mr. SCOTT. Where does he do his work? Where is he carrying it on?

Mr. WHITNEY. We have a building on B street. It is the third building I spoke of that we occupy.

The CHAIRMAN. He is not carrying on any field work then?

Mr. WHITNEY. Yes; he has been doing field work. Last year he had several of his men out in the field. He did some work at Lancaster, Pa., at Jamesville, Va., at Marlboro, Md., and at Goldsboro, N. C., studying the fertility of soils and the methods of handling the soils to get the best results. You know, gentlemen, it is not a small question to undertake to study, and we have needed the best help that could be obtained in the country.

The CHAIRMAN. But you are not prepared to say how long you will need him before your own people are educated up to this point?

Mr. WHITNEY. No, sir.

The CHAIRMAN. Are you educating anybody up to his point?

Mr. WHITNEY. Oh, yes.

Mr. BOWIE. Are there any candidates for high places like his?

Mr. WHITNEY. Oh, yes. It is not so much that we lack men. We do not lack men to take on that work. We could get along without Professor King if he left to-morrow, but it is a good deal as it would be if you employed a special attorney to look after special interests. You can get others, doubtless. You can train other men, but you want the best you can find. You want to have the man there to look after things.

The CHAIRMAN. I will tell you why I have led up to this. You remember the Secretary, and I think all your chiefs of bureaus, stated that you had to train men for this work; that you were not entirely supplied, and you were graduating a force of what are called student scientists, energetic young scientists, along these different lines. That is why I am asking the question how long it will be necessary to keep this high-priced man. Are you not capable of doing his work yourself? But perhaps that is a leading question.

Mr. BOWIE. I think we will all admit he is.

The CHAIRMAN. It looks like putting the cart before the horse to pay a subordinate more than you pay the chief of bureau. You are getting $3,500 and he is getting $4,000. Of course I know it is done with your consent. You would not want to state any time when you could get along without him?

Mr. WHITNEY. I would not like to, Mr. Wadsworth. Of course, as I say, we could get along without him to-morrow just as you might get along without an expert legal adviser that you might have and take the advice of some less eminent legal authority; but while questions are pending that require expert advice you want to have in your employ, you want to have where you can call on him, a man eminently adapted to pass judgment on questions.

The CHAIRMAN. He was with the Wisconsin experiment station, was he not?

Mr. WHITNEY. Yes.

Mr. BURLESON. How much is he receiving?

The CHAIRMAN. $4,000.

Mr. GRAFF. Is it not true that soil investigation is in its infancy at present, and that it would not be like any other work which had been largely developed?

Mr. WHITNEY. It is a perfectly new line of work.

Mr. GRAFF. There are many basic questions which have not yet been solved.

Mr. WHITNEY. Yes; we are working on fundamental principles that farmers need to know, that we need to know, to maintain and increase the productivity of our soils.

Mr. BURLESON. How much was this gentleman paid before he came to Washington?

Mr. WHITNEY. I think he was receiving $3,000, but there were certain perquisites at the college, houses and gardens, and things of that kind. I do not recall just what they were.

The CHAIRMAN. How much did he get in Wisconsin? Did you answer that?

Mr. WHITNEY. I was just saying that I thought his salary was $3,000, and he got in addition a house and garden and certain perquisites.

The CHAIRMAN. Up there?

Mr. WHITNEY. Yes.

The CHAIRMAN. He is not getting much increase then, at $4,000 a year here, is he?

Mr. WHITNEY. I do not think he is.

The CHAIRMAN. He has no Government house here?

Mr. WHITNEY. No.

The CHAIRMAN. And with the difference in the cost of living there is absolutely no increase.

Mr. WHITNEY. I think the reason he came is that it offered him a wider field of research than he was able to command there.

The CHAIRMAN. In this note here there is one assistant at $2,500. Have you the bill before you, Professor?

Mr. WHITNEY. Yes, sir.

The CHAIRMAN. Right after one expert at $4,000 there is "One assistant at $2,500."

Mr. WHITNEY. That is our soil physicist, a man who has been with us about six or seven years, Doctor Briggs. He has charge of our physical laboratory.

The CHAIRMAN. There is an assistant to him at $1,600; 2 assistants at $1,400 each; 2 assistants at $1,200 each; 8 assistants at $1,000 each; 3 assistants at $840 each; 1 foreman at $840; 1 foreman at $720; 2 laborers at $720 each; 3 laborers at $600 each; 2 laborers at $480 each; 1 laborer at $300; 1 laborer at $60 per month; 1 laborer at $50 per month. What is their general character? Take them according to their salaries.

Mr. WHITNEY. Most of these are assistants in the soil survey. You see, we have 42 men in the soil survey, most of them on the miscellaneous roll, and this includes the tobacco experts or tobacco men. I have a list here of the employees of the Bureau, Mr. Chairman, if you wish to see it. We have a total of 118 on the rolls now, 30 of them clerks in the general office, 42 in the soil survey, 12 in tobacco investigation, 9 in soil chemistry, 6 in soil physics, 9 in soil management, 6 in the alkali reclamation work, and 4 in demonstration experiments. I have a statement also of the number who are in Washington and who are outside. The total in Washington is 52, and those that are outside most of the time, 66. Rather more than half are outside, and this note covers all of these positions.

The CHAIRMAN. Just leave that list with the stenographer.

Mr. WHITNEY. Very well. I have here also a statement of the extent of the soil survey.

The papers referred to are as follows:

| | Number of employees. | In Washington. | Out of Washington. |
|---|---|---|---|
| General office | 30 | 30 | 0 |
| Soil survey | 42 | 1 | 41 |
| Tobacco investigations | 12 | 1 | 11 |
| Soil chemistry | 9 | 9 | 0 |
| Soil physics | 6 | 6 | 0 |
| Soil management | 9 | 3 | 6 |
| Reclamation work | 6 | 0 | 6 |
| Demonstration experiments | 4 | 2 | 2 |
| Total | 118 | 52 | 66 |

The 30 employees in the general office include, in addition to the chief of the Bureau, 1 chief clerk (statutory), 1 editorial clerk (statutory), 1 financial clerk (statutory), 1 property clerk (statutory), 7 stenographers, (statutory), 1 fireman (miscellaneous), 2 watchmen (statutory), 2 charwomen (1 statutory, 1 miscellaneous), 2 draftsmen (1 statutory, 1 miscellaneous), 1 photographer (miscellaneous), 2 messengers (1 statutory, 1 miscellaneous), 1 carpenter (miscellaneous), 4 laborers (miscellaneous), 3 routine clerks (statutory).

| | | |
|---|---|---|
| Statutory roll in Washington | 25 | |
| Statutory roll outside | 6 | |
| | | 31 |
| Miscellaneous roll in Washington | 27 | |
| Miscellaneous roll outside | 60 | |
| | | 87 |
| Total | | 118 |

Average salary, both rolls, $1,191.

*Extent of soil survey to December 31, 1903.*

| | No. of areas. | Square miles. | Acres. |
|---|---|---|---|
| 1899 | 3 | 1,125 | 720,000 |
| 1900 | 12 | 4,465 | 2,857,600 |
| 1901 | 24 | 15,246 | 6,557,440 |
| 1902 | 32 | 17,996 | 11,517,440 |
| 1903 | 62 | 26,431 | 16,915,840 |
| | 133 | 60,263 | 38,568,320 |

Total number of areas, 133, in 42 States.

Total amount surveyed, 60,263 square miles, or 38,568,320 acres.

Average size of area, 453 square miles.

Average cost per square mile, $3.10.

Mr. GRAFF. Those on the outside are people who are engaged actively in examining soils, are they?

Mr. WHITNEY. Yes; in field work, in soil survey, and in the tobacco investigation. They are scattered all over the country.

The CHAIRMAN. They mostly work in the South at this time of the year?

Mr. WHITNEY. Yes; at this time of the year.

Mr. HENRY. You have one man in Connecticut?

Mr. WHITNEY. Yes; one man.

The CHAIRMAN. Now, Professor, a little farther on there is a foreman at $840; 1 foreman at $720; 2 laborers at $720 each; 3 laborers at $600 each; 2 laborers at $480 each; 1 laborer at $300; 1 laborer at $60 per month; 1 laborer at $50 per month. What are those laborers employed at here? Are they all in the city of Washington?

Mr. WHITNEY. Yes, sir; well, the laborers are not all in the city of Washington. We have some tobacco laborers; but some of those places are in the old class, in the unclassified service of laborers that were appointed years ago and used for clerical work. It is a class of positions in the Departments, not only in our Department but in other Departments, about which there is discussion pending with the Civil Service Commission as to what shall be done. It is inherited from long back. One of these persons has been in the Bureau, I think, for seven or eight years.

The CHAIRMAN. A man or a woman?

Mr. WHITNEY. A woman; but they are all doing very efficient work.

The CHAIRMAN. They are doing really clerical work, then?

Mr. WHITNEY. They are doing clerical work. They are doing efficient work, and they are doing it at a very much lower cost than if we got changed and had classified clerks. Then some of the laborers and the foremen are in the tobacco investigations.

Mr. BURLESON. How many years have you been conducting these tobacco investigations?

Mr. WHITNEY. I should say five or six years.

The CHAIRMAN. Does the committee want to ask Professor Whitney anything further about the salaries of that Bureau? If not, we will go on to the lump sum. Now, Doctor, we notice that you ask for an increase of $33,000 over last year. Last year you had $170,000. You ask for $203,280.

Mr. WHITNEY. It is an increase of $36,000, Mr. Chairman.

The CHAIRMAN. Yes; that is, with the salary increase, too.

Mr. WHITNEY. Yes, with the salary increase.

The CHAIRMAN. Now, if you will, tell the committee in your own way what the need of that is, and how you propose to expend it, what it is specifically for, in a general way, just as you did last year.

Mr. WHITNEY. The organization of the Bureau takes in the administrative office, soil physics, soil chemistry, tobacco investigations, soil survey, soil management, alkali reclamation work, and demonstration experiments. The allotments for the work this year are: For administration, $36,700; soil physics, $9,140; soil chemistry, $13,380; tobacco investigations, $26,300; soil survey, $96,360; soil management, $15,000; alkali reclamation, $9,020, and the demonstration experiments, $6,580.

We have asked for an increase in the appropriations—total increase, including salaries and lump sum, of $36,000—in order that we could provide for the following increases: We estimate that we will increase the salaries of the men on the lump fund, mainly in the soil survey and the tobacco investigation, about $8,000. These men have been with us now for a number of years. It is the wish of the Department to keep those men in the soil survey for at least five years, so they can get their training and give us an equivalent amount of work. If we let them go after the first two or three years, we get practically no result from their labors. It takes us two years to train a man in soil survey.

It takes us four or five years to train a man in tobacco. The young men we took on when we took this up five or six years ago are just in a position now where they can be trusted to go out and take charge of tobacco experiments. The young men we have had in the soil survey for the last five years are just now in a position to go out from the Department. We have, as it were, a graduating class; men we took on five years ago—there are only four or five of them—are now as far advanced as we can carry them in the soil survey, but the experience they have acquired in the soil survey all over the country with all kinds of soils and all kinds of crops is making them of very great value to us in other lines of the Bureau's work. It is also fitting them for instructors in the agricultural colleges, and I shall speak of the plan of the Secretary in regard to some of these men presently.

But the young men who come to us for $720 or $1,000 a year, young graduates of agricultural colleges, are entirely unproductive for the first year, and in many cases for two years. They have to follow around as mere laborers, or drivers, imbibing their knowledge. The

training they have had in agricultural colleges is not sufficient for them to start at once in positions of any responsibility in the soil survey, so that we have to take the best men we can get with the best training we can get and put them into a position to imbibe this knowledge and this skill in the soil survey, and as they get more and more experience our plan has been to give them an increase of $200 in their salaries, and as they get further along we are advancing them until we are giving our five-year men $1,800.

The CHAIRMAN. Do you find any of them leave you at that salary?

Mr. WHITNEY. No, sir; they stay with us. They are very loyal, although they have had offers.

The CHAIRMAN. Does not that make a congestion in promotions? Does it not prevent promotion?

Mr. WHITNEY. It has not so far, Mr. Chairman, because we have just got our first class up to the top. There are only four of them, and it has not troubled us at all. Then, with the development of the work of the Bureau, there is going to be opportunity for putting them in other lines of work where the experience they have acquired in the soil-survey work is going to be extremely valuable.

This accounts for $8,000 that we think will be necessary.

The CHAIRMAN. That will be increase in salaries?

Mr. WHITNEY. Increase in salaries.

The CHAIRMAN. Under the lump sum?

Mr. WHITNEY. Under the lump sum. Then the soil survey has reached such proportions and is such an important piece of work that we think we must get two men as inspectors, and for their salaries and their traveling expenses we will need about $9,000.

Mr. SCOTT. What work will they do?

The CHAIRMAN. Yes; what work will these inspectors do?

Mr. WHITNEY. We have parties all over the country really engaged in the soil survey. We have 20 parties, and they are going constantly into new areas, finding new soils, describing soils that they are meeting for the first time, and it is becoming more and more necessary that every one of those areas should be visited by some person who is familiar with the work in the other areas. We do not want to multiply the number of soil names that we get. If there is a soil in southern Mississippi that is similar to a soil in eastern South Carolina it is very important for us to know it. It is not only necessary for us to describe the soil in southern Mississippi, but the fact that the same soil occurs in South Carolina may be a matter of the utmost importance.

To illustrate that I will speak of the finding of this Cuban tobacco soil in Texas. In the course of our survey we found what we believed to be the Cuban tobacco soil in eastern Texas. We sent some of our tobacco experts to Cuba and had them examine the conditions in Texas, and the fact that they were satisfied that the conditions of soil and climate, together with the product that had already been grown on these soils, is a sufficient promise to justify us in going ahead with that work. When we had identified this soil it immediately occurred to us that it was similar to a soil that was described from Perry County, Ala., and also from Darlington, S. C., and was similar to a soil that I remembered seeing years ago at Orangeburg, S. C., which is just a short distance away. We have called that soil the Orangeburg sandy loam and the Orangeburg clay, taking the name from South Carolina where it was first seen, although we had first mapped it in Texas. I

at once sent an inspector, one of our experienced men, to visit the soil-survey party that was then going on in South Carolina, and in Perry County, Ala., and in Gadsden County, Fla., and in eastern Texas, and he identified those soils from my conception of the conditions as explained to me by the reports received as identically the same soils.

Mr. HENRY. Mr. Whitney, do I understand you to say that the Gadsden County soil is the Orangeburg sandy loam?

Mr. WHITNEY. They have the same soil.

Mr. HENRY. You designate the Gadsden County soil as Orangeburg sandy loam?

Mr. WHITNEY. As Orangeburg sandy loam and Orangeburg clay.

Mr. HENRY. You find them both in Orange County, do you?

Mr. WHITNEY. We find them both in Gadsden County, and it is on the Orangeburg clay that they get their filler tobacco, but it is on the Orangeburg sandy loam and another sandy loam that they get their wrapper tobacco.

Mr. HENRY. Exactly; you get your filler tobacco on the clay.

Mr. WHITNEY. On the Orangeburg clay. This soil, when it is located about 100 or 200 miles from the ocean, appears to give a leaf which has a better burn, and we have identified the strip of this soil extending parallel to the coast about 200 miles inland, going from east Texas, we believe, across Louisiana. I know it is in Mississippi, and we have encountered it in Alabama, Georgia, and South Carolina. We have traced it right through; but the whole of that work lay in the ability to recognize the same soil where it was encountered in different areas by different people; and so all through our work one of the most important things about it is this correlation of the soils to be sure that when we find a soil in one area and find the same soil in another area they are not to be described as different soils, because the chances are that what we advocate for the soil in eastern Texas is going to be applicable to the soil in Alabama; and we have actually found that so in this case. That is to say, we have grown tobacco this year on these Orangeburg soils in eastern Texas, in Perry County, Ala., and in Darlington County, S. C., and the tobacco is identical, and it has the aroma of the Cuban leaf.

If the work had been done without supervision, without some directing head and without close inspection, the occurrence of the same soil in the Alabama area might have escaped us and we might have described it as a different soil and never have found its application to the tobacco problem.

Mr. HENRY. In Gadsden County of course they have been growing tobacco for two or three generations. The product of that area is known. Are you far enough along to be prepared to say that the tobacco grown on these Orangeburg clays, as you describe them in Texas, in Alabama, and in South Carolina will produce a tobacco that will compete or to any considerable extent take the place of the Cuban tobacco?

Mr. WHITNEY. Our experiments, of course, were only started last year. We have the tobacco now in at Nacogdoches, Tex. We have the tobacco from all these places in together, where it can be handled by the same men and in exactly the same way, and I am going down on Friday with my experts to pass final judgment as to the character of the tobacco from these different places.

Mr. HENRY. It means a great deal to the tobacco industry of this

country if we can produce a tobacco that will take the place of the Cuban tobacco.

Mr. BOWIE. Or that will approximate it.

Mr. WHITNEY. I had intended bringing this matter up a little further on in my talk, but it comes in very well here. I have some cigars here. I thought you gentlemen would be interested in this and that some of you would smoke, probably, and I had our man make these from smokers. They are made out of this tobacco which has just come from the bulk, so that the tobacco is not aged. This filler leaf needs to lie in bulk and in bales for at least two years, if it can be allowed so long.

Mr. BURLESON. You mean the Texas tobacco?

Mr. WHITNEY. Yes; to age it.

Mr. BOWIE. Is it the same with Habana tobacco?

Mr. WHITNEY. Yes.

Mr. HENRY. This is hardly a fair test of tobacco, then?

Mr. WHITNEY. No; it is hardly a fair test, and yet I am sure you can find the aroma that you gentlemen are accustomed to in your Habana cigars. You will notice that there is still a little harshness about this, but there is a very fine aroma that closely approximates the Cuban tobacco.

The CHAIRMAN. Where did this tobacco come from?

Mr. WHITNEY. This tobacco comes from east Texas.

Mr. BOWIE. It is a fair test, except as to its age?

Mr. WHITNEY. Except as to the age.

Mr. HENRY. Right there, perhaps, I ought to say for the benefit of the smokers here that Cuban tobacco or any other filler tobacco is supposed to be at least a year old before it is fit to use.

Mr. SCOTT. Do I understand this tobacco has been grown this year?

Mr. WHITNEY. It was grown this year and just taken out of the bulk. It is not even thoroughly fermented; so, as Mr. Henry says, it is rather a severe test, but I think it is all right.

Mr. BURLESON. On the point of these tobacco investigations, are you making investigations in any other places than Connecticut, Pennsylvania, and Texas?

Mr. WHITNEY. Yes; in Alabama, South Carolina, and Ohio, and we propose this year going into New York and Virginia.

Mr. LAMB. Have you found any of that soil in Virginia?

Mr. WHITNEY. No, sir; not for this tobacco, but for export tobaccos.

The CHAIRMAN. You want the salaries of the inspectors and their traveling expenses?

Mr. WHITNEY. Yes, Mr. Chairman. I think I have made myself quite clear that that is the reason for believing we should have two inspectors, one for the eastern work and one for the western work. It is to watch the efforts of the men and make the results conform to what the other men are finding.

Mr. GRAFF. I notice you classify one of the soils in Tazewell County, Ill., as Yazoo clay or silt, one of the two.

Mr. WHITNEY. Yes.

Mr. GRAFF. I think there were both.

Mr. WHITNEY. Yes; we brought that up the Mississippi River from Yazoo County, Miss., where we first encountered it. It is identically the same soil, so far as we can determine. It is essentially the same.

Mr. BURLESON. Before you commence on this let me ask you this question. Recently I have been overwhelmed with letters asking me for a tobacco soil investigation in Lee County, Tex., and for tobacco experiments. What do these experiments cost?

Mr. WHITNEY. A soil survey costs the Department $3.10 a square mile. That includes the salaries and all expenses. Lee County, I suppose, has about 600 miles.

Mr. BURLESON. I do not know.

Mr. WHITNEY. It would cost about $1,800 for the soil survey work. Then a tobacco party costs about $5,000.

Mr. BOWIE. Additional?

Mr. WHITNEY. Yes.

Mr. BURLESON. A year?

Mr. WHITNEY. Yes.

Mr. BURLESON. If railroad transportation were furnished, could not the same expert look after the investigation at Nacogdoches and a number of other points?

Mr. WHITNEY. I was going to speak later about tobacco investigations, but as this is interesting here I will take it up.

Mr. BURLESON. I do not care to precipitate it. I thought as you were on that subject now I would bring it to your attention, but I will bring it to your attention a little later on.

Mr. WHITNEY. I will just explain now that it is our purpose to have a party of four men with headquarters at Nacogdoches this coming year. If the results of the tobacco experiments that are just being finished, represented by these cigars, are satisfactory, and the Department feels justified in stating that a tobacco of good quality can be grown on those soils, the Secretary will authorize the giving of advice to farmers and we shall have our own little experiments at Nacogdoches on 6 acres, three on each kind of soil, and an experiment at Woodville, which will be grown by our own people, and then we will have Mr. Hinson, the man in charge of that work, visit different parts of the State and advise as to the growing of tobacco, provided it is grown on the soils that we approve, that we think there is a chance of success on. That meets your request, I think, that he will be able and directed to advise farmers who are intending to grow tobacco on the Orangeburg sandy loam or the Orangeburg clay.

Mr. BURLESON. Is Mr. Hinson a soil expert?

Mr. WHITNEY. He is a tobacco expert.

Mr. BURLESON. He is not a soil expert?

Mr. WHITNEY. No; they have nothing to do with that. That is a different line of work.

Mr. LEVER. You have never grown any of this tobacco in Orangeburg County, have you?

Mr. WHITNEY. Yes; we have done that, but it is not so far ahead in the bulk. It was sent down to Texas and was delayed on the road, and it is about two months behind this, so that we can not tell what the result will be.

Mr. SCOTT. What arrangements do you make about these tobacco-growing experiments? Do you rent the land or is it given to you free of cost, and do you do the planting and curing and cultivating?

Mr. WHITNEY. It has been furnished to us free of cost, and the owners have, in most cases, furnished the teams, paid for the fertili-

zers, and done part of the work in the field. We have taken entire charge of the cultivation with the understanding that the tobacco is theirs, but that we shall have the right to have such samples as we want for distribution, up to a certain proportion of the crop.

This cooperation has not worked very satisfactorily. As soon as we have gotten the tobacco up in some shape they think it is going to be a great big thing and they want to have some say in it. They want to have some say as to the disposition of the crop, and I think this year the Secretary will be willing to have us rent the land outright and grow the tobacco at our own expense. It is a very small matter.

The CHAIRMAN. Why do you not get your experiment station to do it?

Mr. WHITNEY. They are not in the right location.

The CHAIRMAN. They can always send a party. They do it in New York State. They send parties to grow beets and show the farmers how to do it, and they are doing so in Connecticut, Mr. Henry says.

Mr. WHITNEY. Yes; they are doing it in Connecticut.

The CHAIRMAN. There is a good deal of objection to establishing Government experiment stations over the country. It has been done, but I think the older members of the committee, at any rate, would prefer the old way.

Mr. WHITNEY. Mr. Chairman, I will say that this is of a most temporary nature. In case we go down there we would have no binding agreement except for the season. We would take a piece of land at Nacogdoches and one at Woodville on the soils that we want and on no others and simply give them $15 or $20 for the use of their land, and then there would be no question about the ownership of the tobacco. We can give it all away. Mr. Henry knows how important it is to furnish samples widespread. If the Government had taken the whole cost of the work in Connecticut it would probably have been very much better for the tobacco business.

The CHAIRMAN. What good does the distribution of samples do?

Mr. WHITNEY. It brings them to the attention of the manufacturers.

The CHAIRMAN. What good does it accomplish if they do not know how to produce it themselves?

Mr. WHITNEY. Yes; but we want to get the judgment of the manufacturers. That is the point.

Mr. BURLESON. They give a certain proportion of the crop to various manufacturers, and they manufacture it and see whether it is good enough.

Mr. WHITNEY. That is a very important part of the work.

The CHAIRMAN. I thought you meant distribution to raisers of tobacco.

Mr. WHITNEY. Oh, no; not at all. It is just to secure a judgment of the value, and some of these tobaccos are very expensive. For instance, the shade-grown Sumatra tobaccos; they are worth $400 or $500 a bale.

The CHAIRMAN. How serious trouble have you had with these people?

Mr. WHITNEY. Not very much. It is an immaterial matter, but a gentleman raised the question here and it seemed to me it would be better——

Mr. BOWIE. Better policy?

Mr. WHITNEY. Better policy.

Mr. BOWIE. It is a mere trifling cost to pay for the land $15 or $20 a year?

Mr. WHITNEY. Yes; and we have never established any station, never had any permanent headquarters, no office, no fixtures. They will give us the land.

Mr. LAMB. Have you not grown some tobacco in Hanover County, Va.?

Mr. WHITNEY. No; but there was some grown there.

Mr. LAMB. I saw it there.

Mr. WHITNEY. We gave the directions for it.

Mr. LAMB. Can you tell me what the result was?

Mr. WHITNEY. They are fermenting that in Connecticut now. It is not through fermentation. The reports, so far as we have had them, are favorable.

Mr. BOWIE. Have you gone far enough to feel a good deal of confidence in the proposition?

Mr. WHITNEY. I think we are going to be able to grow a tobacco in this country that has a Cuban aroma.

The CHAIRMAN. Now let us get along. You have accounted for $17,000 of your increase. What is your next step?

Mr. WHITNEY. Mr. Chairman, we also wish to have two additional soil survey parties. The Secretary has not desired to ask the committee for any large increase in the work of the Bureau of Soils, recognizing the liberality of the committee in former years, but the pressure on us for work in the soil survey has become very great. We have 20 parties now——

The CHAIRMAN. How many?

Mr. WHITNEY. Twenty. We have 20 parties now, and the Secretary desires to put more in the field, at a cost of $8,000.

Mr. BOWIE. Annual cost?

Mr. WHITNEY. Annual cost.

Mr. HENRY. For both parties?

Mr. WHITNEY. Yes.

The CHAIRMAN. $4,000 apiece?

Mr. WHITNEY. $4,000 apiece. Then there has been a great demand on us for increase and extension of the tobacco investigations.

The CHAIRMAN. Before you leave the soil survey parties, are you not going along pretty fast in that work anyway, about as fast as the country needs it?

Mr. WHITNEY. Mr. Chairman, we have about two years' requests on hand.

The CHAIRMAN. You will get requests enough. There is no doubt about that.

Mr. WHITNEY. Well, most of them come from on the hill here.

We have always received with due consideration requests from Congress, but I am free to say the work has been planned with absolute impartiality not only as regards the requests from Congressmen and other outsiders, but with regard to its equitable distribution over the country.

Mr. GRAFF. You take the advice of the State experimental stations, do you not?

Mr. WHITNEY. Yes.

Mr. GRAFF. As to the county in which the survey shall be made?

Mr. WHITNEY. Yes, we rely largely on them for a selection of the location.

Mr. HENRY. I will vouch for the Bureau's impartiality, for it took me three years to get a little extension of the soils in the Connecticut valley. I waited three years for it.

Mr. BURLESON. I will be hopelessly lost if it takes me three years to get one in Lee County.

The CHAIRMAN. At your present rate of progress—I do not know whether you can answer this question—how many years is it going to take you to do this work?

Mr. WHITNEY. Well, I made a statement two years ago before the committee in reply to a question of the same kind from Mr. Williams, who was then a member of the committee, that at the rate we were then working if we had 15 parties we would survey the cultivated lands of the United States in eighteen years.

Mr. BOWIE. Fifteen additional parties?

Mr. WHITNEY. No; 15 parties altogether. That is, he wanted to know what the ultimate cost of this work would be, and I said, taking an area equal to the cultivated lands of the United States, if the work went on with 15 parties at the rate we were then going, the whole area would be covered in eighteen years at a cost not greater than the geological survey for a single year.

The CHAIRMAN. With 20 parties, as you have now, it will take 25 per cent less than that, will it not?

Mr. WHITNEY. Well, we have made quite a showing on the map since last year.

Mr. HENRY. A few weeks ago I was at the Bureau and a distinguished gentleman from Alabama came in—not a member of this committee—and he was urging that some soil investigation must be done in his district right away, and Professor Whitney excused himself and explained the urgent requests that he had had; but the gentleman went away very insistent, and about his last words were: "I shall hope in another year you will get to me." That is the pressure he is subjected to.

Mr. HAUGEN. How many counties can a party go over in a year and survey?

Mr. WHITNEY. We have the season divided into four parts. There are three months in the winter that the parties are in the South; then a spring assignment of three months and a fall assignment of three months in the Northern and Middle States. Then we take the parties back again through the South about the first of October, so that most of the parties survey about four areas. It varies a little.

Mr. BROOKS. I have noticed a red coloring in Colorado in the San Luis Valley tract. Does that represent the alkali land experimenting?

Mr. WHITNEY. Yes.

Mr. BROOKS. That is the part that is contemplated in the future work?

Mr. WHITNEY. Well, we have finished that.

Mr. BROOKS. You have finished that particular tract, I know.

Mr. WHITNEY. We have not finished the whole area, but that is one of the areas we have been working on.

Mr. BROOKS. I want to say, partly for the benefit of the committee, that I do not know of anything the Government has done that has

met with more local approval than the work in that alkali region. I am hearing from it constantly, and I get numerous requests for the enlargement of that work and carrying it on. It certainly has done a great deal of good there.

Mr. WHITNEY. We have had some requests from that area for alkali reclamation work. We are carrying on six pieces of work in that alkali land reclamation, one at Salt Lake City, one at Fresno, Cal.; one at Yakima, Wash.; one at Billings, Mont.; one at Tempe, Ariz.; and one in southern California, having distributed them to take in different sections of the country and different classes of alkali lands, and the work is creating a great deal of attention and appears to be giving a great deal of satisfaction.

Mr. GRAFF. Are the people themselves following these demonstrations up?

Mr. WHITNEY. Yes.

Mr. GRAFF. And carrying them out themselves?

Mr. WHITNEY. Yes; that is exactly what they are doing.

Mr. BROOKS. And they are watching it with the greatest interest all through that country.

Mr. WHITNEY. They are watching it with great interest.

Mr. BURLESON. You have your work for the next year already outlined, have you not?

Mr. WHITNEY. Yes, sir.

Mr. SCOTT. I believe this will be a good place to ask this question, if it would not disturb the order in which you wish to present this matter; I would like to have you briefly outline, if you can, the work that a soil-survey party does.

The CHAIRMAN. Mr. Scott, will you let him right here explain the increase first, and then take that matter up?

Mr. SCOTT. Certainly.

The CHAIRMAN. Go on with your increase, Professor. You have accounted for $25,000.

Mr. WHITNEY. In addition to the two additional soil-survey parties the Secretary wants to maintain two additional tobacco parties.

The CHAIRMAN. How many tobacco parties have you now?

Mr. WHITNEY. We have a party in Ohio, one in South Carolina, one in Alabama, and one in Texas.

The CHAIRMAN. Four?

Mr. WHITNEY. Four. We have a large party in Texas; larger than any of the others, as the area to be covered is considerably larger.

The CHAIRMAN. How much does one of those cost?

Mr. WHITNEY. About $5,000.

The CHAIRMAN. Apiece?

Mr. WHITNEY. Apiece; and we want a party for New York and Virginia.

Mr. SCOTT. How many people constitute one of these parties ordinarily?

Mr. WHITNEY. We have usually two or three in a party, but then we have to hire additional labor.

The CHAIRMAN. Just before we leave the question of increase in salaries, I wish you would give us in detail the $8,000 increase asked for for salaries under the lump sum.

Mr. WHITNEY. Mr. Wadsworth, that would be a very difficult thing to do, because the matter has not been presented to the Secretary.

It is an estimate that we have made as to the amount of money that should be used in increasing the salaries of the soil-survey men and the tobacco men—principally field men.

The CHAIRMAN. How much are they getting now?

Mr. WHITNEY. The average salary in the Bureau of Soils is $1,100—slightly over.

The CHAIRMAN. Would that be the average of the soil survey, too?

Mr. WHITNEY. That is the average of all.

The CHAIRMAN. Would it be the average of the soil survey?

Mr. WHITNEY. Yes; I expect the average would be the same. As a rule these men should have an increase of about $200 a year; not always that much, but men who give promise, who are getting along well—men who would otherwise be attracted outside—we have to advance at the rate of about $200 a year. Now we have 42 men in the soil survey and we have 10 or 12 men in the tobacco. The tobacco men are in great demand, and it is only by my own personal effort in urging them to stay with us until these different lines are carried out that we are holding those men, because there is a place for them at all times in commercial work.

The CHAIRMAN. As I have often said to the committee, however, they are not lost to the country when they leave you. I know the Department is very loath to lose these men, but after all they go forth doing good to the country.

Mr. WHITNEY. Yes; but they are lost to the Department.

The CHAIRMAN. But not lost to the country.

Mr. WHITNEY. They are lost to the country in this respect, Mr. Chairman. Mr. Floyd, who was the expert of the Department until two years ago, was working for the country, for the people. He gave his energies for the people, for Virginia and for Tennessee as well as for Connecticut and for Texas. Now he is in the employ of a company in Connecticut. His services and his talents are for that company. He is not allowed to give information to outsiders that would help them in their competition with this tobacco company. It is a trust. They have bought him up and he can not give this information to the country.

The CHAIRMAN. Was not the information he possessed imparted to your people at all?

Mr. WHITNEY. The country benefited by it. We are benefited by it.

The CHAIRMAN. According to that, he is the only man, then, in America who can do this work. You come back to the proposition you made a moment ago about Mr. King.

Mr. WHITNEY. But, Mr. Chairman, it is a very customary thing for men to be retained in positions. It is the practice in the House, I believe, to retain chairmen in their positions, because they are familiar with these matters.

Mr. SCOTT. Where would the men naturally go if they left your soil-survey work?

Mr. WHITNEY. The men from the soil survey would go the colleges and experiment stations.

The CHAIRMAN. There they would be teaching the youth of the country?

Mr. WHITNEY. Yes.

The CHAIRMAN. I think my ground is tenable—that they are not lost to the country when they leave you.

Mr. WHITNEY. The position I take is that they should remain with us for about five years, because if it takes us two years to train them, and we get nothing from them, we ought to get three years' service out of them after that?

Mr. BOWIE. Did you train Mr. Floyd?

Mr. WHITNEY. Yes. He was a young man. He stayed five years.

The CHAIRMAN. I thought he came to you with this tobacco-growing instinct, as you might call it?

Mr. WHITNEY. Yes; he was a very bright young man that I came across in Florida—discovered in Florida.

The CHAIRMAN. The Department, as I understand it, did not develop him. He developed the Department along certain lines.

Mr. WHITNEY. Well, in a way, yes; but the Department can develop men.

The CHAIRMAN. There is no doubt about that.

Mr. GRAFF. It was somewhat mutual?

Mr. WHITNEY. Somewhat mutual.

The CHAIRMAN. But in that single case Floyd came to you because he was expert?

Mr. WHITNEY. Yes.

The CHAIRMAN. He had acquired some knowledge so that in some way he was an expert for you and for the Department?

Mr. WHITNEY. Yes; he was an expert for us.

The CHAIRMAN. You could not say in detail how that increase of $8,000 would be applied?

Mr. WHITNEY. No; there is no plan for that at all. We simply foresee that it will be needed, and those are the estimates, as we would estimate on any other line.

The CHAIRMAN. Now, would Mr. Scott's question come in here?

Mr. WHITNEY. Just one moment, Mr. Chairman. There is one other item of $1,000. That is for demonstration experiments. We are confronted constantly with the situation of finding soils that can be adapted to crops that are not at present grown. I have called the attention of the committee before to the soils that we have found in southern Maryland adapted to the growing of truck, similar in every way to the soils of New Jersey, and yet the New Jersey soils are farmed by a hard-working class of Swedes and Norwegians and Germans, and they are adapted to the crops to which they devote their attention, and it is a very prosperous community.

The situation in Maryland and in parts of Virginia is altogether different. The soils are not used for the crops for which they are adapted, and we can get up our report and talk to the people and it does not make any impression. We have found that it is necessary in a small way to go right down among them and get some of them to try these things, to interest them to a small extent, as we have done with our tobacco. When we went to Connecticut and told those people they could raise Sumatra tobacco, no attention at all was paid to it; but when we went there and did it, we had every attention that we wanted. So, when we send our soil-survey parties out into these areas and they find opportunities for other lines of agriculture, they have not the time to stop and argue with the people. They have not the time to arrange little experiments with them. They pass on to other areas.

because there is a demand for their work; but they leave with us a suggestion that these soils can be used for other crops than are there growing, and we have organized a little force of men to go down there and take up such problems as that and try to convince those people that we are in earnest and there is a chance of their succeeding.

Mr. LAMB. I do not know where it is needed more than they need it in Virginia.

Mr. WHITNEY. Yes, sir; I have had a piteous appeal from Doctor Stubbs, of the Louisiana Experiment Station, to go into Gloucester County, in eastern Virginia, and tell those people what they can do with their soils. We are spending now $6,580 on that, and in our estimates we included $1,000 to enable us to do more work on those lines. That is the sum of the increases asked for.

Mr. SCOTT. The question I asked a moment ago was whether you could give us briefly an outline of the work that your soil-survey parties do.

Mr. WHITNEY. The soil-survey parties usually embrace two men, one of them an experienced man, the other a less experienced man; sometimes more than two men. They go into an area, making their temporary headquarters at some town or village. They hire a team, and they are supplied with an auger for boring samples of the area from 3 to 6 feet in depth. They judge from the texture and appearance of the soils as to the class or type the soil belongs to. They go over the territory that is mapped out for them with the best map we can find, and if we can not find an accurate map we have to correct the maps by an outline on the map of the different characters of soils.

These men have had a great deal of experience. They are wonderfully acute in judging of these matters, and the map as they prepare it in the field comes to the Department for revision. They prepare a report stating briefly the location of the area, the character of the climate which prevails there, the character of the geology, so far as we know it, very briefly, and then describing the soils—not only the character of the soils, but the crops which in their judgment, as well as the judgment of the people of the locality, are adapted to them. They describe the drainage conditions, and finally send in samples to the office of all types of soil; and we have a mechanical analysis made to show the texture, and we compare the soils here with one another. We have now a collection of 10,000 samples from all over the country which we use just as you would use an encyclopedia. When a sample comes in that is described we read the description and we take the sample down and compare it actually with samples that have been collected all over the country. That is the way an area is surveyed, and we get these maps [indicating] of which you have all doubtless seen samples.

Mr. BOWIE. What county is that?

Mr. WHITNEY. This is Jamesville.

Mr. SCOTT. How much ground is usually surveyed by one party in one place?

Mr. WHITNEY. The average size of our areas is 453 square miles, and our men can make a survey of that size in approximately three months.

Mr. SCOTT. And the number of samples they take is determined, I presume, by the homogenity of the soil.

Mr. WHITNEY. Yes. The uniformity of the soil.

The CHAIRMAN. How many million acres have you gone over? I have not seen the statement this year. Have you the total of the different years?

Mr. WHITNEY. Yes.

The CHAIRMAN. Kindly read it.

Mr. WHITNEY. Altogether we have surveyed 133 areas, averaging 453 square miles and covering 60,263 square miles, or 38,568,320 acres.

The CHAIRMAN. How many million acres did you cover last year.

Mr. WHITNEY. 16,000,000. We have done a great deal of work. We have had our parties out constantly, winter and summer, and the efficiency of the parties is very much increased and the cost has been considerably reduced—that is, the cost per square mile.

Mr. GRAFF. When the map is made and the samples of soil are sent into the Department a chemical analysis is made of the soil, is it?

Mr. WHITNEY. No, sir; a mechanical analysis. So far we have not been able to understand the chemical analysis of the soil, but we have been working on the question of fertility, and I was going to speak of that in connection with our laboratory work.

Mr. SCOTT. What are the elements that enter into the mechanical analysis? What do you determine by that analysis?

Mr. WHITNEY. The size of the grades, the amount of organic matter, and if there is any large amount of lime that is also determined; but it is the amount of the organic matter and the grade of the material that is important—how much sand and silt and clay.

The CHAIRMAN. The percentage of each.

Mr. WHITNEY. The percentage of each; yes.

Mr. WRIGHT. After these samples are all tabulated and analyzed here and your report made, how do you get the practical benefit to the individual farmer?

Mr. WHITNEY. The publication of the work of the Bureau was provided for by Congress by joint resolution two or three years ago, and it provides for the publication of 18,000 copies, a certain number for the use of the House, a certain number for the Senate, and 8,000 copies for the Department. So we have 8,000 copies for distribution, and we send those out so far as they will go. The House of Representatives and the Senate together have 9,000 copies which they distribute. In addition to that we order, of our own responsibility, 1,000 copies of the reprints of each of these separate reports, with the map attached, and send these out so far as we can to applicants in the locality itself, reserving the balance for public libraries and for educational institutions, and for persons who we believe will make use of the bound copy in a more general way than the inhabitants or any local person would probably do.

Mr. BOWIE. While you are on that subject, Doctor, I understand the Secretary has recommended in some way that the number to be distributed locally in that pamphlet form in a particular county should be increased.

Mr. WHITNEY. Yes.

Mr. BOWIE. Will you please explain what that recommendation is, and what expense it involves, and what change in the law is necessary to accomplish it?

Mr. WHITNEY. Yes.

Mr. BOWIE. If it is not interfering with the course of your remarks.

Mr. WHITNEY. Not at all. The Department orders these reprints, as I said, for its own use, and in some cases we have been able to fur-

nish these to Congressmen for their own use; but it has been the feeling of the Secretary for some time that provision should be made for a local distribution of this matter directly by Congress, and last year a resolution was introduced asking for a change in the method of printing the reports and providing that 2,000 copies of these reprints should be furnished to each Representative in whose area the survey has been made, 500 copies to each Senator, and 1,000 for the use of the Department. That resolution failed of passage, but this year I notice that a similar resolution has been introduced by Representative Shepherd, of Texas, and the matter, I suppose, is now before the Printing Committee.

Mr. BOWIE. That would have to go before the Printing Committee and not before this committee. What expense would be involved in having that 2,000 extra copies for the use of the local Congressmen? What expense would be involved in that?

Mr. WHITNEY. We get 1,000 copies of this, and I think it cost us about $5,000 last year.

Mr. GRAFF. Five cents apiece?

Mr. WHITNEY. Yes.

Mr. BOWIE. That would be $5 apiece if you got 1,000 and you paid $5,000 for it.

Mr. WHITNEY. This is for all the reports.

Mr. BOWIE. What would the 2,000 cost?

Mr. WHITNEY. I think they cost with the maps about 10 cents apiece. I have not figured it up.

Mr. SCOTT. The maps are worth nothing without the reports to the average citizen.

Mr. WHITNEY. The main cost is in the map, but the map is already put up. It is just the extra cost of printing that would be involved. The Government Printer does not do the work of preparing the map. He does it by contract, and as soon as the edition is delivered to the Government Printer the contractors destroy their stone and all record of it is lost.

Mr. BOWIE. Is it not your opinion that the real way to make this information available and of advantage is through the distribution of these small bulletins to the parties located in the county?

Mr. WHITNEY. I think so, decidedly.

The CHAIRMAN. Do you think an indiscriminate distribution amounts to much, Professor?

Mr. WHITNEY. Mr. Chairman, it is hard to say. We have just published a bulletin for which there has been a great demand.

The CHAIRMAN. Where there is a great demand for it, where they ask for them, that is where the people want them.

Mr. LAMB. What is the bulletin you refer to?

Mr. WHITNEY. Bulletin 22. Mr. Chairman, I would say that not a copy of the field operations goes out except on request, aside from about 250 names of exchanges and to the libraries and experiment stations. The great bulk of these go out on request.

Mr. WRIGHT. Does your Department take any steps to bring it to people's notice as you have these; and also in regard to the survey of soils?

Mr. WHITNEY. No, not in regard to soils. We have not done that at all. I have never asked at all for any interest to be shown in the matter of soil survey. It has always come up from outside and unsolicited.

The CHAIRMAN. I suppose the agricultural papers take it up more or less?

Mr. WHITNEY. Yes.

The CHAIRMAN. And draw it to the attention of the agricultural interest in that way?

Mr. WHITNEY. These requests come from boards of trade, individuals, and in all sorts of ways.

Mr. SCOTT. With the exception of the tobacco industry, do you know of anything that might be called a new industry that has been started by reason of these surveys, or do you know of the adaptation of old industries to better conditions?

Mr. WHITNEY. Yes; we have been instrumental in quite a number of things of that kind, that is in the introduction of sugar beets on the sugar-beet soils and the elimination of sugar beets on soils that are not adapted to them. Then we took up the question of the Albemarle pippin, the mountain fruit of Virginia and North Carolina, and I think I have a map here now of the part of the Albemarle region where we were able to show the soils adapted to the different kinds of apples, the Porter's black loam for the Albemarle pippin, the Porter's clay for the wine saps, and so by going down and studying these things we have been able to work out from the experience of men and from our own observation the important relations of those different soils to the different varieties of apples.

Mr. LAMB. Right there—I learned from those people in Albemarle that one farm will produce the pippin and the farm right next to it will not produce it.

Mr. WHITNEY. Yes, we have worked that out, and it is in this report. There has been a great demand for that. We went down into the Mount Mitchell area, 35 miles from the railroad, to work out that sort of problems and made a soil survey so that they would know where to establish the apple orchards. It takes seven years for an apple orchard to come into bearing.

Mr. LAMB. You have had no results from that yet?

Mr. WHITNEY. No.

The CHAIRMAN. It is not so much the development of new lines of work as it is the proper distribution of old lines of work?

Mr. WHITNEY. Yes.

The CHAIRMAN. Not trying to raise corn where you can not raise corn, or wheat where you can not raise wheat.

Mr. WHITNEY. Yes.

The CHAIRMAN. Following Mr. Scott's line of thought a few minutes ago, tell us the workings of a tobacco party.

Mr. BURLESON. Just one minute, Mr. Chairman, before he gets to that. Is there anything in this reprint to advise the farmer upon which particular character of soil he is to plant a particular crop?

Mr. WHITNEY. Yes. Now I will also say a word further in regard to the question Mr. Scott asked. We were asked to go down to the Fort Valley area, Georgia—the new peach area in Georgia where they have been so successful—and outline the soils there and find out why it was that they had peculiar failures at times in some of their orchards. We made the survey this year, which is just finished and has not been published yet, of about 200 square miles in Fort Valley. At Fort Valley the area is very peculiar. It is on a little knoll about 500 feet above sea level, and the location protects them in a large measure from

rost, but they have a good peach crop about three years in five. The other two years they are caught by the frost.

The CHAIRMAN. How large a country is it?

Mr. WHITNEY. About 200 square miles, that we surveyed. Of course, it is not all in peaches. We found that the Orangeburg sandy loam, this same soil we found in Texas as a tobacco soil, was the very best peach soil that they had. The Orangeburg clay was altogether too heavy and was never successful in peaches. It is better for general farm crops, but not for peaches. Then we had the Norfolk sandy loam, quite similar to the Orangeburg sandy loam, which is the very best soil of all for peaches; and those two soils were the soils that they had always had success on, but they never realized that their neighbor, Mr. Jones or Mr. So-and-so, had failed because he had his crops invariably on a soil different from that they had succeeded on.

Mr. SCOTT. Is the difference between these soils apparent enough so that a nonscientific man, having had his attention called to it, can always distinguish them?

Mr. WHITNEY. When their attention is called to the matter they say, "Why, yes; we knew this before. We knew that these were different soils;" but they never thought that the soil made the difference in the crop; and now with the soil survey they are prepared to understand more fully than they did before the reason for their success on some soils and their failures on others. Why, when I was a boy on a farm in Maryland, reading agricultural papers, I tried, on those sandy soils that you know about in eastern Virginia——

Mr. LAMB. Yes.

Mr. WHITNEY. I tried the same kind of fertilizers that the people tried in the Hagerstown Valley. I thought I would raise a crop of wheat that would be equal to theirs. I got the same brands and did exactly as they did, but there was no more chance of raising wheat on that than there is of flying.

Mr. LAMB. Not a bit.

The CHAIRMAN. I think it has always been a thing of common knowledge that you always want peach trees on a sandy soil.

Mr. WHITNEY. Yes.

The CHAIRMAN. I know that peach orchards in my country are planted upon a little sandy knoll with an eastern or southern exposure, not on clay land.

Mr. WHITNEY. Yes, sir; that is correct.

The CHAIRMAN. Now you might follow out Mr. Scott's idea.

Mr. WHITNEY. Yes, sir. There are two lines that have been developed in the tobacco investigation; that is, the establishing of new industries such as Mr. Scott suggests. We have found evidences that the Sumatra tobacco could be grown in Connecticut, and we have evidences now that the Cuban tobacco can be grown in Texas.

The CHAIRMAN. In the open air?

Mr. WHITNEY. In the open air.

The CHAIRMAN. But not Sumatra tobacco in Connecticut, except under cover.

Mr. WHITNEY. Under cover in Connecticut, but the Cuban tobacco in the open air in Texas, Alabama, and South Carolina. These parties have been sent down and they have actually cultivated from 3 to 5 acres of land. The land has been donated. We have had the teams furnished us by the owners and the fertilizer furnished just as we want

it, but the work has mainly been done by our own men. They go right in and take the plow and raise the tobacco. They are responsible for every feature of it.

The CHAIRMAN. You speak of the station now in Texas?

Mr. WHITNEY. In Texas, Alabama, South Carolina, and our early work in Connecticut. We have taken charge of the work from the beginning. We have raised the tobacco and have been able to produce a better product than has ever been produced by the people. Your Texas friends know that, Mr. Burleson. The tobacco, after being cut, is then taken to the barn and after being cured is taken to the warehouse, and there the highest skill of our experts is brought into play—how much that tobacco should be sweat, how you are going to bring out the aroma. When this leaf is taken to the barn it has no aroma at all. It is unlike tobacco. You might as well smoke hay; but the delicacy of the aroma and the flavor of the tobacco is brought out in that bale in fermentation. Now, what we have to do to bring that out no one can tell. It is like a person making wine. It is like a cook making bread. You can give directions and one person will get one product and another person will get another product, depending upon the skill of the person. It is something you can not teach a man. You can only allow him to learn. You can put him in a position in which he can learn, but you can not otherwise teach him.

We do not know how long these tobaccos are going to require when we go into a new field like this. The Connecticut leaf can be fermented in thirty days. The Ohio leaf has been in bulk six months and is not yet thoroughly fermented.

The CHAIRMAN. That work is a little above and beyond the raiser of tobacco, is it not?

Mr. WHITNEY. No, sir; not at all. We are teaching those people in Ohio to handle their crops according to our methods. Somewhere in my report to the Secretary I speak of the amount of tobacco that has been handled under our direction, of commercial tobacco in Ohio. It is something like four million pounds this year, of the commercial tobaccos in Ohio, that have been handled according to our bulk methods of fermentation, by direction of our own man.

Mr. BURLESON. Doctor, to speak of the Texas station, you keep these experts in curing permanently at Nacogdoches?

Mr. WHITNEY. Yes, sir; for the season.

Mr. BURLESON. You keep the expert grower, Mr. Hinson, there?

Mr. WHITNEY. Yes.

Mr. BURLESON. To revert to the question I asked you a moment ago, there would be no additional expense to the Government whatever if the people in Lee County and in other counties saw fit to undertake the curing of tobacco, to have Mr. Hinson come there and supervise the growth of it?

Mr. WHITNEY. No; that would be all right.

Mr. BURLESON. And then having grown it to send their product to Nacogdoches to be cured by these experts?

Mr. WHITNEY. Yes.

Mr. BURLESON. That could be done with comparatively little expense to the Government?

Mr. WHITNEY. It can be done provided the results we get this year justify our advising those people to go into it, and provided their soils are what we think are good tobacco soils.

The CHAIRMAN. That is yet to be determined?

Mr. WHITNEY. That is yet to be determined. I go down there this week.

The CHAIRMAN. I understand you can not teach a man how to treat tobacco during this fermentation, exactly.

Mr. WHITNEY. It is a matter of experience, Mr. Wadsworth. You can put a man in the way of acquiring experience. We go into a warehouse in Ohio. A large concern wants to change their method of fermenting from a "case" method to a "bulk" method. They want to give it a thorough fermentation according to our method. Our man goes there and takes up the work himself, builds the bulks, using the labor of this concern—we are at no expense whatever—using their lumber and their warehouse, and he visits them once or twice a week, two or three times a week, as often as may be necessary, to see that the work is done in a proper way, and he tells them when that bulk must be turned. The whole thing is the amount of moisture contained in the tobacco and the length of time it is left down, and the rapidity of the rise in temperature as the tobacco heats up, and they have to watch those things. He may get reports in the meantime. In Connecticut we had reports over the telephone.

The CHAIRMAN. How many years will you have to send that man, for instance, to this case you refer to in Ohio before the people themselves are taught to take care of their tobacco?

Mr. WHITNEY. That work goes on very rapidly. We have a dozen or fifteen farms in Ohio doing this now themselves, but that work is incidental to our efforts to see if the tobacco itself can be improved. We have three men in the party in Ohio, and this same party has for two years now raised a crop of tobacco from selected Cuban seed, and we are judging now of the quality of the tobacco that was grown the year before last. There is sufficient promise in it to justify us in continuing. We believe that the tobacco that we grew last year is better than the tobacco we grew the year before, and we believe we can improve still further on the tobacco if we try it again.

In our work in Texas we made mistakes. There is no question but that we made mistakes in our crops in Texas, Alabama, and South Carolina. The soils and the conditions were absolutely new to us, and we went in there without any experience. The tobacco that had been raised there had been barbarously treated. We did not have much material to judge from. We did not have much profitable experience to aid us, and we went in and did the best we could. On some of those soils the tobacco ought to have been planted closer. On the Orangeburg clay it ought to have been planted closer and cropped higher to reduce the size of the leaf. We have got too large and too heavy a leaf. We have got to go in and crowd it a little more, give it less room, and crop it higher, so as to let more leaves grow on the stalk. In that way we will be able to tone down the leaf, get it to the size we want, but those are mistakes that are necessarily made in an investigation of this kind, and it is through watching those mistakes that we finally arrive at a desirable result.

Mr. BURLESON. And it is on those points that Mr. Hinson is to advise the grower?

Mr. WHITNEY. Yes; and it was from the experience that we ourselves had had in growing this tobacco, in actually handling it, that the probabilities of success are going to rise.

The CHAIRMAN. Do you suppose it will ever be possible for the small grower of tobacco to avail himsels of this knowledge?

Mr. WHITNEY. Oh, yes; they are going into it now.

The CHAIRMAN. I understand it has been almost shown now that the raising of tobacco in Connecticut under cover is a matter of a large undertaking; that the capital required and all that is large.

Mr. WHITNEY. Yes; that requires a good deal of capital.

The CHAIRMAN. And the risk is too great for the small grower to undertake?

Mr. WHITNEY. Yes; but the work in Ohio is with the small grower. There is no expense to that. It is merely a change and improvement in methods.

Mr. SCOTT. Did you have any of your force in Connecticut this year overseeing the business there?

Mr. WHITNEY. We had one man.

Mr. SCOTT. You spoke, when you were before the committee last year, of wanting to send somebody to Cuba to investigate methods and soils. Did you send anybody?

Mr. WHITNEY. We sent a tobacco man to look into the tobacco and to get seed for us, but we have made no soil investigation there except what samples he brought back.

Mr. LAMB. Professor, when will you know about the result of that Habana experiment?

Mr. WHITNEY. I think we will know in about a month.

Mr. LAMB. If you could write that up or let me know, I will put those tobacco people around there in communication with you. They are very much interested in that thing.

Mr. WHITNEY. Yes; I will let you know.

Mr. HAUGEN. When will the report be out of the surveys made this year?

Mr. WHITNEY. They will not be out until the latter part of next year, next fall, unless we get this resolution through, and then instead of having all the work wait until the end of the season, it is proposed to send these reports in as soon as the surveys are made, and have them printed as advance sheets. I have soil-survey work now that was done in Texas last winter. It is lying in my office and has been ready for nine months. It is lying there because it can not be taken up by the Public Printer until all of our work is done in February, when it can be sent down. It might just as well have been printed and distributed.

Mr. HAUGEN. It will come out in bulletins, then, of about 25 pages?

Mr. WHITNEY. Yes.

Mr. BURLESON. Does that resolution of Mr. Shepherd cover it exactly?

Mr. WHITNEY. Yes; I think it does.

Mr. BOWIE. Has that resolution of Shepherd's your approval?

Mr. WHITNEY. Yes.

Mr. GRAFF. The committee here passed a resolution authorizing the publication, or recommending it. Then I went over, on the direction of this committee, to the Committee on Printing and saw Representative Heatwole, and he told me he would have the matter taken up. I urged him frequently, but he did not get it through.

Mr. BOWIE. I think it would be a good idea for us to do the same thing again this year.

Mr. HAUGEN. Is that a concurrent resolution?

Mr. WHITNEY. It is a joint resolution.

Mr. GRAFF. One county in my district was examined on the recommendation of the president of the State university in Illinois, and I am not able to meet the demands of the people for these slips.

Mr. BURLESON. Reprints?

Mr. GRAFF. These reprints; yes.

The CHAIRMAN. Are the experiment stations doing any of this kind of work at all?

Mr. WHITNEY. Yes; we are cooperating with the Illinois experiment station, with the New York experiment station, and with quite a number of the stations.

The CHAIRMAN. I think in these tobacco States you could do a lot of work through those experiment stations at a very small expense and get it done a little more quickly, perhaps.

Mr. WHITNEY. Yes. The Secretary wished me to bring before the committee another matter in regard to the soil-survey men. I have not followed any particular order in this address, but I will bring it up here. There has been a great demand upon us for assistance in our colleges and experiment stations in the matter of teaching, and there has been so little work done along the lines that we have been following that it has been deemed by the Secretary necessary and advisable to let some of our men go out and organize courses of instruction; and some time ago a very urgent request came from Cornell University. They were very anxious to organize a course of agricultural physics, soil physics, so that they could train their students for the lines of work we are developing. There was no one in the country they could get. They were not prepared to permanently take a man. They did not know how they were going to succeed; and so the Secretary detailed to them for the winter months Mr. Bonstile, one of our best trained experts, and he is at Cornell now organizing a course in soil physics along the lines of the work we have been following. It has been an exceedingly popular course. He had over seventy pupils, and then was compelled, by lack of space and because he could not give his attention to more, to close the list. They are having a very successful course in this soil work at Cornell.

It was originally intended that Mr. Bonstile should be there for a short time to organize things, but the work of organizing a course and outlining instruction and the experimental work, and things of that kind, is going to require him to remain there for a year. Then it is the understanding that the college shall take care of it either by taking Mr. Bonstile in accordance with the chairman's suggestion, or by taking one of our younger men.

The CHAIRMAN. I do not suggest taking your men away. I only suggest that I do not think they will be lost to the country by their leaving.

Mr. WHITNEY. Then in order to balance things the Secretary also acceded to a similar request from the University of Kentucky, and has sent Mr. Dorsey for a month to give a course of lectures, with the idea of helping them inaugurate a course of instruction in soil physics. The Secretary thinks it would be advantageous to the men themselves, as well as to the universities, to give the men of experience in the soil survey assignments for the winter months occasionally to some of the colleges, so that we can in time inject our

methods of research and of study and our ideas into the colleges of the country.

The CHAIRMAN. That is practical. How many men are there in a soil survey party?

Mr. WHITNEY. Usually two.

The CHAIRMAN. In a soil servey?

Mr. WHITNEY. In a soil survey.

The CHAIRMAN. Practically an expert and an assistant.

Mr. WHITNEY. Yes; or two experts, if we can get them.

The CHAIRMAN. Would it be possible, then, to send out an expert and then apply to the experiment stations to furnish a man for work in that State? Would not that young fellow take up a line of work and commence from the bottom and gradually acquire a knowledge of the conditions?

Mr. WHITNEY. To a certain extent we are doing that.

The CHAIRMAN. They ought to be willing to do that, I should think. It would be a very small cost to them, and would enable you to do more work. At the same time it would be scattering the rudiments of this knowledge.

Mr. WHITNEY. We are doing that in Illinois. The Illinois station furnished us with three men this year, and we have done a great deal of work in Illinois through private parties.

The CHAIRMAN. Those three men have learned something.

Mr. WHITNEY. We sent out two and they sent four, so we organized three parties under the direction of one of my men.

The CHAIRMAN. I should think that with a little effort of that kind you could multiply your parties without much expense.

Mr. WHITNEY. There are two objections, Mr. Chairman. In the first place it is necessary for us to have full control of the parties.

The CHAIRMAN. That must be understood. That would have to be understood, of course, that if a man goes with you he must be under your orders absolutely.

Mr. WHITNEY. We had cooperation of that kind with one of the northwestern States. I will not mention the name of the State unless I am called on to do so. They furnished the man, but he was withdrawn. He was needed for something else. He was called back to the station to finish up some work, and then they sent us some one else for a few days or a few weeks.

The CHAIRMAN. That would not do at all.

Mr. WHITNEY. They have not sufficient money. They are not large enough to enter into any great work of this kind except in a very limited way, and really it is much simpler and easier for us to do the work ourselves than it is to get anyone to help us.

The CHAIRMAN. I mean in a subordinate position, of course. I did not mean in leading positions.

Mr. WRIGHT. Professor, when you go into a certain county, do you instruct the native farmers there in the art?

Mr. WHITNEY. Not with our soil-survey men; no. They do not have the time. They talk with all the leading farmers they can meet. They come in touch with the leading interests and the leading men.

The CHAIRMAN. In a general way they can say, "This soil is adapted to this crop, but not adapted to that?"

Mr. WHITNEY. Yes; but at all times they are instructed to inform me of the names of the leading men, the leading spirits there, so that

if anything comes up and we want to communicate with the people of that locality, if we want to get ideas inculcated in the minds of the people, we will know how to reach them.

Mr. WRIGHT. My question was prompted by the fact that you mentioned a while ago that you put them in a position to absorb knowledge regarding the raising of different crops.

Mr. WHITNEY. In our tobacco work that is just what we do. We go right to the people and live with them. In our demonstration work we go right with the people.

Mr. LAMB. And they catch on directly?

Mr. WHITNEY. They catch on. We live right with them and manage their fields, their warehouses, or whatever it may be. They let us in very willingly. They tell us to come right in and do what we want. They are always exceedingly cordial to work of this kind, provided we can give them personal attention.

The CHAIRMAN. I believe you could do good work through those experiment stations in the line which, in a rough way, I have suggested, and enliven their interest in this matter of study by employing some of their young men and letting them go along with your parties and doing, perhaps, the cheapest kind of work and not any of the scientific work. It would arouse an interest in the matter in these experiment stations, putting it on the line of a young engineer going out with an engineering party.

Mr. WHITNEY. We often have volunteers join us in that way, but it always involves us in additional expense for teams and for facilities for getting around, and questions of that kind that come up.

The CHAIRMAN. I would not increase the number of your own parties, but you could have one from here and one from the experiment stations.

Mr. WHITNEY. We do that to a certain extent in some stations.

There is a matter I would like to bring before the committee. That is our alkali-reclamation work. I said something about it a while ago, but I think the committee would be interested to know that the work has been highly successful. At Salt Lake City they have 125 square miles of alkali land that is absolutely valueless for agricultural purposes. They have spent enormous sums in trying——

Mr. BOWIE. How many acres did you say?

Mr. WHITNEY. One hundred and twenty-five square miles around Salt Lake City. The present value of this land is nominal, and it can be purchased for from $5 to $8 an acre. There is some little grazing, some soft bushes, but it has no value for agriculture. We have taken out a tract of 40 acres in cooperation with the experiment station. The basis of the cooperation is this: We will have the use jointly of the land for from three to five years donated by the owner, and he contributes $500 to the installation of the drain tile. The Bureau of Soils then takes hold and frees the land from alkali, and when we have got it freed from alkali we turn it over to the experiment station, and they are going to see if we have got it free and demonstrate that we have by growing crops adapted to the locality. We can not do that so well. They are going to do it.

The CHAIRMAN. The freeing of soil from alkali is simply a question of drainage, is it not?

Mr. WHITNEY. Simply a question of drainage. We have installed a drainage plant there at about $15 an acre. The soil had 2½ per cent

of alkali to a depth of 4 feet—that is, this tract had 6,650 tons of alkali to be removed.

The CHAIRMAN. Forty acres.

Mr. WHITNEY. This 40 acres. We put in the drainage system and we put up checks and kept it flooded if possible 4 inches deep for nearly all the time. Drainage waters have been passing off constantly for twelve months and we have removed 5,430 tons of salt, or 83 per cent of the alkali, and we have the soil now, after twelve months, with an average of about six-tenths of 1 per cent, which is just a comfortable limit for crop production.

Mr. GRAFF. You covered the land with 4 feet of water?

Mr. WHITNEY. No; 4 inches.

Mr. WRIGHT. What is the expense per acre of doing it?

Mr. WHITNEY. About $15.

Mr. HAUGEN. That is for the tile?

Mr. WHITNEY. Yes.

Mr. HAUGEN. How much did the water cost you?

Mr. WRIGHT. That is what I mean; the whole expense.

Mr. WHITNEY. The water there is an appurtenance to the land. They have it any way.

The CHAIRMAN. Irrigation?

Mr. WHITNEY. It is irrigation water; yes.

Mr. HAUGEN. You have to buy it, do you not?

Mr. WHITNEY. They own the stock.

Mr. BROOKS. The owner of the land furnishes the water for your experiments?

Mr. WHITNEY. Yes, sir.

Mr. HAUGEN. What do they do with this land after it is reclaimed? I understand they have not water sufficient to supply the land.

Mr. WHITNEY. In that locality they have an abundant supply of water. Unfortunately it is in litigation. There are two or three parties claiming to own the whole amount, but they have water enough to irrigate a great deal of the land.

Mr. HAUGEN. I understand the good lands there are not cultivated now for lack of water.

Mr. WHITNEY. At Salt Lake City?

Mr. HAUGEN. So I understand from parties living there. I was told so last year.

Mr. WHITNEY. There has been a great deal of trouble, but much of that trouble, as Mr. Mead will tell you when he comes before the committee, is pure cussedness, litigation. A man owns so much stock of water and he lets that water run whether he uses it or not, because if he does not use it somebody else will use it, and then when he does want it he can not get it.

Mr. BURLESON. Is Mr. Mead under your Bureau?

Mr. WHITNEY. No, sir.

Mr. HAUGEN. Is this land you have reference to on the lake?

Mr. WHITNEY. No; it is between Salt Lake City and the lake.

Mr. HAUGEN. Between the mountain and the lake?

Mr. WHITNEY. Yes.

Mr. WRIGHT. I would like to ask the value of those lands after they have been reclaimed and this expense put on them?

Mr. WHITNEY. I think next spring we shall make another alkali survey of that tract. We have had two made already. Next spring

we will have another survey made and if it is in the condition that we hope it will be after the winter we will turn it over to the experiment station to put alfalfa and fruit on it. If it will grow alfalfa and fruit it is worth $100 to $125 an acre.

The CHAIRMAN. You consider that experiment as finished, do you not? I mean that the drainage will relieve the land of the alkali?

Mr. WHITNEY. There is no question about it.

The CHAIRMAN. You do not have to go any further along those lines?

Mr. WHITNEY. No; but that is a demonstration for the people of Utah. Now, strange as it may seem——

The CHAIRMAN. Did not that hold good in Egypt?

Mr. WHITNEY. Yes, it held good in Egypt; but, strange as it may seem, what they do in Utah the California people pay no attention to.

The CHAIRMAN. That is their fault.

Mr. WHITNEY. I know it is their fault.

Mr. SCOTT. Similar experiments are being carried on in California, are they not?

Mr. WHITNEY. Yes, sir; and for that reason we have taken up an area at Fresno where they have a different kind of alkali; by the way, another at Tempe, Ariz., another at Billings, Mont., another at Yakima, Cal., and another in southern California, hoping by the demonstration of these experiments to impress the people of these different communities with the possibilities of reclaiming their lands, and as soon as that is done the thing will go of itself.

The CHAIRMAN. You say the Egyptians did this?

Mr. WHITNEY. No; the English are doing it in Egypt.

The CHAIRMAN. Did not the Egyptians do it in early days?

Mr. WHITNEY. No; the Egyptians used a different system of irrigation. They were never troubled with alkali. They grew one crop a year and flooded their lands for about three months, during the rise of the Nile. For about three months the water was on.

The CHAIRMAN. I thought the alkali question became a serious one with them even in early days.

Mr. WHITNEY. No; it did not become a serious one with them until this perennial irrigation was started. That is, adding small quantities frequently. That is what brought it up. That is true with the exception of a large area in the old land of Goshen, which was abandoned and which was for many years not flooded, and that went to alkali and has been a desert ever since, until now they are reclaiming it.

The CHAIRMAN. Have you done anything in Colorado at all?

Mr. WHITNEY. No; not in Colorado. We had a very urgent request from Colorado, especially in the San Luis Valley, but the Secretary takes the ground that with these fixed demonstration experiments it will not be necessary to do any more, and this is as much as we propose to do in that line. Capitalists are taking the matter up, and if it was not for this matter of litigation there is no doubt but what it would be taken up; but there is so much uncertainty about the water rights that people are afraid to undertake anything.

The CHAIRMAN. Is there anything further you wish to say, Doctor?

Mr. WHITNEY. No, sir; I have gone over the main lines.

The CHAIRMAN. Is there anything the members of the committee wish to ask the Professor?

Mr. WHITNEY. I shall be glad to answer any questions.

Mr. HAUGEN. Is the tobacco in these cigars the same grade of tobacco as the Connecticut shade-grown tobacco?

Mr. WHITNEY. No, sir.

Mr. GRAFF. Did you say you had decided on what areas you were going to survey this coming year?

Mr. WHITNEY. No; only for the winter. I have here the schedule for the winter months.

The subcommittee (at 4.15 o'clock p. m.) adjourned until Thursday, January 7, 1904, at 10.30 o'clock a. m.

WASHINGTON, D. C., *January 7, 1904.*

The committee met at 10.45 o'clock a. m., Hon. James W. Wadsworth in the chair.

The CHAIRMAN. I think we will not wait for any more members to come. It is a pretty difficult thing to get them all here.

## STATEMENT OF MR. BEVERLY T. GALLOWAY, CHIEF OF THE BUREAU OF PLANT INDUSTRY.

The CHAIRMAN. Doctor Galloway, we have asked you to come here to-day and explain to us the needs of your appropriations and increases and any changes in the wording of your clauses and paragraphs. Please do it in your own way, and questions may develop as you go along. I see you omit here an annual salary of $480 for your scientific aids on page 9 of the estimate.

Mr. GALLOWAY. That omission, Mr. Chairman, was made for the purpose of unifying the authority for the employment of scientific aids throughout the entire Department. It has been found necessary to pay some of the aids $50 a month in order to keep them at all, and the Secretary thought it would be advisable to have the rate fixed.

The CHAIRMAN. I understood it was the idea to start them at that rate. They are entitled to promotion as much as any other clerks.

Mr. GALLOWAY. This clause, if left in the original form, would fix it so that the Secretary would not have authority to employ them at more in the Bureau of Plant Industry.

The CHAIRMAN. I thought the same language was employed in all these bureaus.

Mr. GALLOWAY. It was when it started out, but it has been changed. The scientific aids are employed throughout the entire Department. It was originally provided that they should be paid $480 per annum, but $40 a month is not sufficient, sometimes, to keep young men in Washington, and that was the reason for the change. They are required to stay two years. As a matter of fact they are usually paid $40 a month at first, and then, after being there six or eight months, if they are found good men, they are increased to $50 a month.

The CHAIRMAN. You mean to say, under this language you could not promote them and increase their salaries?

Mr. GALLOWAY. I do not think we could in the Bureau of Plant Industry.

The CHAIRMAN. Who held that?

Mr. GALLOWAY. The disbursing officer.

The CHAIRMAN. I do not think it was the intention of the committee that it should be so construed.

Mr. GALLOWAY. No; but the disbursing officer holds he has not authority to pay more than $480 where this amount is specifically mentioned in the appropriation.

The CHAIRMAN. The committee's idea was that that was the initial salary.

Mr. GALLOWAY. They are never paid more than $600 a year. That is the limit, and we would like to continue that.

The CHAIRMAN. That clause has been in the bill three or four years.

Mr. GALLOWAY. Yes; that has been the case right along until now.

The CHAIRMAN. Now at the end of that clause you put in some new legislation, "one hundred and sixty-five thousand dollars, of which sum fifteen thousand dollars may be used at the discretion of the Secretary of Agriculture, for the purpose of extending the work of hybridizing cotton resistant to boll weevil.

Mr. GALLOWAY. Yes, sir. I would suggest that I be permitted to run over briefly the increases I have asked for and then call upon our officers who are here with me for particular discussion. They are Mr. Albert F. Woods, pathologist and physiologist; Mr. William J. Spillman, agrostologist, and Mr. William A. Taylor, pomologist in charge of field investigation, all of the Bureau of Plant Industry.

We have asked for our entire Bureau an increase of $75,000. These increases are as follows: Vegetable pathological and physiological investigations, $35,000; or from $130,000 to $165,000. Pomological investigations, $10,000; or from $37,000 to $47,000. Botanical investigations and experiments, $5,000; or from $65,000 to $75,000. Grass and forage-plant investigations, $10,000; or from $35,000 to $45,000. Experimental gardens and grounds, $5,000; or $25,000 to $30,000. Arlington experimental farm, $10,000; or $15,000 to $25,000. There has been no increase recommended for the statutory salaries, nor has any increase been recommended for the tea culture investigations, or the purchase and distribution of valuable seeds.

Mr. Woods, who is in charge of the pathological and physiological investigations, is here as I said, and our plan is usually to present the problems that we are at work upon, and to indicate what the increases are for in each problem. If that meets your approval I will ask Mr. Woods to enumerate the principal problems, and show where the increases asked for are to be added to the problems.

The CHAIRMAN. Take the vegetable, pathological, and physiological investigation first.

Mr. GALLOWAY. Yes; on page 9.

## STATEMENT OF MR. ALFRED F. WOODS.

Mr. WOODS. Mr. Chairman, I have, in the lines of work covered in the physiological and pathological investigations, 50 distinct problems, which we are now investigating. Some of these will require no increase in appropriation; others are practically finished, and the money will be devoted to other lines of work; and there are still others that it is very important to push along to a prompt conclusion, and these are the ones where we have planned to ask for such increased appropriations as the committee may see fit to allow, and which the Secretary has included in his estimates.

The first item on which we would like an increase is the pathological laboratory, the technical laboratory to which the field men send their

diseased plants and obtain their culture media and their technical information.

The CHAIRMAN. How much do you devote to that now?

Mr. WOODS. $12,900, which sum includes everything—salaries, and field expenses, and everything else devoted to that line of work. We devote $12,900 to the technical laboratory work now, and it is our plan to increase that by $1,000, making a total of $13,900. The sugar beet is the second problem, to which we now devote $3,900, and we want to increase that by $1,100, making a total of $5,000.

Mr. SCOTT. Is that in addition to the $5,000 appropriated last year for beet-sugar investigation? That type of an investigation?

Mr. WOODS. Yes, sir; $5,000. Attached to our Bureau is largely the work of gathering statistics in regard to the growing of sugar beets in this country. This problem that I am discussing is the study of the enemies of the sugar beet, the diseases especially in the main sugar beet areas of the country—Michigan, California, and Colorado—where there are diseases which very quickly reduce the sugar output; and although the amount of sugar produced this year is very greatly in excess of any previous year's production, yet the production this year has been reduced about 10, or possibly quite 15 per cent, by such diseases as "curly top," "leaf spot," etc.

Mr. GALLOWAY. I will say, in answer to Mr. Scott's question, that this last item in the Bureau of Plant Industry, of $5,000 for sugar investigation, the Bureau of Plant Industry has very little to do with. It is a floating appropriation. This has been going into the Department's appropriation for several years, and was put in there by the disbursing officer for administrative purposes. The matter is really under the direction of the Secretary of Agriculture himself.

The CHAIRMAN. Who is at the head of that—the beet-sugar matters?

Mr. GALLOWAY. Mr. Sayler.

Mr. WOODS. There is another question in connection with our sugar-beet work, and that is that the present beet-seed ball has anywhere from 3 to 5 seeds in it. When planted, several of these seeds germinate, therefore, close together, and the person who thins them out has to get down on his knees and break off all but the strongest sprout, and in that process the sprout that is left is often injured. So it is necessary to do a large amount of sugar-beet work by hand, and that makes it very expensive. Now, we have reason to think that we can produce a beet ball which will contain one seed only, and we have made over 14,000 selections of individual beet flowers that produced one seed each. They produce a beet that is better and stronger than the others.

Mr. SCOTT. They produce a ball that has but one seed?

Mr. WOODS. Yes; they show a tendency to do so. Our idea is that by selections we can produce a strain of beets that will produce a one-seeded ball. The beets could then be planted and thinned by machinery, and in fact nearly every operation connected with the growing of the crop could be carried on by machinery.

Mr. BURLESON. You say by selection; it is only a matter of selection and breeding, as a matter of fact, is it not?

Mr. WOODS. Yes; the work at present is simply selection. We may have to hybridize those that we secure by selection, those having a higher sugar content, so as to combine the sugar-producing power with the single-seed producing power.

Mr. GRAFF. Does this thinning-out process require a great deal of work?

Mr. WOODS. Yes, sir.

Mr. GRAFF. I know that in Illinois that was the thing that made the success of a large beet-sugar factory impossible—a factory with a quarter of a million dollars' capital, because they could not get the Illinois farmers to engage in work on their hands and knees.

The CHAIRMAN. That has been the great difficulty everywhere in the beet-sugar industry.

Mr. WOODS. There is a machine for dropping one individual ball in a place, and several plants come from that ball. Now, if we get the one-seed beet ball and put it in, it can be thinned out just like cotton.

The CHAIRMAN. Is the seed the result of hybridization? May I use the word prepotent, as in the case of an animal?

Mr. WOODS. It is exactly the same in the plants as in the animals, and if you produce a desirable variety by hybridization it may be fixed by selection until it does not greatly vary; you may then propagate from that fixed group of individuals as an established variety.

The CHAIRMAN. That is the way we do with animals. We have succeeded in raising a breed of hornless or "muley" Durham cattle. Now, the regular Durham is a horned animal, but by selection they have succeeded in establishing a breed of "muley" Durhams.

Mr. HENRY. And the same thing with Jersey cattle, too.

Mr. WOODS. We are helping the sugar men, and if we can secure a variety with one-seeded balls, beet sugar can be produced very much cheaper than it is now, and in competition with cane sugar.

Mr. GRAFF. It would go a long way toward solving the sugar problem in the United States?

Mr. WOODS. Yes; we are told that that would solve the sugar problem.

Mr. GALLOWAY. Heretofore we have been practically importing all our seeds.

The CHAIRMAN. What do you pay for that now?

Mr. WOODS. We now spend for this work $3,900, and ask an increase of $1,100, making $5,000.

Mr. BROOKS. What amount is now paid annually for imported beet seeds?

Mr. GALLOWAY. Five hundred thousand dollars.

Mr. GRAFF. Where do you import it from?

Mr. GALLOWAY. From Germany and France. We have demonstrated the fact that sugar-beet seeds can be grown in certain parts of the West containing 20 per cent of sugar, and we can get that seed delivered on the Atlantic coast at about the same price we pay for foreign seeds. We have tried to get about 10,000 pounds this year, and we plant that side by side with the foreign improved seed to demonstrate the value of it.

Mr. BROOKS. It is true, is it not, that these seeds selected from the seeds grown in this country have a high saccharine test and are reproduced with equally high test?

Mr. WOODS. Yes; and on the other hand the seeds produced in Germany with a high saccharine quality do not always turn out well in this country.

Mr. BROOKS. It seems to me there is a tremendous field there in the one matter of sugar-beet seed.

Mr. WOODS. My work does not include the commercial seed pro-

duction, but after we develop a good strain and show that it can be grown commercially, another group of men then take it and put it into commercial use.

For the work on root rot of cotton and alfalfa we are now expending about $3,000. We have one man and an assistant working on this disease. We have not asked for an increase for this work, thinking possibly that the funds for it might be provided by a special appropriation, so that that is left out, and we can not do anything with the item until we find what is going to be done with the special bill for cotton work.

The CHAIRMAN. Does that include the $15,000?

Mr. WOODS. The $15,000 mentioned at the end of the appropriation for this office was first intended, if no other source of help could be found, for taking our men off these other problems and concentrating them as far as we could upon the problem of securing cottons resistant to the boll weevil. It is very important to do this work, and in an emergency it could be arranged that we can stop certain other lines of work and take up this; but it would mean a stopping of work like the beet work, which should be carried on in the interest of the beet growers.

The next matter for which we have asked an increase is the wilt disease of upland cotton. The upland cotton disease and the sea island disease occur in the southeastern cotton belt, and we have not planned to include this investigation in the boll weevil emergency investigation in the Southwest. The importance of carrying on this work in the upland cotton can be seen by examining the illustrations [exhibiting photographs] which I send around. There you will see photographs of fields completely killed out by this root-rotting disease. And you see other plants that are resistant to the wilt. By means of this wilt resistant a full cotton crop can be produced on lands where, four years ago, the stalk of cotton could not grow. We have settled the question for the sea islands, which produce about $11,000,000 worth of cotton. We do not need to do any more work there. It has been completed, and they have now selections of wilt resistant Sea Island cotton that is as good as can be imagined.

Mr. SCOTT. Will not those varieties thrive on the mainland?

Mr. WOODS. No; it is a different kind of cotton. They have the same diseases in the upland cotton, but the upland cotton compared with the sea island cotton is a different proposition. The loss from this disease in upland cotton, in Georgia and Alabama and all through that section of the country, is very great. We are now spending on upland cotton about $1,000, and we want to increase that by $4,000. We want to put two or three men in the field down there, and select different plants in the different cotton sections, and perfect the resistant strains as quickly as possible. We know it can be done, but the question now is to get them perfected and into use. If that can be done in one year it is a great deal better to do it in one year than to spread it over five years. Now, if we could put $4,000 in that work for one or two years we could settle the problem in that time. This would increase the wilt-resistant work in upland cotton to $5,000.

Mr. BURLESON. Is that resistant cotton obtained by a process of seed selection?

Mr. WOODS. Yes; we go to the worst diseased fields we can find, and plant the most resistant kind of cotton adapted to the locality we

can get, and give the disease every chance possible to kill the plants, and see if they would stand the test. Here and there a resistant plant is found and selected for further testing. We have to consider not only disease resistance, but the length of the fiber and the quality of the fiber, the yield, and the strength. You will see from those photographs how highly productive some of our wilt-resistant sea-island strains are. They have very many more bolls on them than the ordinary kind.

The CHAIRMAN. Mr. Woods, why should not this whole subject be taken up under this emergency appropriation that will be made available? Why should not that be done? That wilt is as dangerous to the cotton growers of South Caaolina and Georgia, perhaps, as the cotton-boll weevil is to the cotton growers of Texas. Why should not this whole subject of cotton disease be taken up under that emergency appropriation?

Mr. WOODS. I presume it could be done.

The CHAIRMAN. That would give you more latitude?

Mr. BOWIE. You mean the proposed statute now pending should be broadened?

The CHAIRMAN. Yes. It would treat all sections of the country alike.

Mr. BOWIE. Would the new statute be broad enough to cover it?

Mr. WOODS. We are planning our work in this way, Mr. Chairman—all the cotton work that is to be done in the Southwest region, where the boll weevil problem has been raised, we are leaving to be provided for in the special appropriation. As a matter of fact, we will use the money that we are using there now for the southeastern work. It is not our purpose to transfer our corps of trained experts to this emergency appropriation, but to make use of the force that we have in fighting the pest there, and using the special appropriation for such additional expenses as the emergency has brought up.

Mr. GRAFF. The regular expenses will not be paid out of this special appropriation?

Mr. WOODS. No; there are a lot of problems that are not of an emergency nature. We are working as hard as we can on the selection of better cotton seed. We find that if we can get the cotton growers to select their seed they can about double their production without increasing their acreage. It has been figured out that the United States must produce much of the excess of cotton required by the world's markets. We have not a great deal more acreage that we can profitably devote to cotton, and therefore we must increase the production to the acreage already cultivated.

Mr. BOWIE. We have reached pretty nearly the limit?

Mr. WOODS. Yes; and we have to produce more on the same acreage. What is the most important for the cultivator of cotton is to get a larger output for the same expenditure of time and money, and that can be done by putting better seed into the ground. It is like stock raising. Does it pay best to raise a high-bred steer or a Texas steer for the market?

Mr. BURLESON. I might remark right here that the Texas steer is the best steer in the world. [Laughter.]

The CHAIRMAN. It is the result of good Illinois and Iowa bulls.

Mr. BURLESON. Yes, and some were brought from England. As a a matter of fact, in reference to this cotton disease, it will take two or

three years of selection in order to make a successful wilt-resistant cotton, and this emergency appropriation will lapse on the 1st of July, 1905.

The CHAIRMAN. Yes, and this appropriation would also lapse in the same way.

Mr. GALLOWAY. Our idea has been that we should carry all of our salaried men, our regular men, not on this emergency appropriation, but only extra men, so that we do not want to get our regular men into this service.

The CHAIRMAN. If they were detailed especially to do that work, to which appropriation would you charge that?

Mr. GALLOWAY. To the regular appropriation.

The CHAIRMAN. If they were on the lump-sum roll?

Mr. GALLOWAY. I prefer that we should have them on the regular appropriation, because the emergency appropriation is temporary. We do not want to get men through the civil service for this temporary work. We do not want to get loaded up with a lot of men and then not be able to unload them afterwards.

Mr. WOODS. I might say that while the cotton is the keystone of this work for which we are asking an increased appropriation, there are other problems that have to be considered in connection with the wilt resistance. One is the rotation of cotton with the cowpea. The cowpea also has a disease like the cotton wilt, but we also have a number of resistant cowpeas that will grow in infected soil and these can be rotated with resistant cotton. The Iron cowpea we spoke of before the committee last year was very successful, but it does not produce enough forage or pease per acre, so that we have crossed the Little Iron cowpea with the Wonderful, and we have thereby secured a hybrid which is resistant and which has the yielding power of the Wonderful.

Mr. GALLOWAY. Here is a group of pods [showing a photograph] from a nonresistant pea and here is a pile from the resisting pea.

Mr. BURLESON. Do you know what causes the cotton wilt?

Mr. WOODS. Yes, sir.

Mr. BURLESON. Now, if you will produce a cotton wilt resistant, after the lapse of three or four years will not the original conditions that caused the cotton wilt pass away? Will it not have to have something to feed upon in order to perpetuate itself?

Mr. WOODS. I should think so. But we know that this cotton wilt is the result of a parasite, and we know that this parasite can live in the soil for ten years, and we have found some cases where it is known to have lived twenty years. But if we continue the cultivation of resistant cottons the parasite will finally die out, but it will take a long time.

Mr. HENRY. Is the wilt due to a parasite at the root?

Mr. WOODS. Yes, sir; we have cultures of it.

Mr. SCOTT. Do you know why it is that one variety resists this parasite and another variety does not?

Mr. WOODS. We have studied that question, and it seems to us that it is due to some actual physiological constitution of the plant. To illustrate: We find in a normal plant that there are certain substances called oxidizing ferments or enzymes. They are possibly a chemical means by which the living protoplasm of the plant secures oxygen and breathes like an animal. We find that when this ferment is

too highly developed in the plant it is sensitive to the disease, and where it is not so highly developed the plant is resistant to disease; but we do not know just why this is, though we do know the conditions under which we can increase or decrease that ferment. However, that is such a technical scientific investigation that we do not feel it is proper for us to put very much time on that problem, particularly when we know of a simple and quick method of producing resistant varieties. We have such varieties, though we can not tell fully why they are resistant. But we are working on the problem as time permits.

Mr. GALLOWAY. The manner in which this little thing does its work may be of interest. It is a little fungus parasite. It goes first to the vessels that conduct the water to the leaves and chokes them up, and that is the whole matter.

Mr. WOODS. It fills up the water ducts.

The CHAIRMAN. What have you done to stop that? What has actually taken place?

Mr. WOODS. We have a plant that keeps the fungus out of its tissues. The plant poisons the parasite or resists it.

Mr. BOWIE. It is a case of anti?

Mr. WOODS. A case of antitoxin; yes, sir, something like that.

Mr. SCOTT. Is it a vegetable or animal?

Mr. WOODS. It is a vegetable. It belongs to a group of fungi very widely distributed. In the same region as the cotton and cowpea wilt is a wilt disease of watermelon. Everbody knows that watermelons can not be grown in some sections of the South more than one or two years on the same land, and the watermelon industry is nearly destroyed in some places. The disease is due to a fungus closely related to the one causing cotton wilt. We are trying also to produce a wilt resistant watermelon.

Mr. BURLESON. That would be of deep interest to our colored brethren.

Mr. WOODS. Yes; and it means many million dollars a year to the southeastern part of the United States.

Mr. BOWIE. I do not want the negro to be understood as being the only friend the watermelon has.

Mr. GALLOWAY. There is a problem in here also that may disturb you gentlemen, because it has reference to the seed distribution. The wilt has got into the melon seed out West, and it has been difficult for us to secure enough melon seed for the annual seed distribution.

Mr. WOODS. The melon will go out of existence as a crop in some sections unless we can get resistant varieties.

The CHAIRMAN. What became of the Turkestan melon?

Mr. WOODS. We are using that with others in our breeding work, in order to get resistant qualities. We have some resistant hybrids that are very sweet and very fine melons, and the question now is, Can we fix these strains and make them come true to seed? A portion of this $5,000, namely, $400 of this, is going to be used on the melon work.

The CHAIRMAN. There is no assurance but that the seed disposed to the cotton wilt will not also be subject to other diseases?

Mr. WOODS. No, there is none; but we find that we have wilt-resisting cotton which is also resistant to some other diseases. The wilt disease, however, is the chief one at the present time. We consider

them all in our selections and get the chief thing first, and then work to the finer points later.

The next point on which we would like to have an increase is cranberry diseases. The cranberry industry is a large industry in certain States, namely, New Jersey, Massachusetts, and Wisconsin. The output of cranberries is very great, but many of the bogs have been attacked by a serious disease, known as the "scald." This disease attacks the fruit as it ripens, and rots it. The New Jersey Experiment Station studied the trouble for a long time, and finally appealed to us for help. We sent a man up there, and we believe that we have now discovered the real cause of the disease and the means of controlling it. We want to put several men in the cranberry bogs to carry out on a practical scale the operations which we think will solve the problem. We are spending $600 on that cranberry work this season and want to increase it to $1,100.

The next line of work is on orchard fruit diseases. We have one pathologist and two assistants who are giving their attention to orchard fruits—apples, peaches, pears, etc. At the present time we have three diseases on which we are working particularly, and upon which we want to work with special vigor next year. One of these is the pear blight, which has already wiped the pear out of certain sections of the country, and which also attacks the apple. It is a bacterial disease, which gets into the blossoms and runs down the branches into the limbs and into the trunk of the tree, often killing it. It is known only in this country, and is the cause of great loss. We have found a method by which we can eradicate that disease, but it must be carried on under expert supervision until the orchardist learns just how to do it.

The CHAIRMAN. What is the nature of the operation?

Mr. WOODS. It is cutting out the hold-over blight. The difference between healthy and diseased tissue is only a slight difference in the shade of color, and it takes an expert to pick it out.

The CHAIRMAN. Spraying does not affect it?

Mr. WOODS. No; not at all. We have demonstrated our method on a commercial scale in Georgia and Texas.

Mr. BOWIE. Will it pay for itself, after deducting the expenses of the experts?

Mr. WOODS. Yes. The cost of the operations is not one-tenth of 1 per cent of the value of the crop saved. It is like giving the orchard one more plowing. In our experimental plot in Texas we saved about $10,000 worth of fruit on the pruned part of the orchard, while there was a complete loss of fruit in the untreated plot.

Now, as to peach rot, which is one of the most serious peach diseases in the world, and the bitter rot of the apple, which for two years past has caused the destruction of over $10,000,000 worth of fruit. These diseases can undoubtedly be checked by the proper application of methods already known. We want to send men into the field and determine if this can be done. We ask an increase of $2,000 for this. We are now using $6,800 for this work.

Mr. SCOTT. You speak of the apple blight having caused the loss of $10,000,000 in the last two years?

Mr. WOODS. Yes; the bitter rot has caused that much loss.

Mr. SCOTT. Is that a guess, or have you some means of knowing with accuracy?

Mr. WOODS. That has been figured out by the National Apple Shippers' Association; they get the returns by the apples that go into cold storage. This disease continues to do its work, after the apples are picked and put into the barrel, and I think $10,000,000 is an extremely conservative estimate. Do you not think it is, Mr. Taylor?

Mr. TAYLOR. Yes.

Mr. BOWIE. Who loses that, the farmer or the middleman who handles it?

Mr. WOODS. It is about equally divided. If the merchant goes into the field and buys the apples on the tree before they are ripe, he stands the loss; but the buyers are usually sharp enough now to wait until the apples are shipped, and then it is the farmer who loses.

Mr. TAYLOR. Two years ago—it was in 1900, in fact—in southern Missouri a large buyer invested heavily in orchards; so much for orchards, so much for working, shipping, and storing, on his own risk; and that season he lost something like $30,000, between what his fruit cost him and what he got out of it. Other buyers operating in that same territory, one operating particularly at Leavenworth, Kans., saw the trouble coming, and pulled his buyers out of Missouri, and put them into New Hampshire and Vermont, and supplied his trade in Texas from New Hampshire and Vermont, and that meant fewer buyers in Missouri and that country.

Mr. BOWIE. I understand our duty is just the same towards the merchant as to the farmer. One is as much a citizen as the other.

Mr. WOODS. The next group of problems come under the plant-breeding laboratory, one of the great problems in the plant-breeding work, is the securing of a long staple upland cotton with smooth seed. We have now produced about 40,000 hybrids, and some selections from them are higher in production than ordinary upland cotton, have smooth seed and staple, of very fine quality. I have not asked for an increase in that work, much of it is carried on in North and South Carolina and the present allotment is sufficient.

Mr. SCOTT. Do you need anything in that work?

Mr. WOODS. No; what we now have will be sufficient. It is sufficiently covered by the regular allotment.

Mr. SCOTT. What I want to ask is this: If you have developed this fully already, what do you want with the money that you have had for that heretofore?

Mr. WOODS. We must "fix" the hybrids we have secured, propagate them, and put them into the hands of the farmers.

Mr. BOWIE. It will take another year to do that?

Mr. WOODS. Yes; we may have to carry it along several years in order to be absolutely sure we have got our strain fixed, so that it will not go back to original types. We do not want to turn the seed into the hands of the farmers until we have proved fully that this is accomplished If a variety should fail to come true to seed it would cause great loss to the grower.

The CHAIRMAN. That is the period when you think it would be sufficient.

Mr. WOODS. Yes, sir; we will distribute some for testing experimentally this year.

Mr. LEVER. How long have you been experimenting on that?

Mr. WOODS. About four or five years; and we will not need any increase, and it will not be necessary to use what we are now spending if we could transfer the work to special cotton investigation.

The CHAIRMAN. How much are you spending on that?

Mr. WOODS. We are spending on fixing our new varieties and other cotton-breeding work, $8,500.

The CHAIRMAN. You think that work is about finished?

Mr. WOODS. Certain phases of it. It means a great deal to the cotton industry.

The CHAIRMAN. Do you think that it is about finished? You would not use the whole of that $8,000 from now on?

Mr. WOODS. No, sir; it would be diverted to other purposes.

The CHAIRMAN. Could not some of it be used for some of these increases you ask for? For instance, could not $4,000 be taken for resistance to the cotton wilt?

Mr. WOODS. No; not without detriment to the work that is still to be done.

The CHAIRMAN. Could not $2,000 be taken for the orchards?

Mr. WOODS. No; I could not reduce the amount we are spending on this cotton-breeding work without endangering the results already obtained.

The CHAIRMAN. But you say it is pretty nearly finished, although you are not sure whether it will last. You can not do much work now until it is proven that it will last.

Mr. WOODS. If I said it was actually finished, I misspoke. I said we have procured the hybrids with the right qualities, but they must be tested for two or three years in order to determine whether they are fixed strains or not; that is, whether they will retain the quality they now have.

The CHAIRMAN. Time alone will prove whether you have succeeded, will it not? You have done all the work that can practically be done, and time alone will prove whether you are right or not.

Mr. WOODS. Our work will be lost unless we can follow it up and produce seed that can be put into the hands of the farmers commercially.

The CHAIRMAN. You do not propose to raise the seed for the farmer?

Mr. WOODS. Oh, no; as soon as we produce a seed that we are sure is going to retain its good quality, the cotton men themselves will grow the seed in sufficient quantities to meet the demand.

The CHAIRMAN. Are they growing it at all now?

Mr. WOODS. No; we do not recommend to them to grow it, because, as I say, it may not be fixed, that is, retain the good qualities now combined in it by hybridization.

Mr. BOWIE. You have not put any other seed on the market?

Mr. WOODS. No. We are ourselves growing enough to make considerable tests this next season.

Mr. BURLESON. Where?

Mr. WOODS. In South Carolina and throughout the cotton belt.

Mr. BOWIE. On rented farms, or how?

Mr. WOODS. We do it by renting an acre of land, or ageeing with the farmer to put the cotton in under our directions and cultivate it under our directions, and we pay for the actual cost of the work.

Mr. BOWIE. You get the rent for a nominal sum in those experiments?

Mr. WOODS. Yes, sir.

The CHAIRMAN. Who takes the cotton?

Mr. WOODS. In some cases we draw a contract which provides that we furnish seed and the grower furnishes everything else, and if a good crop of cotton is produced that pays for the work. In cases

where there is doubt about the value of our seed and we do not expect to get any cotton we rent land and hire the work done and retain the crop if there is any. We reduce the expenses of the experiments by the value of the cotton produced whenever the experiment will permit of such a contract.

Mr. BURLESON. How many of these seeds have you grown last year?

Mr. WOODS. Of this particular variety?

Mr. BURLESON. Yes; the one you spoke of.

Mr. WOODS. We have tested it in about a dozen different sections of the country.

Mr. BURLESON. Have you had any difficulty in getting desirable land for experimental purposes on reasonable terms?

Mr. WOODS. No, sir; but when the experiment interferes with the regular farming operations, the farmer hates to break in on his operations and do our work for us, and they very often refuse to do it. Occasionally we have to pay them a higher price for the work than we would if it was a regular farming operation.

Mr. LEVER. That long-staple cotton gets a much higher price than the ordinary cotton?

Mr. WOODS. Yes, sir.

Mr. BOWIE. What is the average produced? Is it more on the average than the short staple?

Mr. WOODS. Oh, yes. It has a high yield and is of superior value.

Mr. BOWIE. Does it cost more to raise it?

Mr. WOODS. It does not cost any more to raise it; no, sir.

Mr. BOWIE. It is simply that there is not enough of land for it?

Mr. WOODS. No; the ordinary upland is a short staple cotton; there is no attempt by growers generally to select seed either for yielding power or quality in the case of upland cotton. There is very careful selection, however, practiced by the sea-island cotton growers.

Mr. BOWIE. Can the South produce elsewhere a long staple?

Mr. WOODS. We can produce a staple a quarter of an inch longer than the average upland cotton.

Mr. BOWIE. Has this Department ever had its attention called to the result of the big boll seed grown in Tallapoosa County, Ala.?

Mr. WOODS. Yes, sir.

Mr. BOWIE. What is your opinion about that?

Mr. WOODS. It is very good. But in some places they won't use it at all. They can not gin it easily on a roller gin.

Mr. BOWIE. That is owing to the construction of the gin?

Mr. WOODS. Yes, sir.

Mr. BOWIE. They claimed to raise 40 bales of that cotton on 14 acres of ground in one year, and that was three or four years ago. I do not know whether it is true or not, but they certainly did raise a crop all right.

Mr. WOODS. They have a fuzzy seed, which makes it difficult to gin on a roller gin. One of our objects is to breed out that fuzziness on the seed. We have accomplished this, but it may be that these new strains will revert in a few years and produce the fuzzy seed again.

Mr. GRAFF. Have you had any investigation in the line of seed corn, either as to the contents or the development of an ear of corn, properly shaped, etc., so as to contain a desirable number of grains on the ear, and so on?

Mr. WOODS. Yes, sir; I have that noted to present; and if you do not care to have it discussed now, I would prefer to discuss it later.

The next item is an increase of $400 in connection with the hardy orange. We are spending $1,558 on the hardy orange work. I will pass around some photographs of what we have thus far secured in this work. The small orange in the center [referring to the photograph] was the original with which we started. We are trying to get an orange that will grow throughout Florida and be a resistant to frost, and we have succeeded in getting hybrids which are extremely resistant. The particular hybrid we are working with now is resistant as far north as Washington, D. C. This generation of oranges has produced a lot of seed, and from these we expect to get the variety that will give us a resistant Florida sweet orange with all the good qualities of the latter.

Mr. SCOTT. What is the difference between an orange and a lemon in the beginning? Are they of a different family?

Mr. WOODS. They belong to the same genus, but are of a different species——

Mr. GRAFF. You [addressing Mr. Scott] would be a good man to send out to buy oranges.

Mr. WOODS. You can cross any of the citrus species and produce intermediate forms. This [indicating on the photograph] is an intermediate form. The increased appropriation we ask for this item is $400, and we need that because it requires a considerable amount of work to test these new varieties and propagate them.

The CHAIRMAN. Is all this growing done under natural conditions?

Mr. WOODS. Yes, sir.

The CHAIRMAN. Not conditions that would not apply to the average farmer?

Mr. WOODS. No; we germinate the hybrid seeds and start them in the greenhouse, and then send them to the South to our subtropical garden.

The CHAIRMAN. It is practical work?

Mr. GALLOWAY. Our seedlings are distributed and tested. Sometimes our hybrids, when not valuable for fruit, are valuable for hedges. The fruit will be valuable all over the South as a marmalade fruit. It will be planted in every back yard. It could not be produced in any other way, and while it may not be valuable to put it in commercial orchards, it will be a valuable home fruit.

Mr. BOWIE. It will have the hardiness necessary to withstand the cold?

Mr. WOODS. Yes, sir; it is important to the Florida people to grow an orange in competition with Porto Rican and other new orange districts. There is no doubt we can produce an orange that will grow there, and be as good as their present orange and withstand the frost.

The CHAIRMAN. I am not sure but that the cotton-boll weevil and other things of that character are rather gifts of God, in this, that they have compelled these people to pick up other things, and not cultivate the same one crop. Perhaps [laughing] you ought not to stop the cotton-boll weevil.

Mr. GALLOWAY. Dr. Herbert J. Webber, of the Bureau, in charge of this work of citrus fruits, has produced what he calls a tangelo, a hybrid fruit obtained from crossing the tangerine, or "kid-glove" orange, with the pomelo, or grape fruit. The grape fruit has some objectionable points; you have to eat it with a spoon. But this hybrid is a combination that has not that objection, and it is delicious in flavor.

Then he has produced another cross which he calls a tangerine orange. It has resulted in putting more sweetness into the tangerine, and making it two weeks earlier in Florida than before, and it gives an orange larger in size and having more spiciness in it than the ordinary tangerine.

Mr. GRAFF. Is a pomelo and the grape fruit the same thing?

Mr. GALLOWAY. Yes, sir.

Mr. WOODS. The new tangerine, or "kid-glove" grape fruit, is the best thing of the kind ever produced. It is about the size of an ordinary orange.

Mr. BOWIE. The tangerine needs to be larger than it is?

Mr. WOODS. Yes, sir. Our tangerine orange hybrid is much larger. I am not including a lot of things here, for it will take really a day to go over them all.

The CHAIRMAN. We want to hear chiefly about your increases.

Mr. WOODS. The next increase is in regard to Indian corn improvement. We ask an increase of $500, making the appropriation $4,559. Now the importance of that industry——

Mr. BOWIE. Can you not leave off the nine?

Mr. WOODS. I have simply given the actual figures here.

Mr. GRAFF. You had better make it $9,000.

Mr. WOODS. It should be very much larger; but if we can get even an increase of $500 it will help us to carry on our work.

The CHAIRMAN. What are you doing along that line? I thought corn was one of the things that was about finished.

Mr. GRAFF. No; that is just in its infancy.

Mr. WOODS. We are just starting in on corn. The corn industry of the United States, of course, has developed wonderfully and the average yield per acre has increased. We have not begun to produce per acre what it is possible to produce by carefully selected seed. The fact is, corn is susceptible to vast improvements; in the question of production alone, by simple seed selection, in a very high degree. This has been shown by the work of the Illinois experiment station and other stations. The food value of the corn can be greatly increased. The protein content and oil content, and the shape, size, and distribution of the kernels on the cob can be increased.

Mr. BURLESON. Diminishing the size of the cob and increasing the size of the kernel?

Mr. WOODS. Yes, sir; and filling out both ends and increasing the number of good ears per stalk can be accomplished by selection of seed; so that the possibilities in that direction are very great.

Mr. GRAFF. I was surprised to see in a recent publication—in the last Year Book—by C. P. Hartly, in the Department, that the average yield of corn per acre was a good deal less in corn States than it was in the New England States; and that undoubtedly must be due partly to fertilization and more thorough cultivation in small areas, though it is also due to lack of attention to the seed, and must be due to some extent to the large amount of nonproductive stalks. I noticed also in an article which I saw, written by A. D. Shammel, in the report of the transactions of the State board of agriculture, that a count had been made for the State of Illinois by a number of young men who were farmers, scattered over the State, and the result showed that about 30 per cent of the stalks were nonproductive. That is very startling, and if these conditions are true it seems to me that is a very important thing to look into and to spend a little money on it.

Mr. LAMB. A farmer in my district makes 90 bushels on the acre. He made that on his whole farm, and his farm is 9 acres. [Smiling.]

Mr. SCOTT. He calls that a farm? [Laughter.]

Mr. WOODS. Our special problem is to increase the yield, not by any one particular method alone, but principally by giving the farmer seed selected for higher productiveness, for by that process alone we can very greatly increase the yield.

The CHAIRMAN. The trouble is that when you teach them they would forget it the next year.

Mr. GRAFF. I had always supposed that the greatest difference in the yield in Illinois and in other States was due principally to the difference in the soil, but the investigations made at the Illinois agricultural experiment station and also in Kansas go to show that the difference is largely due to difference in cultivation and to difference in seed.

Mr. GALLOWAY. I could add right here, in answer to your remark, that at the recent meeting in St. Louis this question was brought up, and they had an actual record of the distribution of 25,000 bushels of selected corn, and the record shows that, other things being equal, it averaged about 8 bushels per acre in favor of the selected corn.

The CHAIRMAN. There is no doubt about that. The selected seed is a sine qua non with reference to good corn.

Mr. GRAFF. In reference to the seed corn, I would like to have Mr. Woods make a statement as to the result of investigations as to the methods of drying corn for seed, first by the ordinary method of exposing it to the weather, and then by artificial means. Of course the usual method for the farmer in any of the corn States is to go to his crib and pick out the best looking ears.

Mr. HENRY. We do not do that in New England. It is selected when the corn is husked. Is it not true that corn adapts itself very quickly to its environment and localities, much more so than any other product? That has been my experience; and to show it is adaptable even in our State I can say we have upland regions in the Connecticut Valley, and at the Chicago Exposition in 1893 exhibits were made by the Connecticut Experimental Station, and the director solicited samples of corn, and we exhibited in Chicago 75 types of corn grown in the little State of Connecticut alone.

Mr. WOODS. It is true that corn does vary under the influences of environment. Types of corn can be grown that will fit the extreme northern and the extreme southern limits of our country. Corn indeed offers a wonderful field for work of this kind.

Mr. BOWIE. I wish to ask another question for information. You say [addressing Mr. Graff] that the product per acre is less in the corn States than in the New England States?

Mr. GRAFF. Yes.

Mr. WOODS. That depends upon the improvement of the soil conditions and keeping down the parasites.

Mr. BOWIE. Has it been the tendency in the West and South not to diversify?

Mr. WOODS. Yes, sir; there has been considerable concentration on corn in some sections. They are suffering from the evils of not diversifying.

Mr. BOWIE. That has something to do with the reduction of the ear.

Mr. WOODS. In many cases.

Mr. GRAFF. The habit in the West, however, at least with us in Illinois, is to vary the crop with clover and small grain. I would like to have Mr. Woods answer the question I propounded a little while ago as to drying corn.

Mr. WOODS. Kiln-drying corn, drying by artificial heat, does have a great influence on the producing power.

Mr. BOWIE. For the better?

Mr. WOODS. It very greatly increases the production, and apparently increases the vitality of the seed. Our experiments show that, and a number of the experiment stations have also demonstrated it, the Illinois station especially. The results all show that artificially dried corn for seed is very much superior. That one thing alone will increase the production.

The CHAIRMAN. You mean subjected to heat?

Mr. WOODS. Kiln-dried. Just enough heat to cause a movement of air through the grain, as it is stored in the crib.

Mr. HAUGEN. That would be very expensive, would it not? How is this artificial curing done?

Mr. WOODS. It is done in several ways. Some seedsmen go to a considerable expense. They pile the ears in so as to leave a considerable space between the ears, and a current of warm air is run through them.

Mr. HAUGEN. How long would that have to be kept up?

Mr. WOODS. Probably a week or ten days.

The CHAIRMAN. Now, is that any better, really, than corn simply dried up in the garret?

Mr. WOODS. It produces much better when it is dried that way. If you had enough garret room to dry the corn in it would be all right. It is a little slower that way and not quite as certain.

The CHAIRMAN. But you have all winter to do it in.

Mr. WOODS. The slow drying is not as good as the more rapid.

Mr. SCOTT. I have seen a statement that seed corn was injured by being frozen.

Mr. WOODS. Yes; but after it is dried it will not freeze.

Mr. SCOTT. You say it would not be injured?

Mr. WOODS. No; it would not freeze unless the cold were unusually severe.

Mr. SCOTT. How much increase are you asking for this work?

Mr. WOODS. Five hundred dollars.

Mr. SCOTT. Do I understand that you are able to distribute 25,000 bushels of seed this year?

Mr. GALLOWAY. We did not distribute that, Mr. Scott. Those figures were given by a distributing agency. We do not distribute any corn seed at all.

Mr. SCOTT. It was your statement that you had distributed 25,000 bushels of seed. I thought if you had worked the matter up with the appropriation you have to that degree that probably you would not need the $500.

Mr. WOODS. We need perhaps $200 or $300 to grow the selections and carry on the operations at the Arlington Experimental Farm and other places. But most of the money is used in sending assistants into the corn sections, and picking out progressive growers and taking sections of their farms and showing the difference in production between the selected seed and the ordinary seed.

Mr. SCOTT. How much did you expend on that work last year?

Mr. WOODS. A little over $4,000.

Mr. BROOKS. You say you were conducting such an experiment in regard to the adaptability of corn to cold and warm countries, and yet you are distributing no seed. For instance, are you doing anything with reference to species of corn that will grow in semiarid regions and in high altitudes?

Mr. WOODS. We have not distributed any seed yet, but we are sending out bulletins and information on methods of selection and cultivation.

Mr. BROOKS. The reason I ask is, that some little attention in my section is being paid to corn that will grow in high altitudes.

Mr. GALLOWAY. Yes; we are pushing it north and south. We are trying to extend production at both ends.

Mr. WOODS. There is no necessity for us in this work to do more than to cooperate with the experiment stations and the growers.

Mr. GALLOWAY. We had 10 acres in Ohio, and the average corn yielded 80 bushels, while the selected corn was 93 bushels to the acre.

The CHAIRMAN. You ask for $500. How do you arrive at that?

Mr. GALLOWAY. This is the way that is usually done: We make the estimates, and then the Secretary trims the figures, and after he gets through with the figures we take the estimates that the Secretary allows and go over all these problems and decide on which we had better expend a little money and which we had better leave alone. That is the way it comes in odd figures sometimes. We make up a general estimate, and then the Secretary, in consultation with his officers, prunes them down.

Mr. WOODS. The intention here is simply to keep this work on its feet, that is all. My estimate, the amount that I thought we would need, was $8,000, which would be $4,000 increase for this work. But after talking the matter over with Mr. Galloway and the Secretary we decided it would be too big a request, and we cut it down.

Mr. GALLOWAY. We could take, for instance, the increase in the appropriation of $35,000, and in five minutes' time we should dispose of that by saying we needed $5,000 for one thing or $10,000 for another thing and thus dispose of it; but that would not be the detailed way of dealing with the committee. We give you the details of what we want.

The CHAIRMAN. That is all right.

Mr. HAUGEN. Which method do you consider the best of treating the seed corn —outside or artificial heat? Or have you thought of that or had any experiments carried on in that line?

Mr. WOODS. We consider any method of storing that allows good ventilation, without carrying with it too much outside moisture, is the best method of storage.

Mr. BOWIE. How can you prevent the carrying in of outside moisture by having the roof hanging over a little distance?

Mr. WOODS. In some cases they use double walls, so that the air would come from the outside and circulate through the corn and keep rain and snow out.

Mr. SPILLMAN. It is only necessary to keep it in a room where the temperature is moderately even, and it can be done by covering the floors with sawdust to absorb the excessive moisture. The corn itself absorbs very little moisture from the air, unless it be an unusually wet season. On the Pacific coast it is necessary to protect against moisture

in the winter time, because the air is wet all winter. It will rot. But in an average climate no attention need be paid to that.

Mr. HAUGEN. But how do you dry it?

Mr. SPILLMAN. The best way is to kiln-dry it.

The CHAIRMAN. That could only be done in a wholesale way.

Mr. HAUGEN. It would not be practicable to an average farmer.

Mr. SPILLMAN. No; but the farmers are interested in it. At St. Louis the other day the farmers came down to find out how to do things of that kind, and they are going into it on a great scale, and it means a large increase of production, and we are encouraging them in doing that thing on a commercial scale.

Mr. WOODS. The farmers themselves are drying and growing their own seed in many cases, especially in Illinois.

Mr. GRAFF. At present they charge about $2.50 a bushel.

Mr. WOODS. Yes, sir.

Mr. GRAFF. Now, the Seed Growers' Association was organized by this man Shammel after he had been working for the Illinois Experiment Station, and they have discovered that there was a great deal of fraud in the sale of seed corn. A man in Chicago said that he had discovered a superior kind of corn that would produce greatly, and he sold it at a big price. He sent it out shelled, and it did not produce even as much as the ordinary corn did which the farmers already had, and so, in order to meet frauds of that kind, the organization passed a resolution that all seed corn should be sold on the ear, unless especially requested otherwise by the farmer himself. This enabled the farmer to see for himself without deception. The ear is a vital question, and also the shape of the seed. If a man desires, he could also examine the contents of the corn, which could be done to some extent by the naked eye.

Mr. HAUGEN. But most of the farmers save their seed?

Mr. GRAFF. Yes; but the result has been the deterioration of the seed, growing out of the fact that the pollen on a barren stalk of corn is more prolific than the pollen on the healthy stock or fruitful stock, and if the barren pollen falls on the fruitful ear or on a generally healthy stock, it produces poor results and the result is a deterioration of the seed corn.

Mr. WOODS. In the Southwest we are carrying on a line of work to secure alkali-resistant crops. By selection we get a strain of a crop that will stand considerable alkali in the soil. We are spending a little over $4,000 on that work and we ask for an increase of $500, and that is barely enough to keep that work going on until we can get enough to develop it properly.

The CHAIRMAN. There are other efforts being made in another Bureau to eliminate the alkali entirely.

Mr. WOODS. Yes; but after every foot of land is drained that can be drained—the largest areas can not be drained at all—the crops that must be grown there must be sufficiently alkali resistant to permit profitable production.

Mr. BOWIE. Do you think they can grow crops on land having such a large percentage of alkali as in that semidesert region?

Mr. WOODS. The largest proportion of alkali is in the extreme southern portions of California, where there is as high as 4 or 5 per cent of alkali. We are now introducing the date palm in that soil, and it is making a fine growth. The date palm grows in the Sahara desert,

where there is 5 per cent of alkali. We also found alfalfa growing in the Sahara desert in the same sort of soil. We are selecting these crops and breeding up our native crops to greater resistance.

Mr. SCOTT. Why do you say it will require an increased appropriation to keep this work going on? Why can not you go on with the same money you have?

Mr. WOODS. We can, but we can not do anything more than to keep it going.

The CHAIRMAN. There must be some portions of that work at least complete; some problems solved. The statement that it can not live without increasing the appropriation is what strikes the committee as queer.

Mr. WOODS. I did not intend to make that statement in that sense.

The CHAIRMAN. You say to keep it alive. It is the same thing.

Mr. SCOTT. That implies that unless you get the appropriation the work will stop. My idea is this, that if you keep it going on, why can you not keep it going on at some considerable speed?

Mr. WOODS. Yes; it does not seem to me desirable to go at a slow speed, the slow speed we are going. It is not profitable, because the man who is doing that work can do three times as much work as he is now doing if he had more money to do it with.

Mr. SCOTT. We sympathize with you in your enthusiasm.

Mr. BOWIE. What is the increase, Mr. Woods; I did not understand?

Mr. WOODS. Five hundred dollars.

The CHAIRMAN. Is not this sort of work naturally slow? You can not go beyond a certain speed in these researches—you must feel your way along?

Mr. WOODS. Yes; but at the same time you can accomplish a great deal in a very short time. In this alkali resistant work we could accomplish in five years what it would probably take ten or fifteen years to do with a smaller amount of money, because we aim to increase the number of places to make the selections from.

Mr. BOWIE. Is it true that at the beginning of your experiments you can not go as fast as you can afterwards, after you are a little further along and find out more about it? Is not that true?

Mr. WOODS. Yes, sir. We usually start in on work of this kind with an expenditure of $200 or $300 as a side proposition. A man makes a few examinations, probably costing practically nothing. The next year we find that there is really something in that, and that there is enough in it to warrant our putting a man on it, and then it develops, and that is the way these lines of work grow. And after two or three years of such study as this alkali problem we see how we can profitably increase that work to very much larger proportions and get quicker results.

Mr. BOWIE. It is true you will reach your limit some time or other?

Mr. WOODS. Yes; and finish the problem, as we have done in an innumerable number of cases. I have not discussed the finished problems.

Mr. BOWIE. It must be interesting to know what becomes of the appropriations granted for finished problems.

Mr. WOODS. It would go to other problems. If we finish the alkali problem, we might apply the money to the corn problem.

Mr. HAUGEN. What problem has been finished in the last year and dropped from the appropriation?

Mr. WOODS. One of the most important problems that we have finished is the Sea Island cotton. That has been practically completed; and some of the other problems I will speak of a little later on. The macaroni-wheat problem has about been finished.

Mr. WRIGHT. You think there is no question about your getting corn and other products that are resistant to the alkali?

Mr. WOODS. We will get resistant corn and alfalfa.

Mr. WRIGHT. Would it not be less expensive to get this alkali resistance than to eliminate the alkali from the soil?

Mr. WOODS. In some cases it would, but in some cases it would not.

The CHAIRMAN. Where the drainage was feasible and practicable it would be probably the easiest way.

Mr. GALLOWAY. The question of drainage would necessarily put a limitation upon the kind of crops you could grow.

Mr. BROOKS. The drainage would limit the crops to certain kinds that can be grown on drained land. Some areas that are not feasible to drain might be treated this way?

Mr. WOODS. Yes, sir; there is one thing you will hear about next year. That is oat-breeding work. We believe that we can now breed oats resistant to smut, which causes a very large loss every year, and we are making a few scientific tests that practically cost us nothing. If the tests prove successful, very likely we will come here next year and ask you for several thousand dollars for this work.

The CHAIRMAN. You must then finish up something in the meantime. We will hold you to that.

Mr. SCOTT. For our encouragement, I think before you leave the committee you ought to submit a list of finished problems.

Mr. WOODS. In the past?

Mr. SCOTT. Yes, sir.

Mr. BOWIE. A little speech on that subject would be very interesting.

Mr. WOODS. I think we can give you a speech on that subject. The tobacco-breeding work is the next item I wish to present. Last year we did practically nothing on this subject, but this year we found out that the tobacco industry of Connecticut, and wherever they used the tent method of growing tobacco, is threatened by the difficulty of not being able to produce a constant or fixed type of leaf. The types of leaf tobacco are extremely variable as you will observe from these photographs [showing photographs]. The Sumatra-grown tobacco, grown under the tent, can not be used on account of the variability of the leaf. But it is found that it is possible by methods of selection of seed to fix the strain of tobacco which is being grown, and to throw out the variables.

The CHAIRMAN. Those people ought to be experts enough in tobacco raising to drop into that.

Mr. WOODS. They do drop into it very easily. We simply have to demonstrate that what we say is so. We think that with an expenditure of $1,500 for next year, within two years we can demonstrate the fixity of these types of tobacco.

The CHAIRMAN. You will not do that here in Washington?

Mr. WOODS. No, we send a man right up there.

Mr. GALLOWAY. When that work was inaugurated there there was very little knowledge of the variability of these types, and there is little knowledge as to whether these types vary in Sumatra. When we get

them here they are always uniform, and that is why they bring such a high price. When the Connecticut people began to do this work they went into it, of course, in a thoroughly commercial way. But this variability came in, and they have a large quantity of tobacco on their hands that can not be sold at a good price on account of the variations of the leaves. Now, if they could develop the Sumatra tobacco so that they could get 80 per cent of this type, they could compete directly with the Sumatra tobacco product.

Mr. HAUGEN. Is not that the fact with all tobacco that has to be started?

Mr. GALLOWAY. If this tobacco brings $2.50 a pound and you could bring 80 per cent of it up to the uniform type, it would be a valuable thing. I think that in Sumatra they send only the selected leaf. Now they have gone also into the growing of the Cuban leaf up in those States, and we are sending a man now to Cuba to select types of leaves so that we can get that thing started too. The man will go in a short time.

Mr. WOODS. That problem exists not only for the tent-grown tobacco but also in the field-grown tobacco.

Mr. GALLOWAY. This same problem will also come up with the Texas tobacco.

Mr. WOODS. Our study of tobacco-seed selection as now practised shows that even the best growers do not select from individual plants, but from a mixed lot including many variables. Seeds thus selected do not produce plants with a fixed type of leaf. Our method consists in taking the individual plants and finding out which are fixed, and then selecting the seeds from those, and throw out the variables.

The CHAIRMAN. We have not succeeded in the case of animals in getting an absolutely fixed type; they always vary a little.

Mr. WOODS. Yes; but these are now exceedingly variable. There is no trueness at all here, as seed is now selected.

The CHAIRMAN. That happens, too, in very valuable breeds?

Mr. WOODS. Yes; but within very narrow limits.

Mr. GALLOWAY. We keep the different progeny of different seeds separate and distinct, as you do in the case of breeding animals.

Mr. GRAFF. It is the wide leaf, used for the wrapper?

Mr. WOODS. Yes, sir.

Mr. GRAFF. That is the reason they use the wide leaf, so that it will cover a larger surface?

Mr. WOODS. Yes, sir; more and better wrappers can be cut from a wide leaf.

Mr. HAUGEN. Is not the variation largely due to the soil and to cultivation?

Mr. GALLOWAY. Not necessarily. We get all sorts of leaves in the same locality.

Mr. SCOTT. Is the quality of the narrow leaf the same as that of the broad leaf?

Mr. GALLOWAY. It may be, but the idea is to get broad leaves to cover a sufficient number of cigars.

Mr. WOODS. The next item in which I have asked an increase is the work on hardy winter wheat. Macaroni wheat work I will discuss a little later on.

The CHAIRMAN. That is beyond the experimental stage?

Mr. WOODS. Yes, sir; entirely. Here is some of the manufactured

product, manufactured macaroni from American-grown wheat. The industry is practically established in the country west of the one hundredth meridian, and the only problem we are engaged in on macaroni wheat work is in the selection and fixing of the types of these wheats adapted to the northern and southern and central sections.

Mr. GRAFF. Are they raising it to any extent in South Dakota?

Mr. WOODS. Yes, sir.

Mr. HAUGEN. With what success?

Mr. GRAFF. I happen to be interested in that State myself, in the southeastern part of it.

Mr. WOODS. No; we are not working in the southeastern part. That is in the soft-wheat belt.

Mr. GRAFF. Will it not grow fairly well there?

Mr. WOODS. It has a softer kernel, and it is not a true macaroni type.

Mr. GRAFF. Who are the buyers of this in the Mississippi River States?

Mr. WOODS. The millers buy it and ship it to the macaroni manufacturers, and many of the bakers are using macaroni-wheat flour to blend with the soft-wheat flour.

Mr. GRAFF. The millers have to change their machinery to some extent to handle it, do they not?

Mr. WOODS. Not necessarily; no. It will be ground in the same mills with the softer wheat, but they do not like to grind it.

Mr. HAUGEN. I was told by a North Dakota farmer that a great deal was grown last year and that none this year would be planted. It was selling at 25 cents a bushel less than the ordinary wheat.

Mr. WOODS. It will be important to grow it in the places where the other wheat will not grow—in the dry area.

Mr. HAUGEN. This man was farming about 200 miles west of Fargo.

Mr. WOODS. He is in the macaroni-wheat belt, and he can not grow any other wheat there that will compare with macaroni. The difference in the price is about 20 cents.

Mr. GALLOWAY. Three years ago, when the first wheat was raised—75,000 bushels—nothing was heard about it. Then the next year, with 2,000,000 bushels, the millers objected to it, and now when 10,000,000 bushels have been raised they object very much to it.

The CHAIRMAN. Why?

Mr. GALLOWAY. They do not want to have the flour made from certain wheats disturbed. The bakers, however, want it. They can get more out of a barrel of it than out of the ordinary flour. They can get more bread out of it. The baker has been pulling at the miller to get it at a less rate, and the miller has been pushing the farmer to get it from him at a less rate than the other wheat. They cut it 20 cents a bushel. But through our Department of Commerce and through our foreign consuls there is a demand developing. Mr. Robert P. Skinner, our consul-general at Marseille, France, has been very active in selling large quantities of it for use in the production of macaroni in France. The trouble with that, however, is that the flour is sent abroad, and they make it into macaroni, and then send the finished macaroni here.

Mr. GRAFF. How does it compare in productiveness with the other wheat?

Mr. GALLOWAY. It produces about twenty bushels to the acre.

Mr. GRAFF. Then it would not be profitable in regions where they could raise the ordinary wheat?

Mr. GALLOWAY. It produces the wheat all right, but in the soft-wheat belt it does not produce the real macaroni wheat. It comes near to being ordinary wheat when grown in wet or moist sections, and we do not recommend its use in the wet sections because it would interfere with the ordinary soft wheat.

Mr. GRAFF. Suppose a rainfall of 16 inches—that is, the annual rainfall of Kingsbury County, South Dak.—how would it do there?

Mr. WOODS. It would do all right.

Mr. GRAFF. Is that a small rainfall?

Mr. WOODS. If it is properly distributed it would grow all right.

The CHAIRMAN. You mean if the precipitation is distributed properly?

Mr. WOODS. Yes, sir.

Mr. SCOTT. Do they sow this seed in the fall?

Mr. WOODS. Usually in the spring.

Mr. SPILLMAN. They sow it in the State of Washington, in central Washington, in the spring.

Mr. GRAFF. This is raised as far south as the Dakotas?

Mr. WOODS. We have a dozen or fifteen different types of macaroni wheat. Some types do well in the North, and others in the central portions of the country, and others in the South. What we are doing on macaroni wheat this year is simply to study and fix the different types, and we will probably stop that work within a year or so.

Mr. HENRY. Does the macaroni wheat find a market?

The CHAIRMAN. He has just gone through with that.

Mr. GALLOWAY. We sent out, not long ago, bread as samples all over the country—bread made from macaroni wheat—and we had some controversy with the Northwestern Millers' Association about it.

Mr. WOODS. The bread was very good and was sent to experts connected with the Minneapolis Millers' Association, and they pronounced the macaroni wheat bread to be the spring wheat bread of extra fine quality.

Mr. GRAFF. Is it not true that the spring wheat is really moving north?

Mr. WOODS. Well, yes. Spring wheat is pretty well confined to the northern section. We are trying to force the winter-sown wheats north now, because the winter wheats are better yielders and the millers want more winter wheat, so that we are spending this year on hardy winter wheat which we have introduced from Russia about $2,000, and we want to concentrate the work on these hardy winter wheats this next year; and besides the money that we have, we want to spend about $2,000 in addition in increasing the northern and western range of winter wheat.

Mr. GRAFF. They grow no winter wheat in the Dakotas, do they?

Mr. WOODS. Yes, we have winter wheat which will grow in South Dakota and possibly North Dakota and in Minnesota, perhaps a hundred miles west and north of the present winter-wheat belt; and if we can introduce these three varieties which we have been testing, and which have proved hardy, in that area, it will greatly increase the output of winter wheat.

Mr. GRAFF. I talked with one of the prominent officials of the Northern Pacific Railroad, I think the general superintendent, and he stated that the growth of spring wheat was lessening in the Northwest and the cultivation and growing of it was going north rapidly toward Canada; and it struck me that it was a very important fact, because he had charge of the wheat business of the road, and knew what the

figures were as to wheat especially, and he said it was passing away from the States like Minnesota.

The CHAIRMAN (at 12.35 p. m.). Gentlemen, we will now take a recess until 2 o'clock this afternoon.

AFTERNOON SESSION.

The committee reconvened at 2 o'clock p. m., Hon. James W. Wadsworth in the chair.

## STATEMENT OF MR. A. F. WOODS—Continued.

The CHAIRMAN. Now, Mr. Woods, if you will take up your narrative where you left off, we will be glad to hear you.

Mr. WOODS. In order to get through with this I am going to bunch some problems——

The CHAIRMAN. I think the committee are willing to hear all you have to say. While you might be as expeditious as you can, still do not cut off any interesting matter for the sake of saving time.

Mr. WOODS. I have discussed several phases of the cereal work. There are several others, including the experiments with proso and emmer, which are two grains used more for stock foods and adapted to the dry land of the West. We are trying to get as many crops as we can find adapted to that dry land, for three-fourths of that land will never be irrigated (that much of it can never be irrigated), and so we have to have crops that are adapted to that land. It is good agricultural land, and fine grazing land. Besides the grazing operations, there must be stock feed produced there in order to make stock growing profitable. Proso and emmer are two of the most valuable stock foods and they will grow, like wheat, with about ten inches of water.

Mr. BROOKS. Are they suitable for food?

Mr. WOODS. Yes; proso and emmer are both used in Russia as human foods; they are said to make very nutritious bread.

Mr. SCOTT. What grains that we are familiar with do they most resemble?

Mr. WOODS. Emmer is very much like rice and proso looks like oats.

The CHAIRMAN. Are they grains that require considerable skill to grow?

Mr. WOODS. No; they require no more skill than is required to grow wheat or oats.

Mr. STILLMAN. Emmer looks so much like wheat that you would hardly notice the difference.

Mr. BROOKS. Are you doing that in connection with the experiment stations in the arid regions?

Mr. WOODS. Yes; all of this work on cereals is being conducted in connection with the experiment stations.

Mr. BROOKS. I ask you that because I have been over our experiment station pretty carefully with that end in view, and I have not seen anything of that sort.

Mr. WOODS. What experiment station is that?

Mr. BROOKS. The one in Colorado.

Mr. WOODS. No; the experiment station in Colorado is not cooperating with us on this cereal work. They are cooperating with us on sugar beets.

Mr. BROOKS. Is there any reluctance on their part to take this up?

Mr. WOODS. We have corresponded with them about this work, but they have not been able to do anything for us up to the present time. I think very likely that they will undertake it some time in the future, but they have not done so up to this time. I have spoken of proso and emmer. There is the improvement of spring grains in the Northwest. We are introducing a lot of spring wheat and oats and barley and so forth, that are adapted to the Northwest. Some of them are proving very valuable, and we want some additional money for them.

Mr. BOWIE. How much do you want?

Mr. WOODS. I will give the problems and then give the total and the additional sum asked for.

In studies of grains we find it a peculiar fact that a change of seed is an important thing occasionally. We want to determine whether that is simply due to troubles in the matter of selecting the seed or saving seed for planting, or whether it is actually necessary to change the locality of where seed is grown.

The CHAIRMAN. We consider that that is necessary. With us no farmer uses his own seed, or very seldom does, in growing wheat. He always buys from another farmer, even although the other farmer may be in the immediate neighborhood.

Mr. WOODS. We want to find out why that is, if it is due to some effect of the environment of the seed or the grade of the seed running down. The indications are that the bringing of seed from a different locality is absolutely necessary in order to hold the variety up to its highest productive power. We think that practice is absolutely necessary and should be perfected.

Now, in this cereal work for these various problems, and including some additional work on the heat method for drying for smut, we can control all the smuts except the loose smut. The loose smut is extremely destructive, and we want to make some experiments on the method of controlling that. The amount of increase we want on this work is $2,500.

The CHAIRMAN. How much?

Mr. WOODS. Two thousand five hundred dollars on these three or four items.

Mr. GRAFF. Does that include that smut work?

Mr. WOODS. That includes the loose smut of oats.

Mr. GRAFF. You have not reached a conclusion about the treatment of that?

Mr. WOODS. We have tried a good many things, but they are not effective. The hard smuts are fairly easily destroyed, but the loose smut is extremely difficult to destroy, and that is the more common one of the smuts.

Mr. GRAFF. Which one is it that is treated with heating the seed?

Mr. WOODS. That is the stinking smut, so called. It is the smut that forms a compact body in a corner of the grain, and is not outside. That is more common in the wheat than it is in the oats.

Mr. GRAFF. I think they tried the heating process at the experiment station at Urbana, Ill.

Mr. WOODS. I think they did. They have tried that. It works on all the smuts except this particular one. There are four or five different smuts of grain.

Mr. GRAFF. How hot do they heat the water?

Mr. WOODS. From 130° to 132° Fahrenheit.

In the Northwest, including Minnesota, North Dakota, South Dakota, Iowa, and the State of Washington, we have organized a sort of cooperative series of investigations looking toward the general improvement of crops in that region. A large part of the cooperative cereal work is done in cooperation with these stations, and this is an experiment on our part and upon the part of these stations to determine the best methods of carrying on cooperative work between the Department and the stations, to get some idea of what can be accomplished. We are spending in that general cooperative work this year $5,384. It will possibly amount to nearly $6,000. We want to increase that a little so as to include, perhaps, the Nebraska station or one of the other stations in that region. The Nebraska station wants to cooperate with us, but we have not been able to arrange any cooperative work there on account of the fact that we were using all we could for cooperative work in the group of stations mentioned, and the $1,000 we want in the way of an increase here is to develop that cooperative work further.

Now, I come to the physiological laboratory, which takes up a different group of problems from these I have been describing, and in the technical laboratory work, in that line of investigation which includes the problems I will describe later, I want an addition of $2,000. We are now spending $8,114, including apparatus, supplies, and all the men engaged in this physiological work. We want $2,000 additional to get additional help and additional apparatus in that laboratory, making $10,000——

The CHAIRMAN. How much has that grown in the last few years—on what increasing scale has it grown? How much did you set off for that work last year and the year before, if you remember?

Mr. WOODS. Last year $8,114 was allotted to that work.

The CHAIRMAN. And the year before that, if you remember?

Mr. WOODS. Well, the year before that the laboratory was organized as a State laboratory and I do not know how much there was, but I think about half that amount. The work was just starting at that time. This laboratory has been going only about three years, including this year. Some of the results obtained in that laboratory are extremely important, and I want to take up one of the most important of those now. That is the question of nitrogen fixation. We discussed that to some extent last year in this committee, and I told you then that we had isolated this nitrogen fixing organism and had perfected the method of cultivating. This year we have been engaged in producing that organism and sending it out. We have sent out alfalfa to 1,500 farmers, and we have 3,000 applications on hand which we are preparing to fill in the spring.

The CHAIRMAN. Alfalfa applications?

Mr. WOODS. That is for alfalfa; but we get applications for cowpeas and soy beans and red clover and every other variety of leguminous crops. We have these cultures bred up so that the organisms we have have from five to ten times the nitrogen-fixing power that the nitrogen has when we first take it from the tubercle. So when we apply this to the crops the increase in the crop is very great, and is proportionately greater the poorer the soil.

Mr. SCOTT. How is it applied to the crop?

Mr. WOODS. It is applied in this way. I will pass around here just

what we sent out, and I will tear the end of this open so you can see what is in there.

(Mr. Woods passed around packages to the members of the committee.)

Mr. GALLOWAY. In this connection I would simply like to say that one of the great problems of this country is the securing of a supply of nitrogen for the soil. We are sending out every year in our export products, we figure, something like $100,000,000 worth of nitrogen, and we have to get that back into the soil. We can get it back by the application of nitrogenous fertilizers, and this is becoming more difficult because the soils are becoming exhausted. We can get it back, however, by the growing of green manure-like alfalfa and the growing of soy beans and things of that sort, and we can add to their efficiency by treating the seed with these nitrifying organisms. By the application of these organisms, which are in the first place isolated from the plants themselves, taken at the roots themselves and grown under artificial conditions in a laboratory and grown in such a way that their effectiveness is increased from three to five times, and then they are turned loose again on the plant, the result is that the crops are from three to five times greater than if these organisms had not been put on.

Mr. SCOTT. Those cultures can only be obtained through laboratory operations?

Mr. GALLOWAY. Yes, only through laboratory operations.

Mr. GRAFF. But they can be multiplied by the farmer himself?

Mr. GALLOWAY. Yes; This is sent to the farmer and he is given simple instructions that enable him to multiply them indefinitely.

Mr. SCOTT. That is what I was getting at.

Mr. WOODS. I will explain how this is used. This is a pure culture of the organism for alfalfa, and I will pass these around. There is one for, say, beans and one for clover [handing packages to members of the committee]. That is impregnated with billions of the germs; they show under the microscope. The farmer gets that—gets these two packages which are done up this way. That is phosphoric acid and potash [indicating on package]. He puts that in a pail of water, and then puts the cotton in, and then sets the pail of water in a warm place—by a stove or some other place where the temperature is warm enough—and the next morning he will notice that it is slightly milky in color. He is then instructed to drop in No. 3, which is a stimulant; that gives us the organism there.

Instead of dividing once in half an hour, they will divide once in fifteen minutes, and that increases in a geometrical ratio, so by the next morning he has a pail of stuff that looks like milk. Then he puts that in a sprinkling can and sprinkles it over the seeds, and the seed is then ready to sow. That quantity will inoculate 5 acres. If a man writes and says he wants enough for 5 acres, we send him this [indicating]. If he says that he wants enough for 400 acres we send him a typewritten sheet like this which gives him simple instructions as to how to proceed. It is very easy to do this and the farmer can do it himself.

Mr. SCOTT. I can understand how he can multiply these organisms, but the question I asked was whether he could produce the organisms in the beginning?

Mr. WOODS. No; he can not do that. It requires the most careful and technical work to do it in the laboratory.

Mr. BOWIE. What is the expense of it?

Mr. WOODS. It depends on the scale on which it is used. Using it on a smalls scale, say 5 acres, the cost would be about 3 cents an acre.

Mr. BOWIE. I mean what is the cost to the Department?

Mr. WOODS. It does not cost us—well, I can tell you——

Mr. BOWIE. What did you use, say last year, what did it cost you?

Mr. WOODS. The men had been working on a great many other problems, but on this particular item I can give you the figures——

Mr. BOWIE. Not exactly, but approximately?

Mr. WOODS. About $1,200, or something like that. That is also what we used the year before.

Mr. BROOKS. Do the experiment stations supply these same cultures?

Mr. GALLOWAY. No; they have not the facilities or can not do it.

Mr. HAUGEN. Is this sent out over the country free [indicating package]?

Mr. WOODS. Yes; free to all applicants.

Mr. HAUGEN. It is sent out free?

Mr. WOODS. Yes, sir.

Mr. LAMB. How long will it be before the trusts get hold of it?

Mr. WOODS. It is patented in the name of the Government. The trust has been trying to get it. We have had applications from manufacturing concerns, saying they would like to manufacture it for the Government. We have told them that if they will keep it up to standard and sell it at a reasonable price, very well; but they can not manufacture it for us—it is free for everybody.

Mr. GRAFF. The Germans propagate these bacteria—is that what you call them?

Mr. WOODS. Yes.

Mr. GRAFF. They send them out in fluid form. That is, the bacteria were placed in fluid in a different form from these packages which are now sent out. One of your men there told me that the Department here had improved greatly over the methods employed over there.

Mr. WOODS. Yes; in every particular, because the organism they had was less active than the organism in hand, owing to the fact that they cultivate it on a medium containing nitrogen. We cultivate it on a medium containing no nitrogen, making it dependent on the air, and by that we can breed it to a higher nitrogen-fixing power. If you send it out in a moist medium it deteriorates in a few weeks and becomes useless; and then it costs from $8 to $12 an acre to apply it according to their method. There is considerable difference between that and 3 cents an acre. We can send it out around the world and back again on this dry cotton and it will be as good the day it gets back as it was the day we sent it out.

Mr. SCOTT. If this culture can be multiplied indefinitely from a small beginning what is the use of going through this technical and elaborate operation in your laboratory after you have a start?

Mr. WOODS. There is not any use; it is simply a question of keeping it pure and up to the standard. All we are doing now is commencing.

Mr. GALLOWAY. The chances are after the farmer had it for a month he would not have an organism there at all, but something else.

Mr. SCOTT. Why do you not keep it that way——

Mr. GALLOWAY. That is what we propose.

Mr. SCOTT. How much of a beginning did you have to have to insure a continuing supply?

Mr. GALLOWAY. One organism is all.

Mr. GRAFF. What do you have to apply to it to multiply it? What is the farmer told to do in order to multiply it?

Mr. WOODS. He adds more of the substance contained in packages Nos. 1 and 3, certain chemicals and some sugar.

Mr. GRAFF. And are those chemicals cheap?

Mr. WOODS. Yes; they are cheap, and can be obtained anywhere in the United States.

Mr. SCOTT. If you use that same operation with safeguards, could you keep it up to the standard?

Mr. WOODS. Oh, yes.

Mr. SCOTT. So you do not have to go back to the beginning?

Mr. WOODS. Oh, no; not at all now.

Mr. GALLOWAY. As a matter of fact, we adopt more strict methods for keeping these things pure, because the moment you expose them to air you have contamination at once, and then you have to retest frequently to see that you have nothing but the pure organism present. Otherwise, an antagonizing organism would come in and run the other out in three or four days.

Mr. WOODS. It would not do, either, to use with this stimulant, and we say if used it is only to reduce the nitrogen-fixing power. It contains ammonia, and so it is not safe to use it all the time. We always take our original cultures from stocks that have been grown on nitrogen-free material.

Mr. SCOTT. Is that stimulus invented in our Department?

Mr. WOODS. It is not an invention, but might be called a discovery. Yes; it was discovered in our Department.

The CHAIRMAN. How is this used after the farmer has it ready for use; does he sprinkle the seeds?

Mr. WOODS. Yes; in an ordinary sprinkling pot. If he has not a sprinkling pot he can pour it over the seeds.

Mr. HENRY. You dry the seeds, then?

Mr. WOODS. Yes; we dry the seeds, and it will stay as long as the seeds are dry. You can keep the seeds a year, if you choose.

Mr. GALLOWAY. The seed is put in the ground, and the moment the smallest root starts these organisms get on it and begin to form these little tubicles at once and they fix the nitrogen.

The CHAIRMAN. On what crops do you advise its use?

Mr. WOODS. On clovers and cowpeas and soy beans and every one of the leguminous crops used for rotation in different parts of the country. If they do not have these organisms on their roots they depend on the soil for their nitrogen and exhaust the soil the same as other crops.

Mr. GRAFF. You have a different bacteria for different plants?

Mr. WOODS. We have a different bacteria for different plants, there are three kinds of them here.

Mr. BOWIE. Have you one for the cowpeas?

Mr. WOODS. Yes; we have them for all the different plants and we are getting them for every leguminous crop.

Mr. BROOKS. Do the experiment stations know this?

Mr. WOODS. Yes. We have had applications from a great many of

the stations already to furnish them a supply of this material, and we are cooperating with some of the stations in getting it into use on the poor soils.

Mr. BOWIE. We have nine so called agricultural schools in Alabama, and then the State school. Do you supply it to these State schools?

Mr. WOODS. We put it in every county in Alabama through the cooperation of your experiment station. We furnished your station the stuff and they have supplied it to one farmer in every county in Alabama.

Mr. BOWIE. Now we have nine district schools in Alabama; you do not correspond with them?

Mr. WOODS. No; we can hardly answer the correspondence, we can hardly keep it answered, we have so much of it.

Mr. GALLOWAY. We have found in the importing of seed from foreign countries where we get legumes that if you bring the seed in and they are brought in without any earth or anything of that kind that in many cases we can not get them to grow at all, for the reason that the organisms are not brought in at the same time the seed is brought in. Now, our men get some of the organisms and distribute organisms with the seed and get the crops started at once.

Mr. WOODS. For instance, we can get alfalfa that will grow in Maryland where they have not been able to grow it before. It has been the same way in reference to clover on soils they did not think they could grow it. It is a relation between these crops and these organisms that is the result of thousands of years, and if you break it it removes one of the normal conditions of growth, and it is one of those things that scientific men have been working on for a long time.

Mr. BOWIE. Who worked this up?

Mr. WOODS. It was worked up by Doctor Moore in our division—the man in charge of the physiological laboratory.

Mr. SCOTT. Will this be of any advantage to the blue grass?

Mr. WOODS. It will, in this way. If you grow a crop of clover or cowpeas and then remove it, you have left in the soil a lot of nitrogen, and then you can put in there another crop, and this other crop can use this nitrogen.

Mr. BOWIE. That is a secondary process?

Mr. WOODS. It is a secondary process. So wherever it is possible to grow leguminous crops in rotation with other crops you can profitably fix your nitrogen in this way, and it has been known for many years that there are organisms which grow in a soil that do not form on the roots, but continue the power of fixing nitrogen, and we have been studying those for a long time and we have come to the conclusion that we can introduce those organisms into agriculture in the same way we have here. That is, we can produce a culture of bacteria that if it is put in any soil with any crop or even without a crop will go right on fixing atmospheric nitrogen.

Mr. BOWIE. How often do you give that to the soil?

Mr. WOODS. Put it on once and it is there for ten or fifteen years, anyway.

Mr. BOWIE. Then is not one of these packages good for fifteen years?

Mr. WOODS. I presume if you put that on once on any kind of a decent soil you would never have to renew it.

Mr. GRAFF. Is it not true that these bacteria in a soil already charged with nitrogen will not work?

Mr. WOODS. Yes; they will work, but they do not show the same effect of restoring the soil; that is, if you have a crop that has a large amount of available nitrogen in it—that is, a quantity required by that crop—then these organisms simply produce a small amount of nitrogen; but just as soon as the amount of nitrogen available in the soil falls below the requirements of the crop, then these organisms begin to work, and they stand there as a guard against the reduction of the nitrogen in that soil below the requirements of the crop.

The CHAIRMAN. What is the most common proof that your soil is exhausted. What shows to the ordinary farmer that there is no nitrogen left—is it land exhaustion?

Mr. WOODS. It is what the farmer calls land exhaustion. It means that the nitrogen is exhausted; the other materials are there in sufficient quantities, but when the nitrogen is lacking the crop will be low and yellow and very slow in maturing. There are all gradations; it depends on the amount that is lacking.

Mr. GRAFF. Is that the reason why leguminous plants like clover are found to be good in restoring soil?

Mr. WOODS. That is just exactly the reason.

Mr. HENRY. What is meant by "clover sickness," as we term it down East?

Mr. WOODS. It is caused by many different things. The term is applied to any soil that refuses to produce a crop of clover.

Mr. HENRY. Can you give the reason why that soil refuses to produce a crop of clover?

Mr. WOODS. Yes; in New England the main reason is that the soils accumulate organic acids and have to be limed.

The CHAIRMAN. That does not apply to limestone soils, then?

Mr. WOODS. No; unless the lime is pretty far down and completely formed into carbonate, and if it is too far below the roots of the plants. Sometimes you can have a lack of lime in a limestone country. I saw the greatest lime starvation in soils underlaid by limestone.

The CHAIRMAN. That was too deep?

Mr. WOODS. Yes.

Mr. HAUGEN. We can not get clover unless we use fertilizer in such cases.

Mr. WOODS. That means that the organic acids are present in the soil.

Mr. GRAFF. Can this condition of the soil be determined by analysis, either chemical or physical?

Mr. WOODS. It can not be determined by a chemical or a physical analysis; it can only be determined by trying the plant on the soil.

Mr. GRAFF. When you try it, how do you know whether that is the trouble or not?

Mr. WOODS. We tell by the behavior of plants; we can tell by the effect of the soil on the plant whether it is due to acidity. If it is due to acidity, the plant will turn brown and the root hairs will refuse to grow. Very often the acidity is not soluble except to the roots of the plant, and can be detected only by the plant.

The importance of this new form of nitrogen-fixing organisms, I think, will be apparent, and we want to concentrate our scientific work this year upon that new crop of organisms. We have quite a number of them and we know that they will fix nitrogens in any soil that contains decaying organic matter, the roots of any crop, or the decaying roots of any previous crop, and if we can breed those up to the same

point we got these organisms [indicating] it will supplement this rotation proposed and enable us to keep the fertility of the soils up to a much higher standard automatically than has ever been possible before, or ever would be possible, depending entirely upon leguminous crops as renovators, because as production in certain cases becomes more intense and the demands for food crops become greater we are not going to be able to drop out wheat every other year; we can not put it in every fourth year; we have gotten larger areas and more acres of our cotton soil or our wheat soil, and we have to grow wheat or cotton a good many years year after year.

Mr. BOWIE. That is one of the problems that is confronting the cotton planter in the South.

Mr. WOODS. We are going to run the limit of the possibility of rotation, and when we reach that we have to supplement the nitrogen in the soil by such means as this, and when that time comes—it may not come in our day, but when it does—we want to be able to use these organisms.

The CHAIRMAN. Has it come anywhere?

Mr. WOODS. Yes, it has come in a great many countries. Over nine of the European countries, fully nine of the European countries, can not produce more than half enough food for their inhabitants; they have to depend on the United States and Russia and other countries that produce the food of the world. And the time is coming when a great many other countries will be in the same situation.

Mr. GRAFF. What are those nine countries?

Mr. WOODS. I do not know that I can name them all. England, Holland, Belgium, and——

The CHAIRMAN. The thickly populated countries?

Mr. WOODS. Yes. When their population gets above 200 to the square mile or something like that they begin to find it is impossible to produce enough food, even with the most intense cultivation, even producing 25 bushels of wheat to the acre.

Mr. SCOTT. I do not think that you exactly understood the chairman's question. I do not think he asked whether there are any countries that do not produce sufficient food for their own people, but whether the time has come when the soil has become so exhausted that this nitrogen has to be supplied by other means than through the rotation of crops. Was that the question?

The CHAIRMAN. Yes, that was my question.

Mr. WOODS. I do not think that time has come. It is possibly true in England and Belgium——

Mr. STILLMAN. They have to use the nitrate fertilizers?

Mr. WOODS. Yes; and the barnyard manure, such things as that; but they practice the most rigid rotations. But you can see what the possibilities even there would be if we can get rid of the necessity of rotation and keep the fertility of the soil up. If we could do that they could produce a much larger amount than they do.

Mr. BOWIE. Would certain things you would not produce be the things that you have rotated with?

Mr. WOODS. You would keep the nitrogen of the soil up even by continual cropping of one crop.

The CHAIRMAN. Their rotation of certain crops is necessary for feeding the people.

Mr. BOWIE. You rotate for other purposes than for fertilization?

The CHAIRMAN. Yes; they do.

Mr. WOODS. Yes; the whole point is to get this valuable organism into condition where it can be useful. The total amount that we want for these two lines of work—that is, the propagating of these organisms for leguminous crops and the scientific study of these other organisms, and their testing, is $2,000 additional. We are using about $3,000 on that work altogether now.

One other problem which this laboratory is working on is this: For a long time we have been able to tell the man who grows crops on land how to get rid of diseases that attack those crops; but there is a considerable amount of food material, and especially such stuff as water cress and things of that kind, which is raised under aquatic conditions, in places where the crops are surrounded by water. For instance, here is one of the biggest cress-raising concerns in Georgia, and all up and down through the Allegheny region there is lots of water cress raised.

A few years ago they were contaminated with green slimes and stuff of that sort, commonly known as frog spittle, and there was no way to get that cleaned out which we had discovered. So we took this man who had been working on the nitrogen-organism problem and sent him down to see what he could do in the matter, and he found a cheap process by which he could clean that organism out. He has not published the result of his work, but it is simply the use of what is known as the Bordeaux solution in the water. We find by putting this in the water it has no bad effect upon anybody that drinks it and has no effect upon the cress that grows in there, and the amount we use is so small that the most expert chemists can not detect its presence in the water. It is only one part in ten million parts of water. Anybody can drink as much as 1 per cent solution of copper without very much injury. It is so small that we have turned it over to our chemist and to other expert chemists in other places and they have not been able to find it in there. They have said that there was nothing in the water. But the fact is this, that when these tests are present this Bordeaux solution unites with the parasite or whatever it is that combines with it, and the thing dies and settles at the bottom, and the water is then pure and clear as crystal, and there is no taste which is disagreeable or anything of that kind. This is applicable to all water supplies that are contaminated with algæ, and there are a great many of them. We are now spending about $1,000.

Mr. GRAFF. What is that word?

Mr. WOODS. That is algæ, the green slimy substance we see on ponds, the green coating we see on stagnant water. Mosquitoes feed on that stuff, and we find by this treatment that the food the mosquitoes eat is destroyed, so this is a means of getting rid of mosquitoes and thereby getting rid of malaria.

We want $1,000 to make some tests of this on a larger scale than we have been able to do up to this time.

Mr. GALLOWAY. One point that might be mentioned in this connection is the value of this thing in cleaning out city water supplies. Of course that is not directly connected with agriculture, and yet at the same time it has a bearing upon it. We have cooperated with boards of health, especially in Massachusetts, and we find that in this way we can remove this green slime or algæ on water. We can do it at very small expense.

Some of this algæ smells very bad indeed, and by the application of this method to large reservoirs it has in many cases destroyed the algæ. I know in some cases $25,000 or $30,000 has been spent in pumping air to clean out these reservoirs, and they have tried this method that Mr. Woods has referred to and the reservoirs have been cleaned out for $400 or $500.

Mr. WOODS. Some of these reservoirs smell so bad that even stock do not like the water. Of course, all those propositions are strictly agricultural, but in reference to the city water supplies the boards of health in a number of States have requested us to give them information in regard to our methods. They have done the work at their own expense. The Massachusetts board of health is trying it in the Boston reservoirs and the New York board of health is trying it in the New York reservoirs—the metropolitan system. The Kentucky people, in Lexington, have cleaned out the Lexington reservoir. In three days' time we had the Lexington reservoir as clear as crystal, and before that cows even would not drink the water.

The CHAIRMAN. I have seen the drinking pools of the farms of the the blue-grass region in Kentucky so thick with slime that it could be cut with a knife.

Mr. WOODS. It is extremely important to clean this out, not only in order to make the water more palatable, but it reduces very much the number of insect parasites, such as mosquitoes and other insects.

Mr. SCOTT. This Bordeaux mixture is not a precipitant, is it? It does not result in depositing other impurities, does it? For instance, you could not put it in Potomac water and make it clear?

Mr. WOODS. No; it would have no effect on the sedimentary materials, but it does destroy the typhoid bacillus. It seems to be extremely sensitive. One part in ten millions will destroy the typhoid bacillus in one hour.

The CHAIRMAN. This Bordeaux mixture?

Mr. WOODS. Yes. Here is the point, now. We do not want to say very much about this until we get the material well in hand, because if some of us should go along, say one part in ten million is good, one part in five hundred is better, it might be that somebody would dope the water supplies with copper, perhaps, until it spoiled the whole thing; that is, you can get enough copper to be injurious, and it has to be under the control of the proper authorities, and so it is not a thing we can say a great deal about in print at the present time, until the matter is so adjusted that we can control the use of it or that the State boards of health can control it. It is a good thing if properly used.

Now, leaving that phase of the work, we come to the work in the laboratories outside of Washington. We find it cheaper in some of our field work to have permanent laboratories located, for instance, in southern California for the Pacific coast and the southwestern region; located in south Florida for the subtropical region and for the southern Gulf States. We can put our men there and send them from there to localities in the South very much cheaper, and they get acquainted with the region, too, and know it better than if the work were done from Washington.

So we have the Pacific Coast Laboratory at Santa Ana. Their work covers everything in the way of treatment of diseases and the breeding and testing of crops along the lines I have been discussing. For all

we are trying to do out there in connection with the lines I have discussed I want an increase of $1,000 for that laboratory, because we can not begin to meet the demands made upon our men there for work; we can not touch one-quarter of the problems we should be able to furnish help on for lack of money and lack of men.

The CHAIRMAN. What is the experiment station out there doing; is it doing anything?

Mr. WOODS. On other lines it is, but not working on diseases at all; they have no pathologists. I can not say the work we are doing on diseases is being done by them. The station is thoroughly familiar with it, however, and we work in perfect harmony with the station along these lines.

Mr. BOWIE. But not in cooperation?

Mr. WOODS. But not in cooperation.

The CHAIRMAN. They have no pathologist?

Mr. WOODS. They have no pathologist.

The CHAIRMAN. I should think that with their great fruit industry they would have an expert man.

Mr. WOODS. They should have an expert pathologist. There is enough work on the Pacific coast for several of them.

Mr. STILLMAN. The trouble there is the State does not add much to the $15,000 they get from the Government.

Mr. WOODS. In the Mississippi Valley we have a laboratory at St. Louis in connection with the botanical gardens, and from that laboratory we are conducting the work on fruit diseases, and on various tree diseases in the Mississippi Valley region. We have several men located there. We are spending now about $9,000 in that region, from that laboratory as a center, and we want an increase of a thousand dollars on that work because, there again, the demands are very much greater than we can come anywhere near meeting; and a gradual growth will be necessary in those stations probably for some time yet. In connection with that work out there we are cooperating with the Bureau of Forestry in the study of forest-tree diseases, and especially in the problem of methods of treating construction timber; that is, fence posts and all sorts of construction timber.

The CHAIRMAN. Ties?

Mr. WOODS. Railroad ties, yes; and telegraph poles and everything of that kind. We are impregnating them with materials to prevent the entrance and decay produced by these parasitic fungi. The decay in timber is produced by parasitic plants which get in the pores of timbers and destroy it. If you can stop this on plants we can stop it on lumber. The creosoting process is in quite general use, but it is very expensive for the ordinary farmer, and what we are after now is some method of treating the timber which is cheaper, some method by which fence posts and things of that kind can be treated cheap enough to be put into general use and made available to the great mass of the farmers of the country.

The CHAIRMAN. Why is it generally supposed that the charring of fence posts will prevent decay, or at least postpone decay for a certain length of time?

Mr. WOODS. That is quite effective. In the first place, the charring process kills all the parasites on the surface of the wood, and also closes the pores of the wood so water can not get through, and then if an organism lights on the charcoal it can not get in, because there is no nourishment for it.

The CHAIRMAN. That is the scientific reason?

Mr. WOODS. Yes. The tropical laboratory is located at Miami, Fla. There we are propagating and carrying on everything in reference to seeding and plant production that is required to be handled in a subtropical climate. We are studying there the tomato diseases and diseases of crops in the southwestern Gulf State region. We are spending down there about $5,700, including salaries of men, and we want an increase for that work of about $2,000, making a total down there of $7,700.

Now, one other line of work which has never been developed to any extent in this country, and lies along this line of producing a greater supply of food, is the question of growing mushrooms. The mushroom is a fungus that lives upon decaying organic matter, and in Europe the cultivation of mushrooms for food has been developed to an extremely high point. It is one of the main food products of France and England and Russia and Germany. In this country it is a growing industry. We introduce in this country over 85,000,000 pounds of mushrooms, and we introduce many thousands of tons of spawn, and the mushrooms bring a high price in our market. The difficulty has been we have to buy our spawn abroad; we have to bring it from Europe. They have been trying to make it in this country, but they have not succeeded. And another thing which Europeans have never accomplished, and something which has never been accomplished before in the world, is the cultivation of the wild mushrooms commercially.

It seemed to us that that was an industry which was applicable to large regions. For instance, in Pennsylvania and in West Virginia, in the coal sections where they have exhausted large coal mines, and places that are of no special value like that are just exactly the places to grow mushrooms. So we undertook the proposition, to see if we could not perfect the method of producing spawn—that is, the seed of the mushroom—so it would become a commercial proposition, and that we could grow some of the several thousands of the edible varieties that grow in our country. They grow wild everywhere, but there are a lot of poisonous ones that make it dangerous for anybody but an expert to select these mushrooms. I can say this, that we have discovered the means of growing the spawn of any mushroom, and we can produce the mushroom spawn. Here is some [indicating] that is the spawn of a wild mushroom that grows wild in Missouri, and that is the first wild mushroom spawn that has ever been produced anywhere in the world commercially.

The CHAIRMAN. We find our wild mushrooms growing in the old pastures?

Mr. WOODS. That is the edible mushrooms, yes. They are cultivated throughout the world.

The CHAIRMAN. Yes. Now, if I sow this spawn in those pastures will I get results?

Mr. WOODS. No; you would not. You will see this is a cobweb-like substance, and when it once produces a cap it exhausts itself.

The CHAIRMAN. It needs renewing?

Mr. WOODS. Yes; it is extremely difficult to hold that up to its producing power, but we have a method by which we can do it, and we can produce very quickly the commercial spawn of any mushroom anyone wants. That is some of the spawn we have produced [exhibiting the spawn to the committee].

Mr. SCOTT. The spawn is not visible to the naked eye?

Mr. WOODS. Yes, it is; this is the spawn—this cobweb-like material.

The CHAIRMAN. That can only be used for cultivation; you must cultivate the land and sow it as you would sow seed?

Mr. WOODS. Yes. This is grown principally in caves and such places. You can grow it anywhere, but you take one of these caves and put in a lot of horse manure and pack it down tight and then break it up into little chunks and then pretty soon that mass will be impregnated, and within about three weeks the mushrooms begin to come up. They grow for several months, and then you have to replant the beds.

The CHAIRMAN. If you would sow that wild over a pasture it would not grow?

Mr. WOODS. No, it would not grow.

Mr. WRIGHT. Do you distribute this spawn?

Mr. WOODS. We can. We have not the plant for making it on a large scale, but I think all we will need to do is to get up a stock for fine varieties and then turn it over to men who are accustomed to grow mushrooms, and sell it. They can afford to grow it and sell it for $6 a hundred, which is the regular price of imported spawn, and then we will be done with it. It is a proposition that the growers themselves can handle, and I think it will add—it will not only enable us to produce our own spawn, but will enable us to produce all the mushrooms we want, and we can produce enough to export them.

Mr. SCOTT. There is no danger of this spawn reverting to the poisonous toadstool, is there?

Mr. WOODS. Absolutely none.

The CHAIRMAN. I would not advise you to advertise this because you will have too many demands upon you.

Mr. WOODS. We do not want to advertise this, but as soon as we write this up in the Year Book it will be copied in this journal and that journal throughout the country, and we will get letters by the dozen in regard to it.

Mr. LAMB. My constituents are already writing to me about it.

Mr. BOWIE. About this cultivation of mushrooms?

Mr. LAMB. Yes.

Mr. WOODS. It leaks out.

The CHAIRMAN. We have mushrooms now the year around in the city.

Mr. BOWIE. But you have to pay 25 cents extra for them with a beefsteak.

The CHAIRMAN. Yes; they are expensive; they are sort of a luxury after all.

Mr. WOODS. They are in our country.

The CHAIRMAN. There is not very much nutriment in them, is there?

Mr. WOODS. Yes; there is a lot of nutriment in them. They are as nutritious, in fact more nutritious, than the average vegetable; they are four times as nutritious as the same quantity of cabbages or turnips.

The CHAIRMAN. In Europe they are a common food.

Mr. WOODS. In Europe they are the food of the poor people, because the poor people can grow them. They can grow them down in their cellars and other places where there is no light. They do not require light; they can be grown in mines and caves and places where no light penetrates. That is the reason why it is such an important food crop,

and it is the reason why it is important to get them on a basis where they will be available for poor people when the prices of other foods get so high that they can not live on more expensive foods.

Now, another line of work which seems important to develop is what we call plant-nutrition work; that is, the bringing together of the scientific knowledge upon the commercial production of any given crop; such questions, for instance, as determining why it is that the seed of a crop grown in the North will produce a better crop in the South than the seed of a crop grown in the South, and why it is that occasionally the seed of a crop grown in the South will produce a better crop in the North than the seed of that same crop grown in the North. It is the determination of those technical questions which lie at the bottom of many of the most important commercial problems in agriculture, and we find a necessity for them in connection with a lot of the problems which are being taken up in forage-plant investigation with Dr. Sillman, and in the tobacco investigation and in the sugar-beet work.

We find it is necessary to settle in this case some of those fundamental problems, and I want to put the most expert men we have on that kind of work in solving those problems. We are spending this year practically $4,000 on that kind of work. I want to increase that amount $3,000 this year, making a total of very nearly $7,000.

Then, the plant nutrition work. There are problems connected with the use of fertilizers, the effect of chemical fertilizers upon the nature of the crop produced. We find that a plant fed with certain combinations of fertilizers, for instance, with nitrogen, phosphoric acid, and potash in a ration of three, one, and one, produces a different crop from a plant fed with those substances in the ratio of three, two, and one; that is, by increasing the phosphoric acid you can hasten maturity of the crop; you can change the color of it by increasing the ratio of the nitrogen to phosphoric acid and potash, and you can make other changes—in the keeping quality of apples, for instance, and matters of that kind; that is, it is the influence of the nutritive ratio upon the quality of the product. It is a very technical line of investigation, and I want to undertake some work along that line. I am not doing anything on it now, but I want to put a thousand dollars into that work. I want about a thousand dollars to start that work.

Then, finally, I want on the general fund—we have, under "general administrative fund," been paying for rent of buildings and so on; that is, the administrative work and along the problems I have been discussing here, including the salaries of everybody employed, outside of what are included in these items here of about $17,500—I want an increase of about $4,000. A portion of that—about $5,000 of that sum—is kept as a reserve fund, because every year some exigency comes up that requires immediate investigation, and when an allotment is made to one of these problems that allotment remains throughout the year unless something stops it, unless something is necessary to stop it, that the money once allotted is not available for contingent problems that come up, and I keep the reserve fund for contingent problems, and every single year the number of contingent problems has been much greater than we have been able to take care of.

Mr. BOWIE. You were going to tell us about some of the things that have been discontinued, that have been accomplished by the Department, that have reached the perfection stage and have been

abandoned so far as the Department is concerned and turned over to the people.

Mr. WOODS. That requires going over the four or five years of our work. I can briefly mention some of those problems. I have spoken of two that have been practically settled in the last year. One is the macaroni wheat problem. From spending $9,000 or $10,000 we have come to a point where we are only spending about $1,500.

I mentioned one other thing here which we have practically finished up—I do not recall what that is. But one of the problems we finished was the work on the peach-leaf curl. The peach-leaf curl is a thing that has caused immense losses to the peach industry of the United States. It took us about five years to find out a proper method of controlling that disease. We have now reduced that to one spraying just before the leaves come out. We have not spent a cent on that this year and did not spend a cent on it last year. One spraying just before the leaves come out will completely control that disease. So there is not one-tenth of 1 per cent of the crops lost now by reason of that disease. We have settled the cotton problem in Sea Island cotton. We are now devoting our energies to upland cotton, which is a different proposition, although a similar one.

The CHAIRMAN. How about peach yellows?

Mr. WOODS. While we have not been able to find out the technical cause of peach yellows, we have found a preventive so that this is not a serious thing now, commercially speaking. We have not spent a cent for years on that.

Mr. HENRY. Is the method of prevention in that disease the burning of the tree?

Mr. WOODS. Yes; the method of prevention is the burning of the tree or the destruction of the tree. As soon as that is noted the tree should be pulled down.

The CHAIRMAN. What have you done in regard to the little peach?

Mr. WOODS. We have not found out the cause of it yet but, we are applying the same remedy, and we find it is apparently holding it in check. At first that may seem like a very expensive remedy and it is when a man has let 90 per cent of his trees come down, but by keeping it out, pulling down one tree this year and two trees next year, if you pull it out as soon as it shows itself it does not spread, and the peach-tree grower does not have any more fear of yellows.

The CHAIRMAN. It is simply renewing his orchard after all is said and done?

Mr. WOODS. Yes, sir; but if he let that peach tree stand for two or three years——

The CHAIRMAN. I say he is simply renewing his orchard, after all?

Mr. WOODS. Yes, sir.

The CHAIRMAN. The trees have only a life of about ten or twelve years anyway, I think.

Mr. GALLOWAY. One point in that connection, and that is what might be called the indirect point of view of this sort of work. When I first came into the Department I took up this subject of peach yellows. That was one of the first things that we worked on. We worked on the manner of determining what effect the different kinds of fertilizers had on the trees in that connection. Thousands of dollars were spent every year on the eastern shore of Maryland and in other sections where peaches are grown to a large extent in fertil-

izers which were believed to be cures for yellows, and our first experimentation was in that direction, to determine whether or not they had any effect in that direction. It was finally determined that they had no effect whatever in curing or preventing the yellows, and as a result of that you never hear anything more about the application of fertilizers. The money spent in that direction has been turned into other fields.

One other line of work has been set aside, and that is the subject of grape diseases. They have reached the point of treatment so that it does not require any great effort to control grape diseases. When we first commenced to spray for grape diseases we had to pay a bonus to people to spray. The first money was spent that way in different parts of the country. The next year we had three or four volunteers and the fourth and fifth years we had between 6,000 and 8,000 volunteers. So that work developed to a point where it can be dropped, and the spraying of grapes now is a matter like the application of fertilizer.

Mr. WOODS. Then there is the subject of the various blights that we have not worked on for a number of years.

The CHAIRMAN. That spraying was a great discovery.

Mr. WOODS. Yes, sir. There are diseases of other crops that we have been working on and which were finished a number of years ago that we have not even thought of since that could be outlined in the same way that I have outlined these works.

The CHAIRMAN. Doctor, in your note of the list of people paid from the lump sum on that same page (p. 9) I see one pathologist at $3,000. I notice that is a higher salary than the pathologist who is on the statutory roll.

Mr. GALLOWAY. Yes; that is the salary of Mr. Woods, who is in charge of the work, and then we have one for $2,750 on the statutory roll.

Mr. WOODS. That is Doctor Smith, in charge of the pathological laboratory.

The CHAIRMAN. Are not some of those gentlemen permanent in that way, so you could put them on the statutory roll?

Mr. GALLOWAY. Yes, some of them are; but that question we have had up here before. It is a question whether it is economy to put them there, because it puts us in a position where we are in the position of paying more than we really ought to pay. That is the position of some of the other bureaus of the Government.

The CHAIRMAN. "One expert at $600." What is he expert of?

Mr. WOODS. There are two experts there—one is Professor Hayes, who is in charge of the cooperative work in these five States I mentioned. He is the professor of agriculture in Minnesota.

The CHAIRMAN. This is an additional salary paid him?

Mr. WOODS. Yes, sir; and the other one is Florence Eddy. Since this roll was made out she has taken an examination and has been appointed assistant of bacteria in the State physiological laboratory.

The CHAIRMAN. Two experts at $1,500, which you will see on the fourth line.

Mr. WOODS. One of them was one of the men in the physiological laboratory who has been working on some of the physiological problems, Doctor McKenney, and the other is the one who is working on physiological chemistry in grains and plants. Both of those have taken the civil-service examination and their titles are now changed.

The CHAIRMAN. Then the expert at $600 is Professor Hayes?

Mr. WOODS. Yes; the expert at $600 is Professor Hayes; he is the only one on our rolls recorded as an "expert."

The CHAIRMAN. They are on your lump-sum roll?

Mr. WOODS. Yes. We carry most of our investigators on the lump-sum roll.

The CHAIRMAN (reading). "Curator;" what is he?

Mr. WOODS. An assistant in the herbarium. We have a lot of them, and they have to carefully press, and dry, and mount specimens.

The CHAIRMAN. "Four laborers."

Mr. WOODS. One of them is watchman of the building, one of them is in charge of the file room, one of the old laborers; he is really doing clerical work. Another one is working in cooperation with the botanical office over in the seed laboratory.

The CHAIRMAN. "One assistant at $600." He is an assistant of what? Is he a student assistant?

Mr. BOWIE. Then four laborers at $720; after that comes one assistant at $600.

Mr. GALLOWAY. These lists are not made up accurately at all, they were made up last July.

The CHAIRMAN. There are a lot of people there you class as laborers. "One laborer at $600, one laborer at $480, one laborer at $60 per month, two laborers at $50 a month each, one laborer at $45 per month, one laborer at $15 per month, and two laborers at $1.50 per day each." Are those your outdoor men in your experiment work?

Mr. WOODS. A number of them are on the Arlington farm and some on the flats. They are men that are hired sometimes for one month and sometimes for two months. Some of them we use in our field work all over the country——

The CHAIRMAN. You do not transport a man from here?

Mr. WOODS. No; we pick him up on the field. We are not allowed to carry a man on our rolls longer than thirty consecutive days. If we want him longer than that we have to get him from the civil service.

Mr. GALLOWAY. Some of those are off of the rolls now.

Mr. WOODS. At the Tennessee station, for example, the agriculturist there, who is in charge of our cooperative work, is appointed as collaborator at $300, and he is one of those $300 assistants who is spoken of here. Then this one laborer at $60 per month is employed in the Califoria laboratory, and the two assistants at $50 per month are actually laboratory assistants, one in pathology and one in the herbarium; and the two at $50 per month, one is at the subtropical laboratory and the other is at the Pacific coast laboratory; the one laborer at $45 per mouth is on the Arlington farm; the two assistants at $40 per month are employed, one at the subtropical laboratory, and one is employed here in Washington as the assistant of the cereals, and we have one assistant at $25 who is employed at the Tennessee station in connection with the field work.

The CHAIRMAN. That is probably in addition to some other salary?

Mr. WOODS. No, it is all he gets. He is only employed a part of the year. Then we have one at $25 here who is doing our illustration work—drawing for us. Then we have one laborer at $15 who is a charwoman; and we have two laborers at $1.50 per day, one of whom is on the farm and one on the flats, temporarily.

The CHAIRMAN. Your total increase asked is $35,000. It says, "of which sum $15,000 may be used at the discretion of the Secretary of Agriculture, for the purpose of extending the work of hybridizing cotton resistant to boll weevil."

The CHAIRMAN. If we eliminate that and give you that under the special appropriation, your estimates would only show an increase of $20,000, would they not?

Mr. WOODS. That depends upon the interpretation the Secretary of Agriculture puts on this appropriation of $15,000.

The CHAIRMAN. If you were going to spend for the cotton boll weevil and that has been provided for by another appropriation, that would give you $15,000 of the $35,000 asked for?

Mr. WOODS. We had not intended to apply $15,000 of this sum to the cotton work unless it should become absolutely necessary, unless the exigencies should demand it; but if that is the interpretation which the committee puts on that——

Mr. GALLOWAY. I think it would be perfectly satisfactory to the Secretary. That is, in laying out a plan of the work, this emergency work, of course, included that piece of work in it.

The CHAIRMAN. I remembered that, and that is why I put the question now.

Mr. WOODS. The way I have treated this is I have considered that $35,000 to be applied to the general investigations, leaving out entirely everything that is done on cotton in the Southwest. Now, if you desire to consider that $15,000 included in that, that it is the intention of the Secretary to cut that amount out here and increase the estimates for these things $20,000, plus $15,000 for the boll-weewil work, we have to do it from this fund. Then the amounts I have asked for would have to be rearranged or reduced in proportion. The increase that we asked the Secretary for was $100,000 for these lines of work. The increases we have asked for, even if we get $35,000 increase, will be needed, every cent of that.

Mr. BOWIE. They will be needed.

Mr. WOODS. It is absolutely needed—yes, to make the proper extension of the work as the interests involved demand. But I will say this——

Mr. BOWIE. Is it found that as you go along with this work and get it advertised that your demand for similar work in other localities are multiplied?

Mr. WOODS. The demands increase in geometrical ratio. That is, we can not begin to meet the demands that come to us in these various lines. If we do a thing in one section of the country, everybody else is asking us to do the same thing for them somewhere else.

The CHAIRMAN. A great many demands are foolish and trivial.

Mr. WOODS. I know they are.

The CHAIRMAN. If you attempt to meet them all, of course you fail; and it is not a question of money—even with plenty of money you could not do it?

Mr. WOODS. No, we could not. I can say this. I can go on with what I have now without any increase, work along and do as well as we have done the last year.

The CHAIRMAN. My point is this. The estimates here say that you want $165,000, of which sum $15,000 shall be set aside for the purpose of extending the work of hybridizing cotton resistant to boll weevil ——

Mr. WOODS. No; it says of which sum $15,000 may be used.

The CHAIRMAN. But I imagined the Secretary would feel bound to do it if he had no other appropriation.

Mr. WOODS. Yes, sir.

The CHAIRMAN. And that is provided for by the emergency bill?

Mr. WOODS. Yes, sir.

The CHAIRMAN. And so estimated for by Doctor Galloway the other day in his estimates before the Committee?

Mr. WOODS. Yes.

The CHAIRMAN. Am I not right in saying if we give you $20,000 that we will meet practically your estimates?

Mr. WOODS. You may meet what the Secretary intended; that is a question he would have to decide.

Mr. GALLOWAY. This matter is a matter to be adjusted by the committee.

The CHAIRMAN. By the way, too, Doctor, that appropriation has been arranged so that it runs to 1905. Well, that would be the same as in this bill.

Mr. GALLOWAY. While there is no question we could extend this $35,000 to cover as many problems as Mr. Wood has mentioned, if the committee thinks it best we would limit this work to a special thing.

Mr. BROOKS. The aggregate of the amount to-day is $20,000 or $35,000?

A MEMBER. When was this estimate made out?

Mr. WOODS. Very nearly a year ago.

A MEMBER. That is before the emergency was appropriated?

Mr. GALLOWAY. We make out our estimates in June and July, and hand them to the Secretary about September.

Mr. GRAFF. Then if we appropriate $150,000 instead of $165,000 your idea would be that we ought to cut out that about the Secretary using this $15,000 in his discretion?

Mr. GALLOWAY. Yes; that has been provided for.

Mr. WOODS. The amounts here asked for are very small considering the magnitude of the problems involved.

Mr. GRAFF. We drew it on purpose to cover this hybridizing business.

Mr. GALLOWAY. We take the ground that we can do anything enumerated here.

The CHAIRMAN. We can do pretty much anything under this, I think.

Mr. WOODS. We would not try to do anything that was not clearly within the plain meaning of the act.

Mr. GALLOWAY. The meaning of this special act is so ambiguous that I think the Comptroller himself could not——

The CHAIRMAN. It is made so that the Secretary of Agriculture may do anything which in his judgment will stop the ravages of the cotton boll weevil.

Mr. GALLOWAY. And correct the damage caused by this thing.

The CHAIRMAN. Yes; and devise means of stopping it.

Mr. GALLOWAY. He could go down there and grow mushrooms if he wanted to.

The CHAIRMAN. Now, are there some other gentlemen here who wish to be heard?

Mr. GALLOWAY. I will ask that Doctor Taylor address the committee.

## STATEMENT OF MR. W. A. TAYLOR.

Mr. TAYLOR. I will say in introduction, to refresh the minds of the members of the committee as to what was said last year, that the work in pomological investigations is divided into two distinct phases. One of those is the work here in Washington, the work which is done at the Department and which is the outgrowth of a very large correspondence with fruit growers respecting the identification of specimens of fruits, the determination of the recommendations of varieties for planting in different parts of the country, all of which is continuous through the year and which occupies a large part of the time of the Pomologist and of the regular clerical force of the office.

In addition to that line of investigations there was set off at the time the Bureau of Plant Industry was organized a line of field investigations, and this line of field investigations comprised, first, the efforts to increase the export trade in fruits; second, the investigations of the storage of fruits, particularly, so far, refrigeratory storage of fruits—those two, the export work and the storage work, being very closely related. They depend upon each other, and are carried forward in parallel lines by interchange of employees and by exchange of money, as the exigencies occur or require.

Next, a line of viticultural investigations, largely restricted to the Pacific coast, and devoted to the determination of the adaptability of the resistant vine stocks in various soil types of the important vineyard regions of the Pacific coast; and, secondly, to the determination of the congeniality of the grapes that are to be grown on these stocks to these stocks. It is a compound problem.

Next, a line of fruit district investigations, in which, by actual inspection and examination of trees in orchards in the important regions, we are endeavoring more closely and more accurately to outline the commercial fruit districts of the country—the soils, the elevations, the exposures—where particular types of fruits can be grown to best advantage in a commercial way.

And, lastly, a group of miscellaneous problems, such, for instance, as the investigation of the cultivation of the pecan in the South; the investigation of stocks adapted to particular regions for the cherry, which fails at present in certain large fruit-growing section of the country, apparently because the stock upon which the nurserymen are grafting their young trees is not suited to the soil conditions of those sections of the country; and a number of other problems of that sort.

Now, in this analysis we have divided the general investigations into three heads. First, the administrative work, including salaries, including the salary of the pomologist and laboratory head, including salaries and materials, miscellaneous expenses, and reserve fund. Under these appropriations are allotted as follows: To the administrative branch of the work, $9,620; to the laboratory branch, $5,720; to miscellaneous expenses and reserve, $1,500; making a total of $16,840 for the general investigations in pomology.

For the field investigations in pomology, fruit making and storage together, which we handle practically as a unit, $12,300; viticultural investigations, $3,750; fruit district investigations, $3,000; miscellaneous pomological problems, $1,110. The total for field investigations, $20,160, as against $16,840 for the general investigation. The total making up the appropriation for this year, $37,000.

Now, is it your desire that I should go over in outline the lines of work we are engaged upon.

The CHAIRMAN. First tell us the needs of the increases. I think it will all develop as we go along.

Mr. TAYLOR. The particular features that we desire increases upon are these: First, for the purpose of employing and maintaining in Europe for the most part an expert who shall be able to report upon the experimental shipments we are making and to investigate the market conditions that affect the trade in fruit, both from this country and from other countries, we desire an increase of $5,000.

The CHAIRMAN. Have you not a man over there now?

Mr. TAYLOR. No; we have not been able——

The CHAIRMAN. You have had a man over there off and on, have you not?

Mr. TAYLOR. No.

The CHAIRMAN. I thought you sent a man over there.

Mr. TAYLOR. No; the only work we have been able to do in Europe was in connection with the Paris Exposition, where we made observations; and we have been making commercial shipments to commercial handlers in a number of European countries and securing their reports upon those shipments; but we have not been able to see the European fruit market through American eyes or to report back upon the shipments in American language.

The CHAIRMAN. Would not that be a matter for the consuls to do?

Mr. TAYLOR. It is a matter that requires a fruit man first; in other words, it requires a man familiar with American conditions and familiar with the fruit trade. It is a line that is distinctly specialized and one which our efforts to secure information on through the consuls have not been satisfactory.

Mr. GALLOWAY. I may say that this fruit export work has for its object the opening of markets for our farm products, for a great quantity of our fruit, particularly those grown on the Atlantic coast. We have felt the need for some time, and have been endeavoring to open our markets in a way that will make shipments abroad in such fashion that it will redound to the benefit of those fruit growers.

The CHAIRMAN. That is a question largely of supply and demand, after all, is it not? This year we have exported quantities of apples because apples were very high in Europe, and they have been sold for a profit. Next year that profit may disappear.

Mr. GALLOWAY. We are not so much concerned with apples, but we are primarily concerned with such fruits as peaches and pears that are grown frequently on the Atlantic coast. Our investigations show that if they can be gotten to the European market in good condition that will be an outlet for those fruits, and we have made trial shipments so as to determine definitely the cost of the work, and in order to find out definitely how much the profit would be if sold in the European market.

Mr. TAYLOR. I am very glad that this point has come up in this connection, for perhaps those who were present at the meeting last year will recall that one of the principal lines of experimental shipments we made last year and the year before was in an effort to determine whether eastern-grown Bartlett pears could be placed in commercial condition in foreign markets, especially in the London market. There had not been commercial shipments of Bartlett pears from the eastern part of the United States to Europe prior to 1901.

In that season we were able, in cooperation with growers, to make a test shipment. We had difficulty in getting refrigerator facilities on the steamers for the shipment, because the steamship people were not prepared to handle that kind of shipments and did not believe there was opportunity for development along that line in the European markets. We made a shipment of about 50 barrels, dividing it into barrels, boxes, and half boxes, packing in different ways, grading them so that the fruit was perfectly uniform in grade in each lot, and forwarded it in refrigeration and sold it in London, first requesting the attendance of buyers there. The results were very satisfactory so far as we could judge from a single shipment, the result being that the prices received for the fruit in Niagara County, where we secured the fruit, were on the average considerably above the average prices for fruit there.

Last season (1902) we secured a carload of fruit in the same way. It is necessary with these fruit tests to handle fruit in commercial quantities; it is not sufficient to put up a few packages and base the conclusion on the results of those packages. We put a carload through the same mill and in the same way and with results even more satisfactory than those of the previous year. Up to that time there had not been an export shipment of summer pears from the eastern United States successfully made. The buyers of this year have taken hold of this matter, as I indicated at our session last year was likely to be the case, and I yesterday received from the principal handlers in New York through whom this fruit goes abroad, an estimate that over 65 carloads of Bartlett and other summer pears had gone, chiefly from New York—some from New Jersey—this year.

Mr. HENRY. Were these under Government supervision?

Mr. TAYLOR. No, sir; we dropped Department pear work. We were satisfied when we reported last year that we had demonstrated it could be done, and pointed out the way.

Mr. HENRY. Have you ascertained anything further as to the proper degree of temperature?

Mr. TAYLOR. In our storage experiments on this subject we have verified completely the work of last year in order to make sure, and we are satisfied our conclusion of last year is correct; and I would say further, in that connection, that the storage warehouse men of the country have in general come to our ideas on that question.

Mr. HENRY. There was a difference of opinion between the transportation companies, if I recollect?

Mr. TAYLOR. Yes. We still hold a different view from the transportation companies, and that is one reason why we need this man on the other side. We need to know the exact condition in which those things reach London in comparison with the condition in which they were when they left here.

The CHAIRMAN. Can not that be ascertained through the shipper?

Mr. TAYLOR. We have not been able so far to ascertain it.

The CHAIRMAN. No one man could keep track of that over there, could he?

Mr. TAYLOR. Not in all markets at one time, and yet he can keep track of these particular test shipments—those critical shipments which we now lack any accurate report upon.

The CHAIRMAN. I thought you were beyond an experiment; that you knew just how to ship them.

Mr. TAYLOR. No, sir. The receivers at the other end and the steamship people still differ from 4° to 6° in their ideas of the proper temperature in contrast with our ideas.

The CHAIRMAN. What have the steamship companies to do with it?

Mr. TAYLOR. They control the temperature.

The CHAIRMAN. Will they not control it according to the idea of the shippers?

Mr. TAYLOR. No; not unless they take full compartments. The smallest compartment, with the exception of four, are five-carload compartments, and there are few individual shippers who can make five-carload compartment shipments at a time of this perishable fruit. So the question of temperature is one we must study, both on the ocean and at the other end. There are certain conditions in which shipments have reached there that they attribute to too low temperature. Our tests on land, using fruit out of the same orchards, at the same time satisfy us that that condition of the fruit referred to is not due to the lower temperature.

Mr. SCOTT. You insist on a lower temperature by 4° to 6° that the steamship companies think is necessary?

Mr. TAYLOR. We want a temperature of from 4° to 6° lower than they think is necessary, yes, or the receivers on the other side believe is right; and we are satisfied we are right, but the question remains to be demonstrated in a way that will satisfy them, and it is of very great importance in its effect on export trade of the future. The same question arises in the question of exports of peaches.

Mr. HENRY. Have there been any exports of peaches this season?

Mr. TAYLOR. Only in an experimental way. The crop of peaches was so short in the eastern States this year and the season in Georgia was so short at the ripening time and so rainy that we attempted but one experimental shipment of eastern-grown peaches this year. That landed on the other side in fair condition, although it was believed by the receivers to be injured by too low a temperature on shipboard. We do not believe the temperature was too low a temperature at all; we believe it was simply the fact of the wet season at the ripening time and prior to the ripening time that caused that deterioration of the fruit which they ascribe to the low temperature.

Mr. HENRY. What temperature do you advise?

Mr. TAYLOR. We advise on shipboard 33°, knowing that a temperature of 32° will not harm the fruit; we allow 1° for leeway.

Mr. HENRY. That was your statement last year, if I recollect correctly.

Mr. TAYLOR. Yes. And on the contrary a shipment that was made in connection with us, but without expense to the Department, from Oklahoma to Liverpool by a man who desires to find outlet for the future output of his region, was landed in Liverpool in fine condition and sold at prices very satisfactory. I have his letter here to the effect that he will next year go to Great Britain early in the season and make personal arrangements for the handling of fruit there on his own account. And I will say further, too, in connection with the commercial effect that the work is having, that a London house reserved space in a New York steamer for a five-carload shipment of peaches from Georgia early in July, and held it up to the last moment, hoping that the rainy weather would cease, so that they could get that fruit. The season was exceptionally unfavorable.

This shows the interest that has been aroused among the commercial men in that matter, and we believe thoroughly that it will be taken hold of and pushed by the commercial men just as soon as these questions of temperature are settled and a favorable condition exists.

I would like to read from the report of our London consignee on the shipment:

As soon as we had an opportunity of examining, we cabled Mr. French that the temperature of 33 degrees in the refrigerator was too low, the fruit being chilled, and we suggested that 40 degrees would be nearer the mark. We were somewhat disappointed, for had the consignment been in better condition higher prices would have been realized. We found the apples in fairly good condition, but easily bruised. * * * We do not think the Thurber peaches will succeed, the coloring being dark and not very taking in appearance.

These Thurber peaches were the only peaches we could get from Georgia this year. They are a white flesh peach. We desired to test the liking of the English buyer for those in comparison with the yellow ones we had formerly shipped. That is the peach we believe the best future exists for, and that is the variety of which the Oklahoma shipment consisted.

I will say further that in portions of Texas, where the industry is assuming large proportions, the growers are all looking toward the need for an export outlet when their present planting comes into bearing. It is a question which was not urged this year but is likely to become important this coming season, and we desire to work it out now we have it under way. In connection with those perishable fruits of which we made shipments a year ago from Delaware, we have continued shipments with generally favorable results. I believe, first, that we must depend upon express shipments to shippers in order to preserve these delicate fruits against injury, but we have found that from points as far south as Delaware we can utilize the fast freight service, and have secured the cooperation of the railroad companies in this matter and find that they are exceedingly interested in furthering the matter, and that we can depend upon freight service to the seaboard without icing, from points in Delaware. That makes a difference of nearly one-half in the transportation cost to seaboard.

The steamship people have this year showed a very marked disposition to favor the work, in that they are offering to open their compartments for practically any commercial shipments. This is especially true on the slower boats. Whereas in former years they did not consider it worth while, they are making concessions in that line now. In the matter of rates we are able to place in London now, refrigeration and delivery charges on the other side paid—we are able to place such carriers as that, holding three boxes of fruit, delivered on the auction block in London, for 35 cents from New York, a rate which brings it down to a commercial basis.

This is in contrast with a rate of over 60 cents that we were obliged to pay in our first shipments; and that is not a special rate to the Department, but a rate which is available to all commercial shippers this year. These pictures illustrate the methods of packing [exhibiting pictures to the committee.]

Mr. HENRY. Do you mean 35 cents from New York over there?

Mr. TAYLOR. Yes. The express rate from Delaware to New York, the regular rate, was 50 cents, but we succeeded in getting for the fruit growers the special rate of 40 cents.

The CHAIRMAN. Carload lots?

Mr. TAYLOR. No, sir. Our minimum was 100 carriers of this size. A hundred carriers is about the minimum; that would be about one-fourth of a carload. We are testing different packages; we are devising special packages to meet the needs of particular fruits. For instance, we have modified the regular six-basket carrier, which is known throughout the South generally as a six-basket peach carrier; we find the baskets are too small for those summer apples to pack advantageously, and we have made a special four-basket; the unit is the same, but the subdivision of the unit is different.

Mr. SCOTT. Four against six?

Mr. TAYLOR. Yes, sir. And our receivers report that this package is much preferable. It delivers the fruit in much better condition, and it shows off better, as you can see by this print. We are also testing flat boxes, a 20-pound package, which reduces the storage space occupied by a given quantity of fruit considerably, because it is more compact. The result on some varieties with this package have shown distinctly favorable to it; in other cases, not. But that work we shall need to pursue further.

As I have said before, we must reach the point where we can make our shipments of distinctly commercial size. That is the general objection we meet from shippers, that we must be able to handle some of these things after we get an index as to which is likely to be the better, we must handle some of those in carload shipments, so they can take the regular handling of all comers.

Mr. BOWIE. You mean so as to be made more economically?

Mr. TAYLOR. Not only that, but so they can be subject to all the exigencies and uncertainties of ocean handling, so that they will come down the same chutes of the ships at Southampton as other commercial lots do, and in every way receive the same handling.

Mr. BOWIE. Are these apples wrapped?

Mr. TAYLOR. Yes.

Mr. BOWIE. Is that the customary way to handle them?

Mr TAYLOR. No, sir; but with summer apples we have determined that point beyond any question I think, that those delicate apples must be wrapped.

Mr. BOWIE. Looking at those four baskets there, one looks like two?

Mr. TAYLOR. There are two tiers; there is a tray between them. It is a two-story carrier, you might say.

The CHAIRMAN. You need $5,000 increase for your agent abroad?

Mr. TAYLOR. For his employment and maintenance, and the supplemental work that will of necessity grow out of that; we shall have to keep records; we have to devise some way of obtaining records of the temperatures in transit on the ocean steamers.

The CHAIRMAN. Do you not think that is a matter that the shippers ought to attend to; do you think that is a governmental function?

Mr. TAYLOR. I believe it is where it affects definitely the character of the product on its delivery on the other side. In fact, experience shows that unless we undertake it it is almost certain to be done in the easiest way, which is not always the best way.

The CHAIRMAN. It will be done eventually in the way that pays the best; if they do not do it that way they will not do it at all.

Mr. TAYLOR. But it is often the case, at least it is our observation that it is very often the case, that the ocean line does not see things from the right side, they see the ship side of it——

The CHAIRMAN. The point is after you have proved it you can not force the steamship company to do it?

Mr. TAYLOR. Except through competition; if we can point out the best way, as in the case of our storage houses, where they are in competition with each other. If one adopts an improved method the others have to come to it.

The CHAIRMAN. That is so.

Mr. TAYLOR. And the principal thing is to convince them of the necessity of adopting it. It is just the same as with land storage in regard to the temperature of peaches and pears. As soon as we can demonstrate that——

The CHAIRMAN. Do you ever do that in regard to the storage of fruits, etc., on land, to any extent?

Mr. TAYLOR. Yes, we have here two bulletins that are being distributed, one on the cold storage of the pear and peach, the other on the cold storage of the apple. The results of our storage of the last two years have been these bulletins, and this is still in progress. These are bulletins which I would say contain the consolidated experience and observation and results of our work up to the present time—up to this present season; and these bulletins are being taken as guides by the land storage men.

The CHAIRMAN. I thought it had all been settled, temperatures and that sort of thing?

Mr. TAYLOR. No, sir. When we took hold of the question three years ago we found the whole matter of temperatures was in a theoretical condition.

The CHAIRMAN. Three years ago; oh, yes——

Mr. TAYLOR. And we had to work up to it from the beginning each time in order to know surely the condition of the material that we were using. The storage men have been handling apples as they were delivered to them, not knowing their previous history.

The CHAIRMAN. I think three or four years ago there were very few cold-storage plants for apples; I think they have all sprung up in the last two or three years, in the rural districts, at least.

Mr. TAYLOR. That is true, yes.

The CHAIRMAN. I should judge that, so that the questions in regard to them were all settled.

Mr. TAYLOR. No, sir; some of our most interesting work has been done in the city of Buffalo in the past year in determining the question, not only the question of temperature for pears, but also the question of the packing for pears to determine whether or not a package will cool quickly enough through its whole extent to insure the cessation of the ripening of the fruit, as for instance, in this plate [indicating]. These are pears one week after they were placed in storage. The upper one shows the condition of the fruit, the average condition of the fruit at the middle point of the barrel, and this [indicating] shows the condition next to the stave. The contents had not cooled rapidly enough to check the ripening in the middle, so upon moving the top layer you could discern a marked difference in the ripening and shading in the color. Now, that means, especially in warm weather, that a smaller package must be used for the storage of a perishable fruit like the Bartlett pear.

Our work has demonstrated that a 40-pound box, such as we are using in the export work, which has been found well adapted to that,

is very much preferable to the barrel as a storage package. The storage houses have even gone to this extent as a result of that: They have placed a higher relative rate upon pears in barrels than in boxes in order to destroy the use of barrels for storage, simply because they feel that the poorer-keeping quality in barrels will militate against their reputation as storage men if the stuff comes into their house; and the storage men on land are getting an account of it and shaping their work according to that very rapidly.

Another important thing has been the question of the necessity for prompt storing throughout after it is removed from the trees. I have here a water-colored plate—no, this happens to be a question of a difference of 4° in temperature, pretty nearly the difference we are discussing with the steamboats and the Englishmen at the present time. This was a 32° temperature for two months—no, this was the 36° temperature, and this a 32° temperature [exhibiting picture].

The CHAIRMAN. For how many months?

Mr. TAYLOR. Two months, which is about the commercial storage limit.

The CHAIRMAN. Of the pear?

Mr. TAYLOR. Of the Bartlett pear; yes.

The CHAIRMAN. This is about the most tender pear you have, is it not?

Mr. TAYLOR. Yes; and one of the best appreciated pears in the market.

A MEMBER. The sweetest?

Mr. TAYLOR. Not the sweetest; but it is a pear that has a combination of sprightliness of flavor and sweetness that makes it very popular.

Mr. GALLOWAY. There is a point that Mr. Taylor has not made, and that is that in the course of these investigations it has been found that pears picked from different parts of the same tree at different times of the day vary a great deal in keeping in good condition. A fruit, for instance, has a certain life to go through, and one day's difference in picking will make two months' difference, sometimes, in the time it keeps, that hinging upon the difference in temperature at the time of picking.

The CHAIRMAN. I should think there would be a good deal of difference as to whether the fruit was cool or not at the time it was picked.

Mr. GALLOWAY. And the question of soil has a good deal to do with it. The same fruit in the same orchard will have different keeping qualities, dependent on the nature of the soil.

Mr. TAYLOR. I am glad Doctor Galloway spoke of that fact. Here is a case of delay in transit [indicating on picture]. These specimens were kept in 32°, which is our approved temperature for pears. This one was stored immediately after picking [indicating on picture] and was removed from storage and this picture made three months after it was stored. In this case this was delayed ten days after picking before being placed in storage. It was stored in the same room, the packages being side by side, so that they were subjected to exactly the same conditions. The internal discoloration of this pear, which rendered it valueless for any commercial use, is thoroughly characteristic of delay.

The CHAIRMAN. That is, a long delay?

Mr. TAYLOR. Yes; but it has this bearing on this question. Shall we store Illinois pears in New York City or in Illinois; shall we ship them in common cars, or shall we ship them in refrigerator cars, which

will keep them cool? That is one of the most important things in connection with this whole matter, it is a question of where to store them.

The CHAIRMAN. Can there be any doubt of that question?

Mr. TAYLOR. As to where it is best to store them?

The CHAIRMAN. Yes.

Mr. TAYLOR. There can be doubt if the ultimate place of consumption is removed from the place of presumption. If, for instance, a certain amount of pears are to be eaten in London, it is a question of whether we should store them in Buffalo or New York or London and get them into that storage as quickly as we can. That is one of the reasons, also, why we need a man on the other side. There are facilities there for the work. We have endeavored to arrange for tests of these fruits on the other side to see how long they can be held there in good condition in the event they reach there on a day when the market may be down; but we have not been able to do it.

The CHAIRMAN. Who did all that for the beef people?

Mr. TAYLOR. I do not know.

The CHAIRMAN. I think they did it themselves.

Mr. TAYLOR. That may be. There were very large money interests concentrated in one holding in that case, so that they could afford to do it; but I do not know about that.

Mr. BURLESON. Would this man that you desire for the purpose of reporting on this fruit on the other side of the ocean be in the nature of an inspector; would the system be similar to the system that obtains in the inspection of beef?

Mr. TAYLOR. It has not reached that stage, but I will say this: That Canada does that; that Canada is working to develop her trade in fruits by not only inspecting before the fruit is shipped and requiring that the fruit shall come up to a certain definite standard, if it shall bear the name of Canadian produce, but also inspecting those lots upon arrival on the other side. That is one other reason why we desire to have this on the other side, for we know the Canadian inspectors are watching our shipments. We have that directly from them, and they are taking advantage of whatever grows out of it. They are able to take advantage of it even more directly than we ourselves under the present state of affairs.

Mr. BOWIE. Why?

Mr. TAYLOR. For this reason: Perhaps they are able to profit by our mistakes.

Mr. BOWIE. Because we have not a man to take it up?

Mr. TAYLOR. Yes.

Mr. BOWIE. And they would not if we had a man there? Is that what you mean to say?

Mr. TAYLOR. We would be able to get the same good out of it that they do.

Mr. BOWIE. But now we do not?

Mr. TAYLOR. No; we do not.

Mr. SCOTT. Suppose one lot of pears, grown in Illinois, was shipped to New York before being placed in cold storage, and that another lot of pears, grown in Illinois, was placed in Illinois cold storage at once upon being picked and at the end of two months taken out of storage and shipped over in common cars to New York? Which of those two lots would be in the worse condition at the end of two months?

Mr. TAYLOR. Very much would depend upon the weather that the

two lots encountered in transit—that is, upon the temperature. If the shipment from Illinois to New York occurred in warm weather, as for instance, September, and the shipment out of storage from Illinois to New York in a common car occurred in January, without too low a temperature—that is, not freezing—that lot which was shipped in January would probably be in better condition.

Mr. SCOTT. Assuming that the shipments in both instances would be the same, which would be in the better condition?

Mr. TAYLOR. That I could not say; we have not gotten that far along.

The CHAIRMAN. Now, pass to the next $5,000 item.

Mr. TAYLOR. The next is to take up work on the Pacific coast with special reference to the difficulties that have arisen there in the marketing of the citrus fruits particularly.

The CHAIRMAN. What difficulties?

Mr. TAYLOR. The citrus industry you might say in a general way—the orange and lemon industry is what I mean—is in this condition. There are a very large number of producers who have attempted different ways of shipping. They have been very successful in their packing. They have worked out methods I think far superior on the average to the methods prevailing in the Eastern States in the handling of the fruits, but they have found increasing losses, and last year particularly they found that they were meeting with very heavy losses in transit. We have been urged during this year to come on immediately—we were not able to go—but an incidental investigation I was able to make about four weeks ago shows that a conservative estimate of the losses on California oranges and lemons in transit during the shipping season which had then just closed amounted to over $400,000. That is the statement, not only of growers, but of the heavy shippers, all of whom urge the importance of the work.

The CHAIRMAN. It all comes east in refrigerator cars, does it not?

Mr. TAYLOR. Practically all. Some of it is shipped in ventilator cars without ice, especially at certain times of the year. But we suspect that a large part of the difficulty is before the fruit reaches the packing house and before it goes into the cars. There are certain questions involved in the transportation and handling of the cars——

The CHAIRMAN. Those would be very simple experiments, would they not?

Mr. TAYLOR. They necessitate a thorough investigation of the orchard conditions in California, affecting the orange and lemon. The question of the effect of irrigation upon the carrying quality of the fruit; the question of the time of picking to secure greatest durability of fruit; and, in the case of the lemon, the question of controlling the crop so that, instead of coming on the market in the winter when lemons are little desired, it shall come on the market in the summer when they are in great demand, seem to be the most important questions.

A large part of the lemon crop under the present conditions has to be picked between the 1st of January and the 1st of March, and there is little demand for lemons and prices are low during that time. That is one of the cases, too, where there are cooperative efforts. The storage people, the growers, and the railroads have been at work on this problem. They undertook to settle it last year by cold storage, but they did not satisfy themselves that they made any distinct progress, and they turned to the Department for assistance in this matter. They offer us all facilities necessary, and the principal expenditure on our

part will be the placing of a man there who shall take up that problem and work it out, and the maintenance of that man.

The CHAIRMAN. Have you not some man here now that you could send there under your lump sum?

Mr. TAYLOR. No, sir; we are working day and night now in our effort to carry things along.

Mr. BOWIE. Are there any Government employees working at night except members of Congress?

Mr. TAYLOR. I think you will find them in the Department of Agriculture.

Those are the two lines for which we ask particular consideration at this time. There is the general line of detailed storage investigations that the storage men of the country, the American Warehousemen's Association in particular, have urged us to take up. They have followed the work; they call for addresses and reports, and have copies of these bulletins to distribute to their patrons who are storing with them. They desire very much that we shall take up and go thoroughly into the questions of humidity in storage and of actual effect of freezing upon these things and the effect of thawing out, so as to restore the product to wholesome condition after it has been frozen. That can only be taken up in a cold-storage laboratory. That the Secretary has not asked for in the estimates, and we do not present that at this time; but it is a line which, we believe, will yield far-reaching results, not only to the storage industry but to the fruit-planting industry, because every one of these things, as it affects the grower, has its reflex influence upon his methods of cultivation, the varieties he grows, the way in which he picks and ripens, the stage of ripening he permits the fruit to reach before picking; and those are the two that we especially desire to pursue further.

I have a good deal of other matter, but that is the gist of it.

The CHAIRMAN. Anything further you would like to say——

Mr. TAYLOR. I think perhaps that is sufficient, unless there is some other particular point that the committee would like to inquire about it.

I should say this: That in the case of our viticulture, which I mentioned, we have established in California certain experimental vineyards in which we are testing the grape stocks which are known to be resistant to the phylloxera insect that troubles them, and in which we are endeavoring to determine the best vines for the particular kind of soils. It is a very important point. It has been found in Europe to be one of the most important things that has been given a great deal of attention. But their work has not been particularly important because they have been trying soils that are resistant to lime, whereas our soils on the Pacific coast are but few of them limy.

In some cases the soils there have an excess of water. That is in regions that are irrigated. In other cases we must get vines that are resistant to drought, and those are found on hillside locations, and that at the same time are sufficiently congenial to the important types of grapes that are to be grafted upon them, as you will understand that it is necessary to provide the grape you desire to grow with a different set of roots from those that belong to it, in order that it may resist the insects and endure long enough to produce commercial crops. We are doing that work in cooperation with the experiment station in California, although it is necessary for us to pay the entire expenditure. Still we have their cooperation.

Mr. WRIGHT. They raise that fruit to maturity in those experiment stations. Could not they attend to the picking of it under instructions from here, as well as for you to have some one there to attend to it?

Mr. TAYLOR. Perhaps I was misunderstood in this particular. It is this viticulture work. They are growing no fruit. We are in cooperation with them in this viticulture. In fact, we have raised these vineyards on the ground of private growers, and we have underway there that comprehensive investigation of the viticulture problem which we believe will yield large results to that industry. It represents an investment out there of about $100,000,000, and there are sections of the State where grape wood is for sale and is advertised on the fence posts which you see as you drive along. That is owing to the failure of the vines to withstand the insects. It has passed from the entomological stage to the practical stage and that is where we take it up.

Mr. BURLESON. Where did those vines originally come from?

Mr. TAYLOR. Those vines were originally American vines, but they have been chiefly developed in France, where this insect first became troublesome. It did not reach the Pacific coast until long afterwards. This insect was native to France, and it did not appear in the United States until long after it appeared in France and Spain.

Mr. BURLESON. Who originated the idea of the resistant root?

Mr. TAYLOR. I think, if I am not mistaken, the credit was equally due to a French investigator and to our Doctor R——, late entomologist in the Department.

The CHAIRMAN. Have you the bill before you?

Mr. TAYLOR. Yes, sir.

The CHAIRMAN. Take page 10, right at the end, you omit the word phylloxia?

Mr. TAYLOR. Yes, sir.

Mr. GALLOWAY. Phylloxia is simply an incident there. There are other things just as important.

The CHAIRMAN. You are the pomologist on the lump-sum roll, are you not?

Mr. GALLOWAY. Mr. Taylor is the assistant pomologist.

Mr. TAYLOR. I am the pomologist in charge of field investigations, which is my exact title.

The CHAIRMAN. What is your salary?

Mr. TAYLOR. $2,500.

The CHAIRMAN. You are of the lump sum?

Mr. TAYLOR. No; I am on the statutory law.

Mr. GALLOWAY. That is on page 8.

The CHAIRMAN. One pomologist?

Mr. GALLOWAY. Yes.

The CHAIRMAN. Then you are not the assistant pomologist?

Mr. TAYLOR. No, sir; I rank next to Colonel Brackett, the pomologist. The $2,250 place is held by Mr. Powell, who is associated with me in the work I have.

The CHAIRMAN. Is it not rather putting the cart before the horse to place so many of these employees on the temporary roll? It is really becoming a permanent roll.

Mr. GALLOWAY. It is permanent in a way and it is temporary in a way. The fact of the matter is this: It enables us to economize in the matter of salaries, as I have explained before. When we had our reorganization several years ago we did away with divisions and we

have no divisions in our Bureau now; we simply have offices and our offices are all interchangeable. When we find it necessary we can take a man in one office and put him in another office and then put him somewhere else. Before this we could not do that; we had fences.

Mr. BOWIE. You have knocked the fence down?

Mr. GALLOWAY. Yes.

Thereupon, at 4.20 o'clock, the committee adjourned until to-morrow, Friday, January 8, 1904, at 10.30 o'clock a. m.

WASHINGTON, D. C., *January 8, 1904.*

The committee met at 10.35 o'clock, the Hon. James W. Wadsworth in the chair.

There appeared before the committee Mr. Beverly T. Galloway, chief of the Bureau of Plant Industry, Department of Agriculture; Mr. William J. Spillman, Agrostologist, and Mr. Frederick C. Coville, Botanist, of the same Bureau.

The CHAIRMAN. Gentlemen, the committee will come to order. Doctor Galloway, which one of you gentlemen is next on the programme?

Mr. GALLOWAY. Mr. Spillman is next on the programme, and he will discuss the work of grass and forage-plant investigations.

## STATEMENT OF WILLIAM J. SPILLMAN, AGROSTOLOGIST.

Mr. SPILLMAN. Mr. Chairman and gentlemen, I have not had charge of the grass and forage-plant work of the Government very long, having taken charge of it just two years ago, and for that reason I am not as familiar with the work of the Department as some other gentlemen may be; but I am getting familiar with the grass and forage-plant work. There are a number of lines of work of more or less importance to agriculture in the country. Of the 289,000,000 acres of cultivated land in this country 61,000,000 acres are devoted to grass, to hay, and to forage plants, and I am dealing largely with that part of our agricultural area. In addition there are 124,000,000 acres devoted to pasture, and of that area 80 per cent in the United States is wild land, used mostly for ranges.

That is our line of work, with the classes of problems relating to the various crops that are grown for hay and fodder. There are also some problems connected with putting up hay and marketing it. Then there are a number of wild grasses that we are endeavoring to make tame grasses. And there are other miscellaneous lines of work that I will work up as I come to them in order.

Now, the work of propagation, I think, is the most important of our work at present, particularly that of alfalfa and that of clover. The alfalfa crop has received a great deal of attention in our office this year; in fact, we could not avoid giving it a great deal of attention. About one-half of the correspondence of our office relates to that crop alone, and this has been so for the past year and a half, or perhaps two years.

Mr. SCOTT. Can you give us some idea of the volume of this correspondence?

Mr. SPILLMAN. The alfalfa letters will probably run from 10 to 75 a day, averaging about 35 or 40. Of course we have now some bulletins that have been gotten out which are fairly satisfactory, and in

some cases all that is necessary to do is to send to the writers of these letters copies of those bulletins. We are now preparing another bulletin on the alfalfa particularly, which we hope will answer practically all of this correspondence.

Now, there is something peculiar in the history of this crop. It was introduced into this country on the Pacific coast when the pioneers crossed the mountains in 1849 and 1850. They found the monks in the convents out there growing alfalfa for the donkeys and mules. As irrigation developed in the West, alfalfa developed with it, so that it has always been the hay crop of the irrigated West. Now, in Onondaga County, N. Y., alfalfa has been grown as a hay crop ever since the year 1754, or for one hundred and fifty years. Over in Madison County, N. Y., alfalfa is practically the only hay they grow, and that has been the case for generations. In Hamilton County, Ohio, 2,000 acres of alfalfa are grown. In Lake County, Ill., just north of Chicago, there were 8,000 acres of alfalfa last year. In Arkansas a large amount was grown, and that is substantially all that was grown east of the west line of Missouri.

Mr. LEVER. What is the average production per acre?

Mr. SPILLMAN. The average is between 2½ and 3 tons throughout the whole United States.

Mr. LEVER. What is the average price per ton?

Mr. SPILLMAN. The price of hay is governed so much by distance to market that it is difficult to say. I know that in certain places in the United States the price is $3.50, but in the places where the hay is grown near to market the usual price is all the way from $10 to $18 per ton.

The CHAIRMAN. I have paid $6 for it up in my country last fall.

Mr. SPILLMAN. That is good cheap hay. The Eastern farmers have become more interested in alfalfa than in any other forage plant. I took occasion some time ago to look over the leading agricultural papers of the country, and to my surprise I found that all the agricultural papers within the past year have devoted more space to alfalfa than to all other crops of any kind put together.

Mr. BROOKS. Where it has been grown for a long time, as in Onondaga County, N. Y., does it lose any of its essential characteristics?

Mr. SPILLMAN. No; it is just as good in Georgia and Louisiana and Ohio and Arkansas as any clover is.

Mr. BROOKS. It will last, will it?

Mr. SPILLMAN. I know of one field in New York which the owner claims was sown forty years ago. It is but a little patch, but it still yields good crops of hay.

Mr. HENRY. What are you doing in New England?

Mr. SPILLMAN. We are carrying on some experiments in connection with the Connecticut Experiment Station, and Professor Clinton says there are a number of soils there in which it is doing very nicely on a number of farms.

Mr. HENRY. There is an area in South Windsor known as the Podunk section, and Professor Whitney thinks it is adapted to alfalfa.

Mr. SPILLMAN. In fact I think any eastern soil not underlaid by rock and not of a wet nature will grow alfalfa. It is the most delicate of all hay plants in its early life, and the most tenacious of life when once started.

Mr. SCOTT. It thrives best in loose sandy soil?

Mr. SPILLMAN. Yes; in a deep porous soil with a deep porous subsoil.

Mr. GRAFF. How many years will it stand well before it runs out?

Mr. SPILLMAN. That depends altogether upon its treatment and upon the presence of weeds. If nothing is done to it except to cut it three or four times a year for hay, and the weeds are kept out of it, it is good for three generations, say seventy-five years.

The CHAIRMAN. You said that up in Onondaga County, N. Y., there was a little patch. Has it grown patchy with age?

Mr. SPILLMAN. Yes; I think it has, but I think cattle have been turned in on it, and that accounts for that. If it had been handled properly and had no stock upon it, and kept for hay, and the weeds kept out of it carefully, we do not know the limit of life of it.

The CHAIRMAN. You do not advise the pasturing of it?

Mr. SPILLMAN. No. If I had an alfalfa field I would fence off part of it and pasture it with hogs, and keep the other part separate, and you can make more money out of it in that way than by selling hay at $8 a ton.

Mr. SCOTT. Did you mean, in answering Mr. Graff's question a moment ago, that it would last three generations?

Mr. SPILLMAN. Yes; three generations, or seventy-five years. There are well authenticated cases of fields in Europe, where they have been handled with care, where the fields are at least seventy-five years old.

Mr. GRAFF. What are the advantages of alfalfa over clover?

Mr. SPILLMAN. Its principal advantage is in greater yield. You know the great value of red clover lies in the fact that it is rich in nitrogen. Alfalfa is 50 per cent richer in nitrogen than red clover.

Mr. GRAFF. Does it grow in Illinois?

Mr. SPILLMAN. Yes; just as finely as I have seen anywhere. I have seen it at Urbana, Ill., on that typical black soil of Illinois.

Mr. BURLESON. It requires a subsoil base, does it not? It has a tap root?

Mr. SPILLMAN. No, it does not grow to the water. It can use a great deal of water, but it wants that water in homeopathic doses. If the roots should grow down to the water they will rot wherever they touch the water.

Mr. SCOTT. Do the plants send down the deep tap roots in the Illinois soil that they do in the loose Kansas soil?

Mr. SPILLMAN. It sends it down, but not so deep. Instead of 15 feet deep, as in Kansas, in a more compact soil it will send it down only 6 or 7 feet deep.

The CHAIRMAN. And be just as good?

Mr. SPILLMAN. Yes; if the other conditions are all right.

The CHAIRMAN. I have seen it growing in very hard clay, Professor.

Mr. SPILLMAN. Yes, sir; I was talking alfalfa over in Canada recently, and I made the statement that alfalfa was not adapted to hard clay soil, and there was an immediate uproar about that, and there were 50 men there who said they were growing it on hard clay soil.

The CHAIRMAN. I am going to try it. I am afraid, though, of the slate. The rock is a little too close to the surface.

Mr. SPILLMAN. The one essential thing is that the soil must not be full of standing water at any time of the year. If you can avoid that it will grow upon almost any type of soil. But hard clay soil here and hard soil or clay with 10 inches of rainfall are different things.

With 30 inches of rainfall it would grow, but with 60 inches it would be drowned out. It was thought for a long while that it would not grow without irrigation, but that is a serious mistake. I have seen those parts of the country subject to drought. I have seen an 800-acre field of alfalfa that never had any irrigation at all; they had not a drop of rain there for six weeks, but on that account the alfalfa missed just one crop, and then a rain came, and within a month they had an abundant crop.

Mr. LEVER. What are the results of your experiments in South Carolina with alfalfa?

Mr. SPILLMAN. Very satisfactory results, indeed. All over the State we have found soils on which the alfalfa thrives beautifully. I know of one pasture in South Carolina which is said to be 40 years old. The owner of the farm did not know what it was, and he asked me what it was.

Mr. LEEVER. Was that near Lawrence?

Mr. SPILLMAN. Yes, sir. It was at Lawrence.

Mr. SCOTT. What do you consider the proper rainfall under which alfalfa can be properly grown?

Mr. SPILLMAN. That is an interesting question that we do not know fully about yet. I have been at this only two years, and that is the thing that we are working at now—to find the minimum rainfall with which we can produce alfalfa. In the State of Washington we can grow it with 10 inches of rainfall.

Mr. SCOTT. I was going to say we have grown it very successfully in western Kansas with 10 inches.

Mr. SPILLMAN. When the rain is distributed favorably, it can be grown with 10 inches; yes.

Mr. SCOTT. I think very likely it depends upon the subirrigation. In the sections of Kansas where it grows with small rainfall there is a heavy underflow, 15 or 16 feet below the surface, and the long taproots of the plant no doubt are moistened all the time.

Mr. SPILLMAN. Mr. Burleson spoke a few minutes ago about subirrigation. The water will rise by capillarity 5 or 6 feet from the level of the water table below, and that is advantageous to the plant.

Mr. BURLESON. And with such a condition of subirrigation I suppose alfalfa would grow with comparatively little rain, would it not?

Mr. SPILLMAN. Yes. In the State of Washington I know of a place where the average rainfall is not more than 7 inches a year, and they grow alfalfa there and never think of irrigating, but there is a subirrigation under the surface in that region. In the arid region the farmers do not like to see the soil water come too near the surface on account of the alkali that is in it. Now, we are experimenting with a good many varieties of alfalfa.

A great many of our important crops have not been split up into their varieties. Now, we have varieties of wheat that are distinct and unified, and the same is true with corn and oats; but we have no distinct varieties of timothy and no recognized varieties of red clover and alfalfa. But there are, nevertheless, varieties of alfalfa, the same as with wheat, but they are all mixed up together. A field of alfalfa may consist of 60 different varieties. Now, we are separating those varieties and securing still other varieties from other regions. Last summer one of the officers of our Bureau sent a man to Turkestan, Asia, to get alfalfa seed there to suit unusual conditions here. He

secured some seed that is grown in an exceedingly cold winter, to be placed in the States in this country like the Dakotas, where the winters are very severe; and we are growing seed for distribution up there in the future. We are getting seeds from arid countries, and we hope to have varieties that will grow readily with 10 inches of rainfall. That, however, has yet to be determined, and that is some of the work we want to do in the immediate future. Now, this alfalfa crop has been made important in the East, to some extent, by clover sicknesses. There has been difficulty in the East during the past six or eight years in getting a stand of clover, and that has made farmers more interested in the alfalfa crop.

Mr. HENRY. Do you know what is the cause?

Mr. SPILLMAN. It is not the same thing always. It is like the disease called the heart disease, where if a man gets shot through the heart he is said to die of heart disease, but that term may be applied to a large number of other diseases of the heart. In some cases it is due to acidity of the soil, in other cases bacteria, and in some the soil is worn-out.

The CHAIRMAN. I think that last is probably the most frequent cause, and if it happens to be dry at the wrong time you won't get clover. If you have rain at the right time, you get the clover.

Mr. GRAFF. Is alfalfa harder to get set than clover?

Mr. SPILLMAN. It is easier to get the stand. If you do certain things, you will get a good stand of alfalfa. Alfalfa will grow under conditions where clover will not grow at all. Alfalfa will grow in southern Texas, and there is difficulty in getting clover to grow anywhere in Texas. Besides, alfalfa lasts longer and yields a great deal more of richer food than clover does. I know of some regions where the work horses are fed on alfalfa all the year round. That is not a scientific way of feeding horses, but——

The CHAIRMAN. But the horses do their work all right?

Mr. SPILLMAN. Yes; fairly well. I know other men who feed alfalfa and barley together and plow 3 acres a day with the team, but a man who uses alfalfa alone for his horses can plow only 2 acres a day.

Mr. BURLESON. Speaking of growing alfalfa on the light sandy soils of Kansas, is there not great danger of the sand whipping the young tender plants to death before they come up high enough to withstand it?

Mr. SPILLMAN. If you had a sand storm out there before the plants got 3 inches high you would have to sow it over again. When the sagebrush drifts off the sand drifts very badly. Plants of that sort have lately been put under irrigation, and there is great difficulty of preventing the soil from blowing away. But if they can have favorable weather, with no wind, until the plants can get a stand, the sand quits drifting and the plant grows.

Mr. BURLESON. What is the depth of that sand?

Mr. SPILLMAN. From 50 to 100 feet; perhaps deeper in places.

Mr. BURLESON. And when you once get the stand of alfalfa, it does fairly well?

Mr. SPILLMAN. More than fairly well in that section. I know of a man there who gets 8½ tons an acre from it.

The CHAIRMAN. Where is this?

Mr. SPILLMAN. A man at Sunnyside, Washington State, in the Yakima country. But I should say he is a good farmer. A poor farmer would get less. There are three cuttings in a season, sometimes

four in some districts, as Doctor Woods spoke of yesterday, where they get alfalfa nine times a year. They usually count on a ton on a cutting with poor farming, and a ton and a half per cutting with good farming.

The CHAIRMAN. There is no use in top-dressing it?

Mr. SPILLMAN. Yes; it will pay well.

The CHAIRMAN. With barnyard manure?

Mr. SPILLMAN. Yes. The best barnyard manure in the world is that just fresh from the barn.

The CHAIRMAN. Drawn out in the winter?

Mr. SPILLMAN. Yes. And when drawn out that way you can get the liquid manure as well as the solid, and the liquid is 20 per cent better than the solid.

Mr. GRAFF. Is that always true with reference to manure?

Mr. SPILLMAN. Yes; practically always.

Mr. GRAFF. That applies to all conditions of soil and plants?

Mr. SPILLMAN. Yes. If the feed and bedding is all cut into quarter-inch lengths, that manure is short manure to start with, and if you take the liquid and solid together you will get 25 to 50 per cent more fertilizer on the land than if you were to let the manure rot. We have careful data on that.

Mr. HENRY. There is no doubt about that.

Mr. SPILLMAN. If you knew the name of the man who prepared it you would accept the results without question.

Now, to show you the interest that is taken in alfalfa: The price three years ago ran about 10 cents a pound. The interest has increased so that the price is now 20 cents. And when an announcement is made that there is alfalfa seed anywhere in the Eastern States there is an immediate scramble for it, and I think five times as much could be sold as is now produced and available.

Mr. HENRY. How much do you sow?

Mr. SPILLMAN. In some places in the Ohio Valley they sow 30 pounds, but 20 pounds is considered the standard. At Dallas, Tex., a seed house sold over 500,000 pounds of alfalfa. They import all they can get, and they also import strange new things and sell them for alfalfa.

The CHAIRMAN. I paid $9 a bushel last year.

Mr. SPILLMAN. That is 16 cents a pound.

Mr. BROOKS. Are the western-grown seeds as good as the eastern-grown seeds?

Mr. SPILLMAN. We do not know yet where the best seeds come from. A great deal comes from Kansas and Utah, and some from Texas. We are having alfalfa seed grown now in practically every State in the Union.

The CHAIRMAN. It will surely come; that price will fetch the seed.

Mr. SCOTT. What is the relative value of the alfalfa straw after thrashing, compared with the straw cut for hay and not thrashed?

Mr. SPILLMAN. The farmers in Kansas tell me that that is pulverized alfalfa after going through the thrashing machine, and the leaves break up and make a dust which the cattle eat very readily.

The CHAIRMAN. That is better than timothy, a good deal.

Mr. SPILLMAN. Oh, yes; it is more nutritious than timothy.

Mr. LEEVER. What kind of a machine do you use?

Mr. SPILLMAN. A regular clover huller.

The CHAIRMAN. What is the usual yield per acre?

Mr. SPILLMAN. Eight bushels would be a big yield, 5 fair, and 3 bad. One man with whom I am in communication got only 2 bushels to the acre, but he got $10.40 a bushel for it, or $20.80 for that seed; and besides, he had the hay left, and three other crops of hay in addition to that.

Mr. HENRY. Which is the best crop for seed, the first or the second?

Mr. SPILLMAN. I think the second, but it is yet to be definitely determined which of these crops is the best for seed. It is claimed that there are not bumblebees enough during the first crop to properly fertilize the blossoms, but in the second crop the supply of bumblebees is sufficient.

Mr. BURLESON. When is the best time to plant?

Mr. SPILLMAN. South of the Ohio River the best time to plant is in the early fall. North of the Ohio River the best time is in the early spring. But in the Southern States the best time is in the early fall. The reason for that is that the alfalfa will get the good start before the weeds come up. But if sown in the very early spring it gets a good start before the weeds start. I know one gentleman in Texas who has 3,000 acres of land, and has 1,050 acres of it in alfalfa, and he says he will put the other 2,000 in alfalfa and buy 3,000 acres more, and put that all in alfalfa. This crop, gentlemen, is going to revolutionize agriculture in this country.

Mr. BURLESON. Who is that man in Texas you speak of?

Mr. SPILLMAN. Mr. Smith, in Grayson County:

Mr. HAUGEN. What is the best time to plant in Iowa?

Mr. SPILLMAN. In the early spring. I would sow it with early oats, and then cut off the oats for hay, and give the alfalfa a chance. In Iowa along about the first two weeks in April would be the best time to start it.

Mr. BURLESON. Are oats a quicker grower than alfalfa?

Mr. SPILLMAN. Yes.

Mr. BURLESON. Why would not the mixing of oats with alfalfa protect the alfalfa in those sands in Kansas.

Mr. SPILLMAN. I think that is a very good suggestion; it never occurred to me before.

Mr. GRAFF. Do you recommend the growing of oats with alfalfa in Illinois?

Mr. SPILLMAN. Yes; in the early spring in Illinois, as early as you plant any crop.

The CHAIRMAN. As soon as the ground is ready?

Mr. SPILLMAN. Yes; and sow half a bushel of oats only. The object is to keep the weeds from coming up and smothering the alfalfa. If the weeds do come up in alfalfa, it is absolutely necessary to mow that field frequently to keep down the weeds. The next year the alfalfa will take care of the weeds. One of the most important discoveries we have made in the last year—and that is particularly important to the South—is in respect to the Johnson grass, which is the worst pest of a weed known in the United States.

Mr. BURLESON. I approve of that.

Mr. SPILLMAN. And alfalfa and Johnson grass grow together simply beautifully. You can sow alfalfa right down on the very worst kind of Johnson land, and in a year or two there will be no Johnson grass in it. And if the Johnson grass is there, it will absolutely improve the quality of the alfalfa.

Mr. BOWIE. You speak of the Johnson grass as a pest, do you, because you can not get rid of it? Is it not a pretty good grass for feed?

Mr. SPILLMAN. We speak of it as a pest because we can not get rid of it; yes.

Now, I am going to speak of the work we are doing with Johnson grass next. We think these are practical problems, and will pay interest to the practical farmers of the country. We are doing some similar work with red clover, and among the things we have run on to is this, that in the clover-sick country, where the clover does not get a stand, owing to difficulties of weather, we have found that by sowing timothy and clover together in the latter part of August or in the late summer or early fall you can get a good stand much more quickly than by sowing in the usual way, and the next summer you get two big cuttings of hay.

Mr. HENRY. You are entirely right. In New England it is not safe after the middle of August, preferably the last week in July or the first week in August. It has a much better stand and a surer crop than when sown in the spring.

Mr. SPILLMAN. I know one farmer who gets three big cuttings of hay the next year, and two the year after that, but he is a very unusual farmer.

Another thing we have recently discovered is a variety of clover from Russia that has no hair on the leaves of the stem. That is one drawback with clover. It is fuzzy. That fuzz collects the dust and that makes it hard to cure the hay. Now, we have discovered a variety that has no fuzz on it at all. It is as clean and sleek as an alfalfa plant.

Mr. HENRY. Is it a red clover?

Mr. SPILLMAN. Yes; a variety of red clover. We are experimenting with that and we want to put it into the hands of the farmers just as soon as we can. We are growing it on a rather large scale in Wisconsin; we are developing it there, and are going to spread it over the country wherever conditions are adapted to it.

Another important matter is that timothy and clover are sown almost universally all over the hay-producing sections of this country. Clover ripens two weeks earlier than timothy; so that that hay is never the best hay—you either cut it too green or too ripe. We are now trying to get a kind of clover that will ripen simultaneously with the timothy. We have good prospects of success. But that is a tedious work and will require a good deal of application and time.

Mr. HENRY. What comment have you to make on red top?

Mr. SPILLMAN. That is not as palatable a grass as timothy or orchard grass, but it a very excellent grass, and in New England it is popular. It is also sown in New York and Pennsylvania, and also in Southern States and in Illinois. The red top seed is grown in Illinois, in Clay County and in adjacent counties, and is a good grass.

The CHAIRMAN. Rather a wet-soil grass?

Mr. HENRY. A fine pasture grass?

Mr. SPILLMAN. Yes. One of the best lawn grasses, called the Kentucky blue grass, is strictly at home with red top.

Mr. BURLESON. I suppose you derive the clover from a species of seed selection?

Mr. SPILLMAN. Yes; we do. We find in the case of timothy a whole

lot of varieties mixed together, as much mixed as varieties of wheat. The same is true in the case of clover. We know there are some late-maturing plants, and also in the case of timothy; and we are working on that kind of plant.

Mr. HENRY. Were you ever in communication with Mr. Olcott? He is an expert on grasses.

Mr. SPILLMAN. Yes; I know of his work.

Mr. HENRY. Speaking of the different varieties of timothy, he has potted a large number.

Mr. SPILLMAN. Yes. And of Kentucky blue grass he told me the other day he had 232 varieties of blue grass. I have a friend up in the State of Washington who has 15 varieties. But Mr. Olcott says he has 232. In the case of blue grass and timothy they come through the seeds strictly, but from clover they do not. But we know how to make them come through the seeds.

Mr. HAUGEN. What kind of seed would you sow on a low peat ground?

Mr. SPILLMAN. Ordinarily, for low ground I would recommend red top and Alsike clover. I would mix all the wet land grasses together, timothy, and blue grass, and all. Now one other class of clover which is very important, and which we are working successfully with, is the crimson clover. It is introduced from Germany. It is sometimes called German clover.

Mr. LAMB. It is called German clover in my country.

Mr. SPILLMAN. Yes; it comes also from Sweden and Norway. It is a good hay, and very prolific, and it is a magnificent fertilizer.

The CHAIRMAN. We do not use it as a hay, but as a fertilizer.

Mr. SPILLMAN. Its best use is as a fertilizer.

Mr. LAMB. It is good feed when green?

Mr. SPILLMAN. Yes; but there is this peculiar thing about it. When horses eat the hay it makes witch balls in their stomachs. The balls are as round as a ball and as hard as a stone, and these balls collect in the stomach of the cattle and are very detrimental to the digestive functions. The flowers make the witch balls, and it is dangerous to have the horses or cattle eat it.

The CHAIRMAN. Is that the reason why clover is not considered good for horses?

Mr. SPILLMAN. Yes; if clover is well cured it may be good for horses, but it is not always well cured.

Mr. HENRY. Can you tell us under what conditions crimson clover is superior to the other clover?

Mr. SPILLMAN. It will grow in the South where other clover will not grow. It is a very important matter to fertilize an orchard properly, and these clovers produce nitrogen more cheaply than you can buy it. And if you have your crop of apples practically maturing you can sow the clover and it will keep the ground from washing, and next spring you turn that under and fertilize your orchard. That is a valuable use for crimson clover.

Mr. HENRY. As a hay crop, how is it?

Mr. SPILLMAN. It is not superior to the red clover except where they can not grow the red clover.

Now we have another variety of clover. We have a patch of it about the size of the dimensions of the top of this table. It grows high and looks as if it would yield 3 tons to the acre. I have been unable

to buy any seed of that kind. I do not know where this came from. I found it growing in the grass garden when I came here. I am saving the seed of that grass very carefully, and I am going to plant it by hand, either in the spring or fall—I have not made up my mind just when.

The CHAIRMAN. Was it put in by Mr. Scribner?

Mr. SPILLMAN. I do not know who planted it, but it is a wonderful thing. I have found a few references to it in literature, and it is said to make good hay. From the way it is growing in our grass garden I know it will yield a big crop.

Mr. SCOTT. Does it spread?

Mr. SPILLMAN. Oh, no; not of its own accord. It would spread by the seed, but we are saving every seed of it carefully. As soon as we get seed enough we are going to try to find out where it will grow best, and so on.

Mr. GRAFF. How do you ascertain the food value of those leguminous plants?

Mr. SPILLMAN. By feeding them in comparison with other things that we already know of.

Mr. GRAFF. It is not done by chemical analysis?

Mr. SPILLMAN. Yes, we carry on chemical work in connection with it. That requires a careful laboratory experiment. We are doing that now with the Missouri Station and several others. Here is a crop [exhibiting a photograph] showing the production of alfalfa on a farm in Missouri. I do not know how familiar some of you gentlemen are with the West, but those of you who are from the West will probably feel homesick when you look at that picture. That is typical of the way alfalfa fields look in the West.

Mr. BOWIE. To what extent is the alfalfa grown in the South?

Mr. SPILLMAN. It is grown in small patches in every State of the South; I might say in almost every county of the South?

Mr. BOWIE. You have no statistics as to the amount?

Mr. SPILLMAN. No; not since the census of 1900. In some places you find little patches, more experimental than otherwise.

Mr. GRAFF. Is the crimson clover as good a food plant as the other clover?

Mr. SPILLMAN. No. Its particular function is as a manure crop and a cover crop.

Mr. BOWIE. Is your alfalfa your principal recommendation for this diversification of crops?

Mr. SPILLMAN. That is one of the principal ones. I should say alfalfa must become the standard crop all over the cotton belt. There are some difficulties in growing it in the South, but the people there will learn them.

Mr. BOWIE. The question in the South always in diversifying crops is the question of market. You may already have explained that. I do not know.

Mr. SPILLMAN. No; I was going to take that up.

Mr. BOWIE. I thought perhaps you had already discussed it.

Mr. SPILLMAN. No; I will take that up later. Now, the next thing I want to call your attention to is our Johnson grass work. That is the worst weed pest we have in the United States. I was told when I undertook that by my old tutor, a man who had been director of an experiment station in the South and had handled Johnson grass for nine

years—I was told by him, "Spillman, you have a big job on your hands," and I supposed I was undertaking an impossible task. Now please examine these photographs. [Exhibiting photographs.] The one I hold in this hand represents a portion of a farm abandoned to Johnson grass. It had the Johnson grass on it a year ago last summer. At Columbus, Tex., there are thousands of acres of that rich land in that neighborhood practically abandoned to the Johnson grass, and we picked out this piece of land in the middle of a 1,400-acre farm which they had simply quit plowing because the Johnson grass had become so thick they could not plow it with the ordinary implements. Now here, gentlemen [exhibiting a companion photograph], is the cotton crop grown within 130 feet of this Johnson grass. One crop was grown under the owner's own methods and one under our methods. In the latter case the owner carried out our suggestions with extreme fidelity.

Mr. LEVER. How much does it cost to get rid of that Johnson grass?

Mr. SPILLMAN. One extra plowing and three extra harrowings. I am now preparing a bulletin setting forth the results. I published the main facts in one of the Southern newspapers when I was down there, and in one of the Northern agricultural publications, namely the American Agriculturist. They requested it. And then it was published in the Houston Post, near where these experiments were conducted. There is no question but that we have Johnson grass on the run. We can get rid of it and grow any crop you want to grow without undue expense, and where Johnson grass has been grown for years.

Mr. BURLESON. The complete success in eradicating the Johnson grass would depend upon the time of year they went to work on it?

Mr. SPILLMAN. Yes, sir; to a large extent. You have to plow the land when it is in good condition for plowing.

Mr. BURLESON. And also when it is dry?

Mr. SPILLMAN. No; it does not have to be dry, but simply in good condition for plowing. If it is too dry it becomes cloddy, and then we have to treat it to break up the clods. We plow the land in the fall of the year, at a time when it is in a good condition to plow. We harrow it down smooth, and then put in an instrument called a root digger, and it goes along and brings out the clods, and you have a good ton of hog feed to the acre from the Johnson grass. The next spring you harrow it out again, and you will harrow out a great many more roots.

Mr. BOWIE. What does the harrow cost?

Mr. SPILLMAN. Eight dollars, laid down in Texas; but it is not entirely satisfactory. You, gentlemen, all know that if you are building a new agricultural machine on a new principle it takes time and money to perfect it; and I feel that we are justified in asking an appropriation for a root digger for that purpose. It is a narrow thing, so wide [indicating], and you have to lift it out of the ground every fifteen steps. I am now working on a machine that will pull the roots out of the ground and cut them. It has buzz saw teeth.

Mr. GRAFF. When you arrive at the proper model for a machine like that, what do you do to protect your rights? Do you patent it in the name of the Government?

Mr. SPILLMAN. Of course the Government can own a patent just the same as a private individual. A man could not use it without the permission of the Government, and our policy would be to give that

permission to anybody to manufacture it, provided he supplied it in the right way and at a not excessive cost.

Mr. HAUGEN. What do you do about the quack grass and Russian thistle?

Mr. SPILLMAN. We try to prevent them from going to seed.

Mr. BOWIE. Where is the Johnson grass distributed?

Mr. SPILLMAN. There is a strip in Alabama, in the prairie region of Alabama and Mississippi, and in that great rich prairie soil of Texas, and that is where the Johnson grass is most at home, and there is not much of anything else at home when it gets there.

Mr. BOWIE. What was done about the boll weevil in this field that you said was in the boll-weevil country, where you fought Johnson grass and boll weevil both?

Mr. SPILLMAN. There was nothing done in that country about the boll weevil then, and it never occurred to me to do anything with it. In fact the method of handling the boll weevil only came to me after I had this other work entirely inaugurated. We are going to treat a good many acres this year.

Mr. SCOTT. What is the use in continuing experiments which appear, by these illustrations, to be so entirely successful already?

Mr. SPILLMAN. That was done on one-third of an acre, on one man's farm, in one part of the United States. If we should publish a bulletin on that merely, that would not settle it. Although it ought to settle it, it would not. I think I can get people to go down and see that farm, and get the railroad company to carry people there to see it. It will not cost a great deal to have an acre, or 2 or 5 acres, treated in ten or twelve different places in the South where this test is had.

Mr. SCOTT. Why does not the man who owns this place, after seeing your method of treatment, treat his whole farm in that way?

Mr. SPILLMAN. This is the beginning of the experiment. When we made the experiment I had five plants, and treated them, each one. One of the methods used completely exterminated the pest, although at a high cost. We grew a crop of cowpeas on the land, and that crop was not bothered at all with Johnson grass. I want to repeat that process largely, so as to gain the confidence of the farmers.

Mr. SCOTT. It still seems to me—I do not believe you quite answered or quite caught the question I had in my mind—it does seem to me that the farmer would use his eyes when that demonstration was made, and he has more interest in continuing the experiment himself than anybody else could have, and he should be expected to treat his whole farm as you treated this one-third of an acre; and then his neighbors would see it, and the neighbors of those would see it, and use the same method on their farms, and in that way the knowledge would spread with great rapidity, and thus obviate the further necessity of work by the Department.

Mr. SPILLMAN. It would seem that that should be the case, but things of that kind will not spread as fast as the boll weevil. This man, for instance, may think in his mind that Johnson grass can not be killed, and no amount of demonstration will convince him that it can.

Mr. GALLOWAY. I would like to add a word on that point. My experience in the Department has oftentimes been very discouraging for that very reason. We had an experimental vineyard some

twelve or fourteen years ago near Washington, over in Virginia. A gentleman out there, who afterwards became a member of the Virginia legislature, had this vineyard, and we asked him for permission to treat it. We ran a block through the center of it in one direction, and then in the opposite direction, and we treated 2 acres. The understanding was that he should sell the fruit, and keep a strict account of the results of the untreated portions. And the result was that he did not get a cent from the untreated portion, and he got $60 from the treated portion. Then he came around the next spring and wanted to know if we were going to treat his vineyard again. We said, "No; we have demonstrated that you can have a crop." He said, "I would like you to show me how," and that was just after we had done it right there before him and he had seen it. The next year, however, he did understand how it was done, and after that other people adopted his methods. I have often said that you could plaster bulletins 6 inches deep over the farms throughout the country, and it would not have the same effect as some of these actual visible experiments would have that are shown before their eyes.

Mr. SPILLMAN. There are some cases, for instance, where a man may be nominated for office. It ought to be simply necessary for that man to write out his convictions and send the document out among the people. But experience shows that that alone will not do. A man must go before the people and get acquainted with them and get their confidence.

Mr. HAUGEN. Have you been experimenting with the Russian thistle?

Mr. SPILLMAN. No; I have not attacked the general weed problem. I have attacked Johnson grass because it is an important grass rather than because it is a weed. We wanted to know how to control it, so as to be able to handle it. I know of rich land in the South that has been abandoned. I have a cousin in Texas who owns a magnificent farm, and he simply moved off his farm because it was infested with Johnson grass. Now, if the man has Johnson grass we teach him how to utilize it and make money out of it.

Mr. LAMB. What do you do with it?

Mr. SPILLMAN. Make hay out of it.

Mr. LEVER. Is it not good for pasturing purposes?

Mr. SPILLMAN. Yes; and it yields a fertilizer.

The CHAIRMAN. How do you call it a weed, then, when it is good for hay?

Mr. SPILLMAN. Because when it gets on a farm it gradually spreads until pretty soon nearly every acre in the place is full of Johnson grass.

Mr. SCOTT. How does it compare in nutritive value with prairie hay?

Mr. SPILLMAN. Oh, it is away ahead. The difficulty is that the farmer can not tell when the grass has made seed. He is not acquainted with the floral organ. If the Johnson grass is chopped out before it makes seed, there is no trouble about destroying it; but the farmers usually do not know this, and it is a very dangerous thing to have on a farm.

Mr. HAUGEN. Does not the Department have a bureau that attends to weeds generally?

Mr. SPILLMAN. Yes; that is in another division. Mr Coville has that. I consider the Johnson-grass work and the alfa'fa work and

the clover work as being some of our most important problems. The increase asked for for the coming year for alfalfa and clover is $2,000, and we ask for $1,000 increase in the Johnson-grass work. We have got to confirm our past experiments by further experiments on other soils, and we want to bring them to the farmer, and we want to get an implement that will remove these plants from the land. It is rather expensive to use the implements we now have. It would be very desirable indeed to put one man on each of the important grass problems in this country, but that could not be done for less than $60,000 a year.

Mr. SCOTT. I should think that the committee would be interested in knowing what your recommendation to the Secretary was.

Mr. SPILLMAN. It was about $62,000.

Mr. SCOTT. How much of an increase would that be?

Mr. SPILLMAN. An increase of $36,000. But everybody has important work, and we asked for increases, and the Secretary allowed me $20,000. But I could use $250,000, and make big interest on every cent of that. Now, another line of work we are doing in our office is making some studies in connection with the marketing of hay. We have run onto some very interesting facts out near Kansas City, Mo., where we have learned of a firm that has a double compressing machine for alfalfa and compresses 3 bales into 1. That means the decreasing of freight on the hay; a great saving of freight. It means you can market hay twice as far from home as heretofore, and it would put hay into places where they now have to pay $20 a ton for it.

The CHAIRMAN. Are there many places now in the world where they pay that?

Mr. SPILLMAN. There are places. We are shipping hay to Alaska and to Honolulu. And I saw the other day where the Government had contracted for a large amount of hay to be shipped from San Francisco to the Philippine Islands, and I would not be surprised if we should be called upon to send hay to Japan, or eastern China, or Korea, or Manchuria pretty soon.

Mr. BOWIE. You think there is likely to be trouble there?

Mr. SPILLMAN. Oh, I am not looking out for chances to sell hay. We are making the farmer familiar with the fact that the hay can be put in that compressed form.

Mr. BURLESON. It does not injure the quality of the hay?

Mr. SPILLMAN. No, sir.

Mr. HAUGEN. Do you not think that the manufacturers of this compressor will make it fully known?

Mr. SPILLMAN. When they hear of it.

The CHAIRMAN. Do you not think that that question will take care of itself? You people are too prone to treat the farmers as ignorant and as babies. I do not know that any greater percentage of them fail in their business than in the dry-goods business or in manufacturing.

Mr. SPILLMAN. Yes; but then it is easier for them to succeed in their business. Now, in the South, where the cotton-boll weevil has made an invasion, the farmer must do something else than produce cotton. He must produce hay; he must produce live stock.

The CHAIRMAN. Have they taken to feeding live stock in the South elsewhere than in Texas and in that neighborhood?

Mr. SPILLMAN. No; unfortunately, not yet. On the Savannah River, the river between South Carolina and Georgia, there are farms

where a couple of thousands of acres of hay are raised. Last year a man down there had a thousand dollars worth of volunteer grasses on his farm, and that hay is standing on his farm to-day, rotting.

The CHAIRMAN. There is no market for it?

Mr. SPILLMAN. He is too far from his market. He can not sell it.

The CHAIRMAN. You could not change that?

Mr. SPILLMAN. You can have the distance from the market practically reduced by the doubling compress, by the compression of his product by machinery into a smaller compass, for transportation.

Mr. BOWIE. Does that compress require a patent?

Mr. SPILLMAN. There are at least two such machines that I know of.

The CHAIRMAN. Do you suppose that these machines can travel around and bale hay?

Mr. SPILLMAN. Oh, yes.

Mr. SCOTT. It will not be in the nature of a cotton press?

Mr. SPILLMAN. Yes. And by the way, I think one of those machines was invented by the cotton press company.

Mr. SCOTT. But you do not carry the cotton press around to the farms?

Mr. SPILLMAN. No; the only thing I want to do is to have this matter looked into, and let the public know that this is being done, so that it will become generally known. And the result will be that a market will be made for these poor fellows who can not sell their hay.

Mr. WRIGHT. Would not the patentee pay the expense of getting that before the public?

Mr. SPILLMAN. Yes; but you understand that an advertisement does not carry quite as much force with it as does a bulletin from the Department of Agriculture.

The CHAIRMAN. As Doctor Galloway said a few minutes ago, you could plaster the country with bulletins and they would not really reach the people.

Mr. SPILLMAN. Yes; we need to impart visible information as well as bulletins.

Mr. HAUGEN. Do you need money for the bulletins?

Mr. SPILLMAN. Yes; and I need the traveling expenses to have one of my men, the best man we have there, to go and get illustrations of these things and get the facts about them, and write up and publish a small bulletin. I want to see that that is put out in proper form. There is one State in the Union that has a law governing the method of finding out how much hay there is in a stack of hay. I have no doubt that the men who passed that law had the best intentions in the world, but that law cheats the farmer out of 40 per cent of his hay.

The CHAIRMAN. What is that method?

Mr. SPILLMAN. It is measuring the distance on the ground from one side of the stack to the other and multiplying that by four and then by the height.

Mr. SCOTT. What State is it that has this law?

Mr. SPILLMAN. New Mexico. No, no; it is just a Territory. I find there has never been any investigation to determine the measurement of the stack.

The CHAIRMAN. We estimate the width and the length, and estimate the height. A stack of fine hay is 500 or 600 cubic feet, according to the quality of the hay.

Mr. SPILLMAN. I have a definite rule that will give you, with the accuracy of 1 per cent, the amount of cubic feet in the hay.

Mr. SCOTT. Does not that depend upon the judgment of the measurer, when you come to estimate the weight of a cubic foot of hay?

Mr. SPILLMAN. I do not get your point.

Mr. SCOTT. I do not understand just how you know how much a stack weighs when you ascertain the cubic feet.

Mr. SPILLMAN. To make any investigation at all I have got to measure a stack that is being baled and get the weight of it from the baler and the dimensions of it from the measurements. Now I want a small amount of money to make my experiments on that.

The CHAIRMAN. I do not think you could do that with an ironclad rule. It has got to be an agreement between the buyer and seller.

Mr. SCOTT. Will it work with a hay stack that was stacked a year ago or two years ago?

Mr. SPILLMAN. Yes, it will. I have to allow, of course, for the length of time the stack has been standing and the shape of the stack.

Mr. SCOTT. Is not that a matter of judgment?

Mr. SPILLMAN. No; of date and time, although there may be still some guesswork after the most accurate measurements. But if you decrease the guesses you benefit the farmer. In some parts of the country hay is sold a great deal by volume. I have made a collection of the rules used all over the United States, and I find that as a rule those rules get from 25 to 40 per cent too little hay in the stack.

The CHAIRMAN. There is very little hay sold now, except in the far West, that is not baled, and the baler's weight is taken and that is near enough.

Mr. SPILLMAN. Oh, there are millions of tons sold without weighing. Take, for instance, the great Yakima Valley in Washington, where they do nothing but grow hay and fruit. They do not weigh the hay. If we could convince the people—the farmers—that they are being cheated in the weighing of hay, they would put up those scales.

The CHAIRMAN. The emergency appropriation for the extermination of the boll weevil will be taken up, gentlemen, when the House meets at 12 o'clock, and I would be glad to defer the rest of this hearing until 2 o'clock. If you will meet us then we shall be much obliged.

Thereupon, at 12 o'clock m., the committee took a recess.

AFTER RECESS.

## STATEMENT OF WILLIAM J. SPILLMAN—Continued.

The CHAIRMAN. You may proceed with your narrative, Mr. Spillman.

Mr. SPILLMAN. I shall try to be as brief as I can, Mr. Chairman, because there are a number of men in the Agricultural Department who are doing more work than I am that want to talk to you.

The next point I want to mention is the domestication of certain wild grasses. I have here a map showing the wild hay cut in this country. [Exhibiting map.] Each of the little dots on the map represent 1,000 acres of wild grasses cut for hay. There are now something over 15,000,000 acres of wild grasses cut for hay.

The CHAIRMAN. Prairie hay is wild grass?

Mr. SPILLMAN. Yes; and swamp grass. There are about four or five million acres of that swamp grass in Iowa, Minnesota, and Wisconsin. There are 40,000 acres of wild hay cut in Cook County, Ill., every year.

The CHAIRMAN. The value of the hay crop is greater than the value of the cotton crop?

Mr. SPILLMAN. Yes; it is considerable.

The CHAIRMAN. By the way, what is the value of the hay crop?

Mr. SPILLMAN. I will have to do a little figuring before I can tell you. There are 61,000,000 acres that yield an average for the whole country of $1\frac{3}{10}$ tons per acre, and the average value per ton for the whole country is somewhere in the neighborhood of $8 or $10. Multiply those figures together and you will get it for the whole country over.

Mr. BOWIE. It is as much as the cotton crop in some years, but not as much as it is at present?

Mr. SPILLMAN. I should say that the hay crop and the cotton crop——

Mr. BOWIE. They are pretty near together?

Mr. SPILLMAN. Sometimes one is ahead and sometimes the other. I presume that is the case.

Mr. GALLOWAY. The yield of corn in 1903 was two and one-half billions of bushels?

Mr. SPILLMAN. The acreage I have not in mind, but the acreage of hay is next to corn and next to that comes wheat, and then, I believe, cotton comes next on the list. Out of these 15,000,000 acres of hay that are cut from wild grasses, no one of these wild grasses has ever been domesticated. Now, some of them make hay that sells at a higher price than any other hay on the market. In Denver there are two kinds of hay that are regarded as superior to timothy hay for carriage horses, and livery-stable men pay $1 or $2 more per ton for them than the finest timothy hay. Those are wild, and we know very little about them except that they make good hay. There are millions of acres of land in the West that are now used only for range land, upon which we believe it is possible to make these grasses grow.

Mr. RODEY. We cut tens of thousands of tons of it and pack it for sale in the market.

Mr. SPILLMAN. There are some of those grasses that we are familiar with and we have been studying them now for two years. My predecessor studied them a good deal, too, and we have gotten far enough to individualize those grasses which we know are of great value, but here is one of the difficulties we meet with in studying those grasses. Take one of the very best of all of them, it is a grass that would yield, I should say, twice as much as timothy and the stock will eat it in preference to timothy, but it is a grass that has seed habits that are so bad that it is absolutely impossible to grow it under cultivation at present. Now, that grass is found in nearly every State of the Union. It is a weed that is plentiful around Washington City. It is a weed plentiful in the State of Washington. It can not be grown under cultivation, but frequently is cut for hay in the wild state. We find it a very variable grass and we are working with the hope of being able to get a strain that will hold its seed until it is ripe.

Mr. HENRY. What is its name?

Mr. SPILLMAN. Reed canary grass. I have seen it grow higher than my head under exceptional conditions. I have cut 5 tons of it to the acre.

Mr. SCOTT. When it grows so rank as to yield 5 tons to the acre, is it valuable for food purposes?

Mr. SPILLMAN. Stock will eat it in preference to timothy or red clover or redtop. There are European grasses that are superior to our grasses, but our farmers will not grow them. We are trying to get them to grow them.

Another point in connection with the work in that country. There is a great call for means for finishing off range cattle. In the mountain States, and west of the mountain States, they do not grow corn. It is not adapted to that country. They need some substitute for corn to feed their stock. We are working on that problem, and whenever we have the crop which we are confident will do that, we have to convince the farmers with some feeding experiments that that will be the case before they will go to the expense of growing these crops.

The CHAIRMAN. That is a case where your experimental station ought to come in. The United States Government ought not to go out there and feed any cattle.

Mr. SPILLMAN. We do that. Take the work I am doing in Wyoming, for instance, in connection with the domestication of those grasses. I am doing that in connection with the Wyoming experimental station, and, as far as we can, we do that. Frequently it is impossible for the experimental station to take up a problem of that kind. They say "we have got $5,000 to work with; go ahead and do your work; but we can not help you."

The CHAIRMAN. The State ought to help them out.

Mr. HENRY. You do not find the desire to assist in these experimental stations?

Mr. SPILLMAN. We find every man has his predilections concerning problems. We find the experiment stations filled up with able men, but they have their own views of things, and their views are restricted by State lines, and frequently they can not see some of these problems because they are confined to State lines. There are a lot of other problems that are of more importance to them, frequently.

Mr. HENRY. It is not a fact that under Doctor True's administration of the experiment stations they are cooperating with you more cordially and more satisfactorily than——

Mr. SPILLMAN. Well, we find that as time goes on the cooperation between the Department and the experimental stations is becoming more cordial. We are learning how to get along together.

Mr. RODEY. In regard to the point brought up in regard to the lack of fattening food for stock, that result in the stock in western Colorado, Arizona, and New Mexico being shipped into eastern Colorado and eastern Kansas and Nebraska. There is hardly any stock finished fattening with us at all. The railroads carry them into the grass States.

Mr. BOWIE. It is noticeable to that effect in our State in Alabama, to some extent.

Mr. RODEY. We have been wondering for years if the Department would not do something by getting us something as a substitute for corn. Even if we grew corn, it would not be anything compared with what we would really want for feeding purposes.

The CHAIRMAN. What is your experimental station doing there?

Mr. RODEY. It is doing splendid work in every way.

The CHAIRMAN. The people ought to make feeding experiments. In these experiment stations in the corn belt they have done that. The Government has not made any feeding experiments that I know of.

Mr. SPILLMAN. We furnish money for them to do that.

The CHAIRMAN. They have done that all by themselves, I understand.

Mr. SPILLMAN. I am furnishing $1,100 this year to a station in one

of the richest sections of the corn belt to carry on feeding experiments.

The CHAIRMAN. Of grass?

Mr. SPILLMAN. Yes, sir; grasses. That is, we are testing clover as against timothy and corn fodder as against cowpeas—the forage plants for finishing off cattle. Now, we are doing that in a State that urges that we ought to be giving them $100,000 a year; but we do not give them a cent.

Mr. SCOTT. I think it would be a good idea for you to name that State. It might prompt the legislature to do its duty.

Mr. SPILLMAN. I happen to be a native of it, so I can abuse it all I want to. It is the State of Missouri.

The CHAIRMAN. That State is backward in those things?

Mr. GALLOWAY. In regard to the statement that Mr. Rodey makes, I would say, that that station is occupied with a good many other problems which are probably considered more important than those of cattle feeding. It is occupied with a number of important problems on irrigation and the growing of particular crops. It is doing a good deal of work on date culture, and with the $15,000 that it has its officers probably consider they are doing their duty when they are taking up the immediate problems and left those more general problems to the other stations of the Government.

Mr. SPILLMAN. Another thing, New Mexico is not a populous Territory and the legislature there can not afford to be very liberal to the Experiment Station.

Mr. GALLOWAY. Missouri does not need any defense. So far as Missouri is concerned in the matter of experimental work, this work we took up there was not at the request of Missouri but at the suggestion of Secretary Simms, who wanted certain important problems worked out with reference to native grasses; and we found, as a matter of fact, that Missouri to-day is the only State where we can get the fullest and most hearty cooperation in work. That is the Missouri people put it in this way: "Here is the station, here are people, here are our grounds; come and do as you please, and we do not ask you to put any money in this unless you can come here and see how the money is spent."

Mr. SPILLMAN. Another point which has been receiving a good deal of attention with us is winter pastures in the Southern States. We believe it is possible to keep stock on pastures the whole year in the Southern States, and we are experimenting with a number of crops with the view to using them for pasture in the winter time. Summer pasture is abandoned down there. The farmers are not familiar with the things that can be used for winter pasture, and do not know how to grow them. We are experimenting along that line to find out ourselves how to grow them, and what crops are best to grow, and the conditions that will enable farmers to use the crops.

Another line of work that we have given always some attention to is the range work of the West. A good many phases of the work we have considered solved, so we have got the investigation. But there are some other phases that have become rather pressing at present. They do not know what to do with the range lands in the West. Eighty-two per cent of the area of the United States is range land. Only 18 per cent is considered improved land—of that 414,000,000 acres, considered improved land.

Mr. HENRY. Do you count the forest?

Mr. SPILLMAN. It is outside, but the forest is all used for range; all of it.

Mr. BOWIE. Very few cattle per section?

Mr. SPILLMAN. Very few. On a great deal of the range land of the West they consider 50 acres of land to the head about what the land will carry. Now the question is what to do with that land out there. We are taking that up. It seems to me that the principle of the homestead law can not be applied to the range land in this way. The principle underlying the homestead law is to give a man a bit of land where he can get a decent living for his family; the area of land that has been given him by the homestead laws has been supposed to enable that man to accomplish that. Now, with the millions of acres of land in the West that can be used for no other purpose except range, the question is, How much of the land will it take to make a decent living for a family? That should be the size of the homestead. It is important in that connection to determine what the stock-carrying capacity of the range country is. We have already determined that over some of the more important districts of the range country, but the range country is enormously large, and there are some large areas that we have not been able to get into yet.

I will give a little instance. We fenced a little piece of range land out in Wyoming, and by conferring with the man whose cattle grazed on that land we estimated there were about 50 head of cattle fenced out. We found that we actually fenced out over 500 head. So we have got to go to the cattle men, and get into their confidence, the sheep men, and get into their confidence, and let them know we are not hunting figures for taxation purposes, in order to find out what the carrying capacity of the range is. We have a gentleman in our office who is thoroughly familiar with the range conditions. He has studied that question for years, and he is one of those men who has courage enough to go 100 miles across the desert out there, with only two water places, one a boiling hot spring and the other an alkali spring. We are going to get some results out of that. We are trying to determine the carrying capacity of those ranges of the West, and those problems that arise there.

The CHAIRMAN. Can not the cattle and sheep men determine that?

Mr. SPILLMAN. Each one knows it, but he will not tell anybody.

The CHAIRMAN. Can not any cattle or sheep man tell the condition of the range, whether it is overstocked or understocked?

Mr. SPILLMAN. We want to find out what the homestead should be in the various parts of the range country.

Mr. SCOTT. It does not seem to me as if the investigation on that line will throw any particular light upon the homestead question, for the reason that, obviously, the homestead, from your statement, would have to be of very different sizes in different sections of the State.

Mr. SPILLMAN. They certainly would, and the size would have to be determined by some commission. We already have a commission which is looking after the question of public lands of the West and to make recommendations. We want information for them to use. We are going to have laws on that subject. It is a pressing subject in the West. Men are shooting each other down there over misunderstandings about land that does not belong to either one of them.

Mr. RODEY. We have 7,000,000 of sheep and we have a lot of cattle and we do not find them on the assessor's book.

Mr. SPILLMAN. Another problem we are giving attention. About 4,000,000 of acres of grasses are cut on swamp land in the United States. We do not know fully all these different grasses that constitute the hay that is cut on swamp lands. We do know that some of that hay will sell at higher prices than timothy when put on the market; and on some of these swamp lands in the State of Iowa there is something like half a million of acres cut, and if this land is drained and put in other crops it would be worth easily $100 an acre. That must be of some value or they would not retain land in swamp grasses where land around them is worth so much; and much of it is easily drained.

One of the assistants in my office owns a nice farm in eastern Kansas on land close to town and worth $100 an acre, in sight of the college of Kansas, and he keeps that in grasses. The yield is sufficient to pay. We are beginning to study these swamp grasses with a view of saving the seed of them, and we are trying that in many places where there is swamp land that has nothing on it at all. The richest land is overflowed land, and it is found in every State of the Union. We are trying to find out if these grasses can be propagated by seed. We have got to study grasses in that way in order to find out how to propagate them. When we have done that I think we can make this overflow land and swamp land valuable land. It is very rich, and all it needs is something that will stand the conditions to which it is submitted.

There is one other very interesting line of work that shows the desirability of a man keeping his eyes open. A year ago I had a letter from a man out in Utah, who told me that he thought I would like to know of an experience of his; and I assured him I did appreciate it after I found out what it was. One winter he had no hay; it was $30 a ton. Grain was plentiful and cheap. He decided he would undertake to winter his cattle on cactus and grain—the prickly pears of the West growing all over the desert, and where it is really desert, too. It was mentioned here yesterday by some one that it has been the practice in famine years for a long time to burn these prickles off of the cactus—to singe the thorns—and then feed them to cattle; and they make pretty good fodder. Now, this man was somewhat original in his ideas and methods, and he decided he would cook the cactus instead of singeing the thorns off of them. He mixed his grain with it and went to feeding his cattle, not knowing whether his cattle would starve to death or not. I am merely giving you what he tells me in his letter, and I do not know whether it is true or not, but I have some reason to think it is. He says: "In ninety days I sold the best bunch of steers I ever sold;" and then he added—which was, I think, due to enthusiasm and not quite true—"I regard the boiled cactus as the equal of alfalfa hay, pound for pound."

I think he is very enthusiastic in that matter. But last summer I was down in San Antonio, Tex., and I found a manufactory down there manufacturing machines for chopping cactus. They have learned by accident down there that these spines, which are terrific things on the prickly pear, and which crush into the flesh—you kill cattle down there and you find them sticking into the flesh and bones—when these things are wet they become like feathers and will not stick into anything. They run them through the chopping mill and let their own juice exude onto the spines. You can pick that chopped cactus up and find that it has not a prickle on it. To-day they are feeding tons

and tons of that stuff around San Antonio, Tex. Now there are several millions of acres of land growing cactus in the United States.

Now, there are a few things I believe it is our duty to investigate. When I tell farmers these things they are incredulous, and make fun of them. I want to get some facts. I have seen the machinery building where the machines are made that cut the cactus. I want to get some definite information and I want to determine the real food value of the cactus, and I am going to ask those experiment stations out there, and am going to give them the money to do it, to feed that cactus that has been running through the cutting machine against alfalfa hay and so on, and publish that for the benefit of the people who live on the desert.

Mr. SCOTT. Does not this fact seem to indicate that the people in that region understand it?

Mr. SPILLMAN. I simply want to bring it to the attention of everybody in that country.

Mr. SCOTT. Do you not think that the manufacturer of that machine will be likely to help you?

Mr. SPILLMAN. I do not think he will. He is just manufacturing these little machines as a side issue, and he does not appreciate the importance of it.

Mr. RODEY. How so n could the crop be removed?

Mr. SPILLMAN. That is the thing I want to find out myself; it is a very important one. That is the very next thing I have my finger on here. How long does it take that crop, after you have harvested your crop in the desert, how long does it take to grow on there again? You see that grows in batches 50 or 100 yards apart all over the desert.

The CHAIRMAN. Do you not know how quickly it will grow again?

Mr. RODEY. I really do not know. I have been through from El Paso to Los Angeles on the Southern Pacific; and you pass through hundreds of miles of that cactus 4 or 5 feet high—of different varieties—and one would think that it ought to be good for something, a crop enough to feed millions of head of stock if it can be used for that purpose. If this Department can show that fact it will have conferred a blessing on this country that will be almost incalculable.

Mr. SCOTT. Do you know whether any other variety than the prickly pear is used for food?

Mr. SPILLMAN. Lots of them.

Mr. RODEY. In time of famine the cattle feed off of them.

Mr. BOWIE. Is this the plant here [showing papers]?

Mr. SPILLMAN. That is a true cactus. I want to give some information on that point. It is only going to take a small amount to get the information I want. It will take a little more to carry on the feeding experiment. I have only estimated $1,000 for the whole work. If we can demonstrate and get the confidence of the farmers and show them what the cactus will do and how to utilize it I do not hesitate to say that it will be worth hundreds of millions of dollars to the United States of America.

Mr. RODEY. I have heard men who grow hundreds of millions of cactus say that "nature put it there for some purpose, and when we find out what it is it will make a tremendous crop."

The CHAIRMAN. Is cactus a slow growth, Doctor?

Mr. SPILLMAN. That I do not know. I want to find out; we have no information on the plant.

I have finished all I care to say to the committee. I have tried to give you some little insight into the problems we are working with. We think they are important problems; we would not be fit for the work unless we did think that, and we hope that you, gentlemen, will think the same way.

Mr. RODEY. What experiments have been made in the production of tannic acid?

Mr. SPILLMAN. There has been some work done with that; important work.

Mr. RODEY. It has been known for many years in the West that there is a plant that grows, and has been propagated to some extent, that has a larger percentage of tannic acid than either hemlock or other tanning barks. At Deming, N. Mex., a few years ago, they built a small factory. It is a root that looks a good deal like a sweet potato, and they get the acid out of it and put it in small boxes, and use it in tanneries all over the nation. That is an industry in the West that could be enlarged almost indefinitely.

Mr. SCOTT. I would like to ask a question or two about blue grass.

Mr. SPILLMAN. Blue grass is the most important pasture grass in the United States north of the Ohio River and a small space in Kentucky. Its best development is in Kentucky—one little circle in Kentucky.

The CHAIRMAN. About five counties.

Mr. SPILLMAN. Five or six counties, and on the fringe of a few others. In Iowa, Missouri, Illinois, Michigan, New York, and New England the blue grass is a magnificient pasture grass.

Mr. SCOTT. It is the handsomest lawn grass we have, but in Kansas we find great difficulty in keeping a stand of it.

Mr. SPILLMAN. You find the same difficulty in Washington City.

Mr. SCOTT. I fancy that must be the case for the reason that I see them nursing the lawns all the time. What is the principal reason why it is hard to keep a blue-grass lawn here in Washington?

Mr. SPILLMAN. Because of the lack of magnesia and lime in the soil. In Kansas it is because of the irregularity of the climate and smaller rainfalls.

Mr. SCOTT. Would fertilization help us in Kansas?

Mr. SPILLMAN. It would help, but it would not make it what it is in Kentucky, Missouri, and Illinois.

Mr. SCOTT. What would you recommend? Fertilizer?

Mr. SPILLMAN. Complete fertilizer, one containing all three elements of plant food, at the rate of about 400 pound per acre per year.

Mr. SCOTT. Supplied by a manufactory?

Mr. SPILLMAN. Yes; also a good covering of barnyard manure, barely covering it, and raked off in the spring.

Mr. SCOTT. What is the best time to sow it?

Mr. SPILLMAN. The best time to sow it would be moderately early in the fall, but if you happen to have a hard winter after that it would die. Ordinarily, I should say early in the spring is the best time to sow it.

Mr. SCOTT. Do you advise sowing any other seed with it?

Mr. SPILLMAN. Yes; I should think I would sow redtop and white clover. I was up in the city of Buffalo last summer, and I saw the prettiest lawns I ever saw in my life. Redtop is the kind of grass that is not very common in your section of country, but it is a grass

that looks a little like blue grass. It is a natural grass all over the eastern part of the country. I would sow redtop and Kentucky blue grass and white clover out there, and fertilize it, and if you fertilize it and give it plenty of water, you will get along.

Mr. BOWIE. I asked you a question in reference to alfalfa and the markets in the South, and did not catch your answer to that.

Mr. SPILLMAN. That is one point I tried to make a while ago in connection with studying the hay problem. I meet this question more than any other when I am preaching to the farmers through the South. I tell them to grow alfalfa, and they say, "What are you going to do with the hay?" I say, "Feed it to stock." "We have got no stock; we do not know how many times to feed a day, a ton or a handful; we want to grow something that we can sell." Hay is a bulky thing and can not be sent far to market, the freight rates are so high; and then, again, $10 a ton is only half a cent a pound. When you pay another half a cent a pound for freight you have doubled the price of hay at once. If we can get some method in which we can compress the hay of 400 pounds in the size of 100 or 150 pounds we can get greatly reduced rates.

Mr. BOWIE. Are freight rates based on weight?

Mr. SPILLMAN. Weight and volume both. There are five or six classes of things of different prices. They are classified according to value and volume, the more valuable things paying the higher rates, and the less valuable things paying a lower rate. More bulky things pay a higher rate because they occupy more space.

Mr. BOWIE. Often it is raised every year?

Mr. SPILLMAN. Yes.

We are preaching that, and hay, and live stock. It takes time to do that and they learn to grow the hay much quicker than they can learn to utilize the hay. We want to help them every way we can to make a market for their products. We are laying out a campaign of work this winter to get those people to utilize the hay on their own farms, to feed the hay and make manure of it and put it back on the land. We are working on those problems as hard as we can with the small amount of money we have on hand.

Mr. BOWIE. Are you doing any work on fiber plants?

Mr. SPILLMAN. Not in my office; in Mr. Coville's office.

Mr. WRIGHT. Up with us the farmers are using cotton-seed meal.

Mr. SPILLMAN. I am doing some work with that as a feed for live stock.

Mr. WRIGHT. What are the comparative merits of that with corn?

Mr. SPILLMAN. That depends altogether on the kind of hay you feed it with. If you are feeding such things as timothy hay, the cotton seed is valuable. Alfalfa hay is extremly rich in nitrogen, and you want to feed something that is poorer in nitrogen in order to even it up. It needs to be fed with nonnitrogenous things, such as corn-fodder, and mixed with timothy.

Mr. BROOKS. Have you said anything about what the Department is doing with regard to finishing foods for cattle?

Mr. SPILLMAN. I spoke of that when you were out.

Mr. BOWIE. I have here some resolutions passed by the Grain Dealers' National Association, protesting against the supervision of inspection of grain by the National Government. Does that come in your Bureau?

Mr. SPILLMAN. I have nothing to do with that. Mr. Coville will take that up.

Mr. BOWIE. I wanted to get some information on it.

Mr. SPILLMAN. He is going to talk to you on that subject.

Mr. GALLOWAY. One point that Mr. Scott raised in regard to blue grass. We have 40 acres here in Washington that we have been trying to get into blue grass for fifteen or twenty years, but have not been quite successful yet. The fact of the matter is that unless the blue grass is shaded here in this climate it burns out, and our experience has shown us that the more the grass is watered artificially the more trouble we have in getting a stand. We can take our hose and write our name in that blue grass where the summer grass comes in. We have found that where we throw the hose down on the grass and the water comes in the shape of a fan that that fan grows in there. When we let water run on at night we won't have that difficulty. Our experience has shown that in the planting of blue grass if you plant two parts of blue grass and one part of clover you get the best combination for this climate.

Mr. SCOTT. Do you think your stand is helped any by watering at night?

Mr. GALLOWAY. It is here, but it would not be practicable at night.

The CHAIRMAN. You do not think you can get a permanent blue-grass seed here for pasturing purposes?

Mr. GALLOWAY. No, sir. In this climate, where there is the shade of a tree, blue grass grows all right all summer.

Mr. BROOKS. Is that the same as the blue stem?

Mr. GALLOWAY. No, sir.

## STATEMENT OF FREDERICK D. COVILLE.

Mr. Chairman and gentlemen of the Committee:

One of the pieces of work with which the office of botanical investigation is charged is that of inquiry into the cause of deterioration of grain in storage and in transit. Complaints have come, particularly from the other side of the Atlantic, of the character of the shipments which have been received there, and there is a tendency to attribute the defects of the grain received on the other side to the inefficient grading and a further tendency to consider it as dishonest grading. The Department found it necessary some time ago to investigate these charges and we have completed a certain portion of that investigation. The machinery which has resulted is on exhibition here. I can give you some idea of the character of those requests which come to us from the other side. Here is a copy of a letter transmitted to us from the Department of State, as follows:

No. 206.] CONSULATE-GENERAL OF THE UNITED STATES,
*Berlin, Germany, December 3, 1903.*

Hon. FRANCIS B. LOOMIS,
*Assistant Secretary of State, Washington, D. C.*

SIR: I am constrained to ask the attention of the Department of State, and through it that of the honorable Secretary of Agriculture, to the serious and increasing complaints which are heard in European markets concerning the alleged untrustworthiness of American certificates of grain inspection and the depreciated condition in which shipments of wheat and corn, even though accompanied by such certificates, are frequently received.

The complaint has reached a stage in which produce exchanges and chambers of commerce in this country have combined to appeal for relief. Before taking further

steps the Grain Dealers' Association of Berlin (Verein Berliner Getreide und Producten Handler) has requested me, and I have consented to lay before the Department for such action of reference as it may elect, a plain statement of the case from the standpoint of the German importers, in the hope that some solution of the difficulty may be found and the remedy applied before grain-export trade of our country to Continental Europe shall be still more seriously compromised.

Until quite recently the wheat imports of Germany from the United States have been shipped mainly from the port of New York, where the inspection authorities refused to grade any lot of wheat as of a new crop unless the whole of it were actually sold. But certain other rival shipping markets have been less scrupulous in this respect, and have graded as new-crop wheat cargoes containing as high as 40 or even 50 per cent of grain from the harvest of the previous year. Whenever, as was the case during the past season, the new-crop wheat is in general distinctly superior in quality to that of last year, such an admixture of old grain changes and depreciates more or less seriously the value of the cargo, and unloads upon importers who have ordered and sold before arrival wheat of the new crop, a mixture which their customers often either refuse to accept, or if they do so, claim discounts which entail a net loss on the transaction to the importer.

But it appears from a statement of a member of the New York Produce Exchange that the inspection authorities at that city, moved by the loss of grain-export trade through diversion of other American ports, and by the difficulty of obtaining new wheat on account of the general practice of mixing at interior points, have this year decided to lower their standard and certify as new crop all wheat containing as high as 80 per cent of this year's product. The German importers claim therefore that there is no longer any security or meaning in an American certificate of new-crop grain, and this not only adds another black mark to the commercial repute of our countrymen, but puts a trenchent weapon into the hands of the agents who seek to undermine and discredit our grain exports in favor of those from Argentina, Australia, Russia, Hungary, India, and other wheat-exporting countries.

Irregularities of this kind are difficult and humiliating for a consul to explain or defend because they constitute, according to European standards, a plain violation of the integrity of international trade. An official certificate which deliberately states one thing and means another, which enables the seller to deceive a purchaser and evade the plain elementary condition of a contract should, it would seem, have no place in a branch of commerce so important and so dependent upon good faith as the wheat-export trade of the United States. In Europe a board of trade certificate as to grade, age, and quality of grain, is absolute, and admits of no equivocation or misstatement of facts. If a similar standard of integrity can not be maintained in the markets of the United States, the consequent effect of such laxity upon American cereal-export trade can not fail to be serious and permanent.

I am, sir, very respectfully, your obedient servant,

FRANK H. MASON, *Consul-General.*

I would like to say that this is the letter which has been received to-day, and I simply brought it in because it happened to be at hand. We have been receiving these complaints for years past. This is an allegation with reference to the mixture of an old and new crop, but the principal allegations have been with reference to the deterioration of the grain in the hold of the vessel, and that deterioration we found was due largely to the question of moisture. We found that ordinary inspection, such as is used at the different ports of shipment—an inspection simply by the sense of touch—could not in all cases be relied upon to offer a safe guide. Therefore, after long investigation, we have invented a machine which will accurately and quickly gauge the water contents of the grain; and I will show you briefly the working of that. But, first, I wish to show you two samples of corn, one of which contains 16.71 per cent of moisture, and the other contains 15.20, a difference of less than 2 per cent of moisture. This grain has been kept in this condition for months without deterioration [exhibiting]. As you will see, this is moldy and rotten [exhibiting].

The CHAIRMAN. With less than 2 per cent of difference?

Mr. COVILLE. Less than 2 per cent of difference. This illustrates to you how difficult it is by sense of touch alone; but by our machine

we can gauge it so closely as to be able to state specifically that this cargo under certain conditions will deteriorate; that this cargo under certain conditions will carry safely.

Mr. SCOTT. Would an equally small difference in the moisture contained in wheat be shown as plainly as it is shown here in this corn?

Mr. COVILLE. Yes, sir; but there is less trouble in the case of wheat than of corn. Corn is a crop that does not always ripen properly, and there is a great deal of difficulty, especially in a season like the last. Our method in handling this is to take a small sample of corn and grind it; we grind a sample of 20 grams. (I have set up a little drug mill on the desk yonder). Our methods have to be precise. We place the sample in one of these dishes. We then set it into this oven and dry it for twelve hours at a uniform temperature of 100°. It gives us then a per cent of moisture, and to get a precise result we dry it twenty-four hours. It has taken us some little time to ascertain these facts; but the facts are simple. The outfit can be purchased for less than $50, and if application of these results can be made there should be but little trouble in supplying them.

The CHAIRMAN. That will indicate the percentage of moisture, will it?

Mr. COVILLE. We weigh a sample after it has been dried for twelve hours, and then we get by different weight the amount of moisture that it contained, and we figure out the percentage from that. It is a simple method of determination. We secure results accurately, within one-half or 1 per cent.

The CHAIRMAN. I suppose with large cargoes you might get a different percentage of moisture at different portions of it? Those cargoes consist of 50 or 60 carloads of corn or wheat or whatever it may be. How would you get over that, Professor?

Mr. COVILLE. The inspection is made now by each carload. The sample is drawn from the interior of the carload by the sampler, and the whole thing is mixed, and then these hand tests are made. You can get it by that process of selection of the sample.

Mr. RODEY. Like quartering down a mining sample?

Mr. COVILLE. Yes, sir.

The CHAIRMAN. Do you think you can get it close enough by mingling samples of several carloads?

Mr. COVILLE. In probably 49 cases out of 50 the inspectors—and the inspectors are exceedingly expert— can tell by the sense of touch that this sample would go way above 15 per cent, and this would go below 15 per cent—would be safe for grading for No. 2 corn, for example. It is only in these cases where the moisture comes near this crossing line where it would be necessary to shut a car out and subject it to a test of this sort.

Mr. SCOTT. Is the grade of corn determined always by the content of water?

Mr. COVILLE. No; this is simply one of the factors, but this is the one factor which is most difficult to determine, and is one factor, as it is easily measureable, which can be figured out mathematically. It is a factor that should be determined in that way.

Mr. SCOTT. And 15 per cent is supposed to be on the safe side?

Mr. COVILLE. For certain purposes. Fifteen per cent of the moisture is ordinarily too much of a moisture to ship in the confined hold of a vessel for a long voyage.

Mr. SCOTT. Has this apparatus of yours been adopted by the gauging officers in New York?

Mr. COVILLE. No inspection department in the United States has up to the present time adopted this apparatus.

Mr. SCOTT. Or any similar one?

Mr. COVILLE. Or any similar one with the exception of the office in Chicago which adopted a similar apparatus for the inspection of flaxseed. The inspection of flaxseed upon the Chicago market is so precise that it is rare indeed that any objection is raised by anyone to the decision of the flaxseed inspection department of Chicago; but with that exception, no such apparatus is used.

Mr. BROOKS. Are the same complaints made with reference to grain from the Argentine and Russian at European ports?

Mr. COVILLE. Yes, sir; they have a voluntary inspection in the Argentine, but in general our grain has a good reputation.

The CHAIRMAN. What are your efforts directed toward in this matter of grading grain for foreign shipments?

Mr. COVILLE. Our present efforts are directed toward inducing present authorities who have charge of the grain-inspection departments to take up this apparatus, to adopt certain definite mathematical standards for grain instead of the general standards which they have now, and which are impossible of precise application because they are general; to induce them to substitute this method of precise inspection for their present unprecise methods. There has been a public demand for inspection of grain under the Department of Agriculture, but it is the position of the Department that a national inspection of grain, except as a last resort, is undesirable; that if we can induce the present organized authorities to improve their methods of inspection—and it is easily demonstrable that it can be done—that the present agencies for the supervision of that inspection are in most cases amply substantial for providing a thoroughly good grain inspection both for interior markets and export shipments.

Mr. BOWIE. It is that particular question that was raised by the Grain Dealers' Association, to which I referred when Mr. Spillman was concluding his remarks—at Minneapolis, Minn., October 8, 1903—protesting against the supervision of the inspection of grain by the National Government at terminal markets. [Handing papers to Mr. Coville.] Have you seen that?

Mr. COVILLE. No, sir.

Mr. BOWIE. I wish you would look at it and give us your opinion on it.

Mr. COVILLE. I was familiar with this resolution, but I had not seen it in this printed form.

Mr. BOWIE. Your attention has been called to it?

Mr. COVILLE. Yes. That resolution is, I suppose, a protest against the bill which is now before Congress to create a national inspection under the direction of the Department of Agriculture. Our position with reference to that has been somewhat embarrassing because it has been believed that this bill was originated in the Department of Agriculture in order to secure jurisdiction over these inspections. On the contrary, the Department of Agriculture does not desire to secure jurisdiction over this inspection, but does desire to have these present agencies of inspection adopt the way which we have shown them to perfect their inspection. I think that the principal reason why they have been slow in adopting this has been that they looked upon it as a method on the part of the Department to secure a move toward the

national inspection of grain, when it is, on the contrary, an entirely educational affair.

Mr. BOWIE. Then, at the present the attitude of the Department would be that they do not now want this sort of a bill passed?

Mr. COVILLE. The attitude of the Department, so far as I can speak for the Department, is that a uniform, precise inspection is necessary; that this inspection can be secured under present agencies by the changing of their methods of inspection; that a national inspection is undesirable except as a last resort, if the present agencies refuse to change their present methods of inspection.

Mr. GRAFF. Would it be difficult to obtain grain for export that filled the requirements of the inspection which you propose?

Mr. COVILLE. In seasons of bad harvest, or a bad ripening season, particularly for corn, it would be difficult to secure the proper amount of grain unless the grain was dry. There is no difficulty, however, in putting corn and other grain through a drying apparatus in enormous quantities and bringing it down to the proper moisture contents.

Mr. GRAFF. Is that done to any extent in this country now?

Mr. COVILLE. It is done at the port of New Orleans; it is done also in Chicago in the salvage grain which has been weighed in shipment. At the export ports of New York, Baltimore, and Boston there is no drying of grain.

Mr. GRAFF. Do you know what the prospect of the corn crop of the United States is?

Mr. COVILLE. I can not give you any figures; would prefer not to give you the figures.

Mr. SCOTT. All of our meats intended for export are inspected by the Government; that is generally considered to be desirable, I believe. Why do you regard that as desirable, if you do, and should think it was not desirable to have the Government inspect grains intended for shipment?

Mr. COVILLE. Theoretically there is no reason why grain for export should not be inspected. The difficulties are in the matter of inspection.

Mr. SCOTT. If we continue to send grain to other markets which is not up to the standard, will they not demand an inspection of grain?

The CHAIRMAN. They may.

Mr. SCOTT. What I was trying to get at was the reason why a Government inspection of grain was not considered desirable. The fact that there are practical difficulties in the way does not seem to be sufficient answer to that, if you will pardon me, because one of the purposes of the Department of Agriculture is to solve problems in the interest of the agricultural industries of the country.

Mr. COVILLE. One factor that has a bearing on it is the matter of expense, the expense of inspection of all the grain in the United States, export and interior inspection; the latter presumably would go in with the export inspection and would be very large. That inspection at the present time is borne by the trade.

The CHAIRMAN. It ought to be borne by the trade, really.

Mr. COVILLE. Under the other system it would probably be borne by the country.

Mr. SCOTT. Do you think of any other difficulty?

Mr. COVILLE. There are practical difficulties. One of the principal difficulties is the impossibility almost of not making an occasional mistake; and if a Government inspection should be established and a

large cargo of corn should arrive on the other side after having received the Government certificate as of a certain grade—should arrive in such a condition as to indicate it ought to have been graded in that way——

THE CHAIRMAN. The Government must be held responsible?

Mr. COVILLE. A reflection would be cast upon the whole Government inspection. That is simply one of the practical difficulties.

The CHAIRMAN. Do England, France, or Germany inspect?

Mr. COVILLE. They do not export any grain.

The CHAIRMAN. Things they do export, not the grain alone, from one country to the other. Is there any law in those countries under which the government can inspect these exports of grain?

Mr. COVILLE. They do in the Argentine. I believe their inspection has not yet been made a Government inspection. There is optional inspection, but I am not positive whether it is a governmental inspection or an inspection of an organized company. I believe it is an optional Government inspection.

Mr. GALLOWAY. It would cost about $1,000,000 to inspect the grain, it is estimated.

Mr. BOWIE. I find no such bill has been introduced in the House. This bill I had reference to I find has been introduced in the Senate. It has come through the mail to me, and I simply wanted to get somebody's opinion about it; that is the reason I asked it.

The CHAIRMAN. You have not made much progress in this investigation?

Mr. COVILLE. We have make very distinct progress. We are in communication with half a dozen chambers of commerce. Under the fear of a national inspection bill I believe they will adopt the methods that we have suggested to them for an improvement of their inspection.

Mr. GALLOWAY. A thing that seems to worry the people at the ports of entry is that it will introduce some politics in the thing if it becomes a governmental function.

Mr. COVILLE. Taking up the second subject of inquiry in the office of the Botanical Investigations, that of poisonous plants, I wish to call your attention to a discovery made during the past year which is likely to be of considerable importance to the range country. We have been investigating the subject of loco weed, which for years has baffled the investigations of chemists, botanists, and owners of live stock. The investigation was carried on in Colorado and in Montana—more particularly in Montana. To sum up the thing in a word, we found that a large part of what was attributed to poisoning by loco weed was caused by a small worm known as a stomach worm, which interfered with the entire operation of the animal and brought about these symptoms, which are either identical with a true loco disease or are the true loco disease.

That portion of our inquiry puts this matter in the hands of the Bureau of Animal Industry, which is now going ahead with the investigation of this stomach worm, and will, I believe, be able to provide a cure for hundreds of thousands of sheep in the northern range country which are suffering from stomach worms instead of poisoning by loco weeds. This illustrates, too, a small point that may be of interest to the committee in connection with something said by Professor Spillman, that of simply publishing a discovery and letting it drop. A

remedy for this stomach worm was devised by Doctor Stiles of the Bureau of Animal Industry a few years ago and was published, but so far as I know was not put in application in any part of the West unless it be in the northwestern Texas district. The remedy for this worm is coal-tar creosote.

The CHAIRMAN. That is being published in all of the agricultural papers now. In them all you can see the advertisements of the creosote cure for stomach worms.

Mr. COVILLE. The people in Montana do not use it at all.

Mr. SCOTT. Has your investigation gone far enough to determine if there is any poison in the loco weeds?

Mr. COVILLE. It has not. We are continuing these investigations, having thrown out but one of these diseases, which has been mistaken for what probably is a loco-weed disease. We believe there is such a disease, and we shall proceed on that basis until we have either discovered——

The CHAIRMAN. The symptoms of loco poisoning in a horse is very much like staggers, and if this arises from the stomach worm it would give the same symptoms.

Mr. COVILLE. This is in sheep.

The CHAIRMAN. But not in horses?

Mr. COVILLE. We have not found it in horses yet.

Mr. BROOKS. Are there some in cattle?

Mr. COVILLE. Our investigation this year was made entirely with sheep.

Mr. BROOKS. A case in Colorado some time ago came under my notice where a whole range of cattle became infected with what they thought was loco poisoning, and on investigation their stomachs bore this feature which you speak of.

Mr. COVILLE. I believe we will still discover a loco disease, and we will be able to show these various other diseases which have been mistaken for it.

I want to call your attention to the adulteration of Kentucky blue-grass seed with Canada blue-grass seed. I told you last year, I believe, the causes of the low percentages of germination of Kentucky blue grass. Here is a sample that is absolutely worthless, although looking as though it were a very good sample [exhibiting sample]. We found it was killed by being heated in the windrows in which the seed was piled when gathered. This year we are taking up another phase of the Kentucky blue-grass inquiry—the adulteration of it with Canadian blue grass. I have here two samples, one bottle of Kentucky blue grass and one of Canadian blue grass, the Canadian blue grass being in most parts of the country a worthless grass. Here is a mixture of half Canadian blue grass, which to the ordinary eye and to the eye of all the seedsmen of Kentucky is indistinguishable from pure Kentucky blue grass.

The way the seed has been distinguished is by plunging their hands into a sack, and if their hand is pricked they conclude it is Canadian blue grass, the reason of this being that Canadian blue grass as it comes upon the market invariably has in it the ends of the spine of the Canada thistle, while our own Kentucky blue grass is free from that. We are, however, able by the examination of these seeds to figure out the exact percentage of Kentucky blue grass and Canadian. There has been exported into the United States from Canada since 1902 over

900,000 pounds of Canadian blue grass, practically all of which was used for the adulteration of Kentucky blue grass.

The CHAIRMAN. I wonder if that is shipped to Kentucky for adulteration of Kentucky blue grass? In other words, where would you be likely to find pure Kentucky seed?

Mr. COVILLE. It is mixed chiefly at the markets and especially by the seed dealers. I think that none of the mixtures are made by the growers of the seed in the State of Kentucky. We are testing those samples free of charge for any one who may wish to send them to us, and we are pointing out the necessity or desirability of this sort of action which would make it impossible to put those things upon the market.

I have here some similar mixtures which have been shipped with alfalfa seed adulterated with yellow trefoil. Here is a bottle of alfalfa seed, and here a bottle of yellow trefoil, and here a mixture of alfalfa. These are commercial samples, bought in the market, of alfalfa seed containing 33 per cent of yellow trefoil. It is almost indistinguishable except by an expert indentification of the seed; it is indistinguishable from pure alfalfa seed.

Mr. SCOTT. Is yellow trefoil grown for any other purpose except to adulterate with alfalfa seed?

Mr. COVILLE. The legitimate sale of yellow trefoil seed in the United States would be a small fraction of 1 per cent of the imports.

Mr. SCOTT. Then for what legitimate purpose would it be used?

Mr. COVILLE. It is sometimes used in lawn mixtures. There has been imported into the United States since July, 1902, 129,000 pounds of yellow trefoil.

Mr. BOWIE. Is that an inferior grass?

Mr. COVILLE. It is worthless, and in most cases worse than worthless.

Mr. BOWIE. Why do they want to adulterate it?

Mr. COVILLE. This yellow trefoil is bought at low price and is sold at the same price as alfalfa seed.

Mr. GALLOWAY. It is bought for about 5 cents and sold for 18 cents.

Mr. COVILLE. It is not simply a question of the value of the seed; it is the unfortunate result of planting this mixture upon the land. Here is stuff which is imported into the country, alfalfa seed screenings and that sort of thing; here is an alfalfa seed imported which is of pure alfalfa, but only 5 per cent of it will grow. It is imported for mixture with good alfalfa seed. There are clover mixtures imported for adulteration containing a small percentage of clover and another of alsace clover containing only 49 per cent.

Mr. SCOTT. You can do nothing to punish the adulterations except to respond when called upon for tests?

Mr. COVILLE. That is the only thing we can do at the present time.

The CHAIRMAN. Have you not the same power that Professor Wiley has?

Mr. COVILLE. We have not,

The CHAIRMAN. You ought to have it.

Mr. BOWIE. What is Professor Wiley's power?

Mr. SCOTT. Under the pure-food laws.

The CHAIRMAN. Why would it not be practicable to do as Doctor Wiley is doing in food, and when an invoice of seed is landed in this country examine it——

Mr. TRIMBLE. In reference to that I would suggest that I am in conference with the Department, and have been, in regard to a bill which

covers this point in adulteration of blue grass and blue-grass test. The blue-grass dealers have made complaint. They buy Kentucky fancy blue grass for $1.20 a bushel, and they buy the same quality apparently of Canadian seed at 60 cents. They mix these two seeds, half and half, and sell it for a fancy price. Perhaps they will sell it for 10 cents a bushel less than the fancy seed, you know, just to get their seed on the market, and the result is that honest dealers are being put out of the business unless some kind of a law like this is enacted. The same thing with a mixture of orchard grass with the Italian rye grass, and a very inferior grass—a cheap grass—and sell it and impose on the public, which is very detrimental to honest people.

Mr. BOWIE. Have you introduced a bill on the subject?

Mr. TRIMBLE. Mr. Galloway here and myself have been in conference and the bills are ready to be introduced.

Mr. GALLOWAY. It gives the privilege of sending a sample to the Department for test.

Mr. TRIMBLE. It will be effective all right. It puts a heavy penalty for adulteration.

The CHAIRMAN. I remember this clause, and it seems that we can stop it under that, as follows:

And the Secretary of Agriculture is hereby authorized to purchase samples of seeds in open market, test same, and when found not up to standard, he may, at his discretion, publish the results of such of these tests, together with the names of the seedsmen by whom the seeds were sold.

Mr. GALLOWAY. If that thing was in force the entire seedsmen would combine and come down on Congress.

The CHAIRMAN. You can get at the big invoices that come over here from Europe and from Canada; you can stop that under this clause, and you would make a great headway.

Mr. GALLOWAY. This is handled by comparatively few firms. If there were a slight increase in the tariff on blue grass it would stop coming in here, but that would bring up the whole question of tariff.

The CHAIRMAN. I should think you could get at that foreign seed, anyway. I do not see any objection to that clause. If you could catch one of the people once it would ruin his business. The mere danger of their being exposed, I should think, would deter them.

Mr. BOWIE. Do you not think that while there is a fraudulent adulteration of an article of that sort that it ought to be penalized in some way—be made a penal offense?

Mr. TRIMBLE. You can not prevent the mixture of seed, but you can force the dealers to say what percentage of the seed is mixed, and if they sell adulterated for pure seed it would be a fraud and ought to be punished by a heavy fine.

Mr. HENRY. That it is what they do in States with fertilizers.

Mr. TRIMBLE. I do not see how anybody would fight a bill of that kind except fraudulent seed dealers; there is no injustice done to anybody in a legitimate business, and if a seed dealer makes a fight on that——

The CHAIRMAN. I think a clause could be framed to cover this trouble and be put right in the bill.

Mr. BOWIE. Would it not be subject to a point of order?

The CHAIRMAN. There would be very little danger of that.

Mr. BOWIE. I would be perfectly willing to put it on the appropriation bill.

The CHAIRMAN. Nearly all the legislation on these bills is subject to a point of order. I wish you would take that up with the Secretary, Mr. Galloway. We might not get the right thing the first time.

Mr. COVILLE. I want to say, Mr. Chairman, with respect to the provision which you have read, that one of the great difficulties in applying that would be the injustice to our seedsmen who sometimes unwittingly sell seed which come below our standards. If we publish the results of our analyses, we would have to publish them all, and we would have to publish in the list of those who had sold bad seeds the names of some seedsmen who are trying to do a legitimate business. But another bill could be drawn which would not be open to that objection.

The CHAIRMAN. Why, it is not absolutely mandatory on the Secretary. It is within his discretion.

Mr. SCOTT. What provision do you think would not be open to that objection?

Mr. COVILLE. Various ones have been suggested. One that has been under discussion at the Department is one providing against the sale between States of seed containing a certain percentage of certain specific adulterations, also prohibiting them altogether.

The CHAIRMAN. Now, why can not something be drawn on the lines of that clause in Professor Wiley's Bureau of Chemistry whereby he examines food brought from other countries?

Mr. GALLOWAY. That bill covers about four pages—that pure food bill.

The CHAIRMAN. He does it in a clause, in this bill. It is very short, and right to the point.

Mr. GALLOWAY. I know what you have reference to.

The Chairman read as follows:

To investigate the adulteration of foods, drugs, and liquors, when deemed by the Secretary of Agriculture advisable; and the Secretary of Agriculture, whenever he has reason to believe that articles are being imported from foreign countries which, by reason of such adulteration, are dangerous to the health of the people of the United States, or which are forbidden to be sold or restricted in sale in the countries in which they are made or from which they are exported, or which shall be falsely labeled in any respect in regard to the place of manufacture of the contents of the package, shall make a request upon the Secretary of the Treasury for samples from original packages of such articles for inspection and analysis; and the Secretary of the Treasury is hereby authorized to open such original packages and deliver specimens to the Secretary of Agriculture for the purpose mentioned, giving notice to the owner or consignee of such articles, who may be present and have the right to introduce testimony; and the Secretary of the Treasury shall refuse delivery to the consignee of any such goods which the Secretary of Agriculture reports to him have been inspected and analyzed and found to be dangerous to health, or which are forbidden to be sold, or restricted in sale, in the countries in which they are made or from which they are exported, or which shall be fasely labeled in any respect in regard to the place of manufacture or the contents of the package.

Mr. COVILLE. Under the Constitution the United States has the right to make laws bearing on the public health, and that is the basis on which that law was made, but the adulteration of seed is a matter which could not come under the protection of the public health.

The CHAIRMAN. There is another clause in here that practically prohibits them sending to this country what is not permitted to be sold in countries from which the shipments are made.

Mr. GALLOWAY. I have no doubt that a clause can be drawn for insertion right here that would cover the point.

The CHAIRMAN. Even the old clause, if used very vigorously and with

a little courage, would answer the purpose. It would have to be used pretty arbitrarily, perhaps, sometimes.

Mr. TRIMBLE. The publication?

The CHAIRMAN. You catch a man bringing seeds adulterated here and advertise to the seed business that you caught him at it——

Mr. TRIMBLE. The firm that they know is adulterating. For instance, the drummer starts out from Paris, Ky.; that is the headquarters of blue grass, and goes into Virginia and offers his dealers at $1.20 a bushel for fancy seed. The dealer tells him he bought at $1.10 seed apparently as good as his seed. He tells him it is adulterated or Canadian seed. Well, he says, "I can not sell pure seed when somebody else in town is selling seed at a less price." Of course the results are different. But it apparently looks as good.

The CHAIRMAN. Why was that clause taken out of the bill?

Mr. GALLOWAY. It was taken out because it was thought it was undesirable to keep it in there, for the reason the Department of Agriculture is cooperating with a good many good, substantial seedsmen. And undoubtedly in getting after one man we would reach some of the good ones; the seedsmen themselves are all opposed to it, the good seedsmen were opposed to it; that is, men that were not adulterating.

Mr. GRAFF. Simply because they said that under the conditions under which they work there were times when they would be hit by it when they had no intention——

Mr. COVILLE. If we publish the analyses of all the bad seeds, not all of that would come on the men who are deliberately selling adulterated seed, but some of it would unwittingly be placed on the market by those who are conducting a legitimate business; it would seem undesirable for the Department to do a thing of that sort.

Mr. SCOTT. You remember this clause placed the whole matter at the discretion of the Secretary?

Mr. GALLOWAY. The trouble was that the Secretary would not act at all. He did not want to get into any mix up with the seedsmen. There is one way it might be handled, and that is to give the Department of Agriculture authority to certify to certain specific quantities of seed and give them a tag, and that would be an incentive to the good seedsmen to secure such certification of certificates and sell under those certificates; and then a dealer or a planter or a consumer would have the right to send his samples to the Department, and if they were not up to the certificate, then he could go into the Federal courts and get damages.

Mr. TRIMBLE. Do you not think the bill that is now prepared would prevent it?

Mr. GALLOWAY. It is only a question of getting the thing through.

The CHAIRMAN. It would involve an army of employees.

Mr. TRIMBLE. It would not involve any work at all. It would not cost a cent. I will introduce the bill to-morrow, I think.

The CHAIRMAN. Briefly, what are the terms?

Mr. TRIMBLE. It provides a penalty for the adulteration of seed where it is sold as pure seed; and where a party is caught selling the Canadian grass and Kentucky grass as pure blue grass he is subject to a fine.

Mr. GALLOWAY. On the other hand, it provides that in case the seed are sold and are adulterated, and if the contents are printed and attached to the package, it can be sold for what it is.

The CHAIRMAN. You provide that it shall all be tagged?

Mr. TRIMBLE. No; that the adulterated seed shall be tagged.

Mr. COVILLE. It is similar to the pure-seed law in your State?

The CHAIRMAN. Suppose you stop in a retail store and buy 50 bushels of Kentucky blue-grass seed and found it was not Kentucky blue-grass seed, and no tag on it?

Mr. TRIMBLE. That could be traced up to the wholesale dealer, and I think you could have the seed dealer bring him up and have him indicted.

Mr. WRIGHT. Would not that come under the fraud laws of the State?

Mr. TRIMBLE. You would have to have a State law to comply with the Government law.

Take 35 per cent of the Kentucky blue-grass seed and orchard-grass seed, and it is adulterated.

The CHAIRMAN. Half of the clover seed is adulterated.

Mr. TRIMBLE. This bill covers clover seed. I have been in conference with blue-grass and orchard-grass seed dealers in Kentucky since I have been down and it is very acceptable to them—the honest dealers.

Mr. COVILLE. I want to call your attention to some work we are doing on the cultivation of medicinal plants. We import from $12,000,000 to $15,000,000 worth of medicinal and drug plants, and we are working to demonstrate the possibility of cultivating drug plants in the United States. I have here some samples of those that have been grown in experimental plants here at the Department and in Vermont.

The CHAIRMAN. What are those plants?

Mr. COVILLE. These three here [indicating] are belladonna. I would like to show them all around and show you the superiority of the American-grown article. The drug men are delighted at the prospect of growing these in the United States.

Here is also digitalis [exhibiting] in addition to belladonna. I will say very briefly there is a very excellent promise of our being able to grow these things profitably.

The CHAIRMAN. Where is belladonna grown?

Mr. COVILLE. Chiefly in Germany and England.

The CHAIRMAN. And digitalis?

Mr. COVILLE. Both grown in the same countries.

The CHAIRMAN. Is it a profitable crop?

Mr. COVILLE. I do not know if it would be a profitable crop under our conditions, but believe it will be. We can not, at the present time, recommend it strongly as a crop, until we have gone further ahead with our experimentation. We have to make an analyses of the amount and character of the alkaloid it contains, and the whole process is rather a slow and expensive one. I will not devote any further time to the question of medicinal plants further than to say that we wish to increase our plant a little in the matter of medicinal plants and to carry experiments on in the South in addition to those experiments we are carrying on in the North. There are certain plants it is impossible to grow in the Vermont station that it is possible to grow in the Gulf station.

One of the troubles we have at the Department of Agriculture is to give advice to people who are questioning whether or not we shall go into certain doubtful enterprises. One of the things that has

caused us a good deal of trouble in the past year is the question of ginseng culture. I want to show you here the seed of the ginseng, which is put on the market as a substitute for the American ginseng seed and which involves a total loss to the grower, and which otherwise would result in thousands of dollars in profit. It is a pure adulteration. And in addition to that, we are trying to keep the people from going into ginseng growing. There is a legitimate profit in ginseng of about $1,000,000 a year. The natural export crop can be grown on 50 acres of land, but from those thousands of requests from people who wish to go into it, it looks as if we will have an enormous production in a few years of ginseng crop. Fifty acres will produce the annual export.

It costs at the present time, for 2-year-old roots, about $20,000 to start an acre of ginseng.

Mr SCOTT. Has it any medicinal virtue?

Mr. COVILLE. It has not.

Mr. SCOTT. It is used in China?

Mr. COVILLE. Yes, sir.

Mr. BOWIE. What for?

Mr. COVILLE. As a tonic.

In the matter of the things that are deceiving the public we are running across interesting things in the question of tropical agriculture, and I would like to read to you a letter that was received not long since with reference to floating of stock in india-rubber plantation companies:

——— *College,*
——— ———,
*Dec. 28, 1903.*

Mr. O. F. COOK, *Warden's Office.*

DEAR SIR: I am greatly obliged for your letter and for your pamplet on "The Culture of the Central American Rubber Tree" which you were good enough to send me. I am a clergyman and teacher with a limited income, nearly 66 years of age, and have no money to throw away. I have bought 15 undivided acres of the ——— ———Rubber Plantation Company through the church ——— society of ——— which looks after the interests of clergymen ot the Protestant Episcopal Church. It is not a "get-rich-quick" concern, as it promises to pay no dividend for six years, but then it assures us of a return of 20 per cent, gradually increasing, until it pays 200 per cent in ten years. Your report is not as encouraging as I could wish. Will you be kind enough to tell me your honest opinion of ———? It is, under Mr. ——— ——— and his manager, Mr. ——— ———, being carried on honestly, intelligently, efficiently, and economically. Even if investments in it do not yield the very large returns promised, are they not likely to pay well? If you will kindly answer these questions and give me any other information on the subject that may suggest itself to you, I shall be greatly indebted to you. I am relying on this investment as the support of my old age and can not afford to make mistakes.

Yours, very truly,

Rev. ——— ———,
——— ———.

That is one of the lines of work, a large correspondence on questions of fraud and information on questions of doubtful enterprises, some fraudulent, and which consume a considerable part of our time; and part of our efforts, in connection with tropical agriculture, and these other things, is devoted toward producing conservative information which we believe will be as useful to the people in a negative way as information regarding agricultural enterprises suitable for the investment of money would be in the opposite direction.

Mr. SCOTT. Do you report unconditionally against these rubber enterprises?

Mr. COVILLE. No, sir.

Mr. HENRY. What kind of a reply, if it is allowable, did you make to that letter which you have read?

Mr. COVILLE. That letter I did not reply to myself; the reply was written by Mr. Cook, but the general reply we make to such letters is, that we advise these gentlemen to look into it with a great deal of care; that these rubber companies are often deceiving themselves in the probable return from their investments, and we suggest that they go into the matter with circumspection.

Mr. HENRY. We have been beset with these kinds of propositions, and I think that tens of thousands of dollars have been invested in these Central American plantations. If you recall the fact, I asked you these questions. Have you anything to add to what you said then?

Mr. COVILLE. A little to add. We have been investigating the rubber plantations of Central America, and, incidentally, we have producted authenticate information about the question of rubber culture in these countries—information which is, we believe, very useful to our people. This information is being published in the form of books——

Mr. HENRY. I want to say I have sent marked copies of the last report to people that have inquired of me in regard to it.

Mr. COVILLE. Millions of dollars are being invested in tropical agricultural enterprises which will never be returned to people who are making the investments. Some of the investments will make good returns.

Mr. HENRY. Do you think there is a possibility of any of these enterprises in Central America realizing anything?

Mr. COVILLE. Yes. Many of those that will be moderately successful and give returns which will be small. It is a general proposition that if a company knows definitely that it is going to make certain returns, if it is convinced it is going to make those returns, it does not have to float stock and sell it to retired clergymen through the United States in order to raise funds.

Mr. BOWIE. That is the thing that condemns them all. There is plenty of money for that sort of business if it is genuine.

Mr. COVILLE. Why should a company desire to distribute its profits to citizens throughout the United States instead of putting the profits in its own pockets?

Mr. HENRY. They make the most alluring propositions, much more so than this clergyman reports here.

Mr. BOWIE. Do you think some of those things come within the provisions of the fraud law of the Post-Office Department?

Mr. COVILLE. We have called the attention of the Post-Office Department to one case, but I have not seen any published account of how they treated it, and they have not notified us.

Mr. HENRY. Is it not true that it is done by personal solicitations instead of by mail?

Mr. COVILLE. Many of the prospectuses are full of misstatements. It is astonishing what misstatements will be made in regard to some of the companies. I would like to show you information we are securing in regard to these rubber plants. The information we are now publishing is the best information we have ever published [showing photographs to the committee].

I do not know, Mr. Chairman, if you care to take up the question

in regard to coffee cultivation. We have some additional facts in regard to that.

I do want to show you one thing. Speaking of questions of fraud and improper methods of handling commercial affairs, here is a sample of Manila hemp—a sample which is much less discolored than usual. If you will test this fiber you will find it is almost impossible to break one of these fibers which has not already been weakened by bending [exhibits to committee]. Here is a sample which came from the New York market [exhibiting]. Most of this consists of an excellent first-grade quality. Its grade is the same as the first one except it is a little discolored by being exposed to the weather, but inside of this is a sample of what is known to the trade as a "Dutchman." This outside fiber is almost unbreakable. This inside fiber is as rotten as the poorest jute. This is of an exceedingly low grade. We found large quantities of this were coming into New York packed up in this way. The matter was brought to the attention of the Department and we drew up certain suggestions to the Philippine government, and those suggestions have been put into effect to a certain extent, providing for the more careful surveillance of the export of Manila hemp, and which have materially increased the grade of hemp that has been imported from the Philippine Islands.

Mr. SCOTT. Is this scheme invented by our little "brown brothers" or is it an American invention?

Mr. COVILLE. It is not done by the Americans. These things are already in bundles before they reach the Americans. It is alleged that the adulterations are done by the Chinese through whose hands it passes. We have been unable by our representatives to make our own investigations in the islands.

Mr. HENRY. How large a percentage of that bogus hemp——

Mr. COVILLE. The percentage of this hemp is small—I suppose 10 per cent, perhaps—but it was sufficient to throw doubt on the whole question of the character of the importation of manila hemp, and buyers in New York were threatening to go back to the Mexican fiber, which, during the Spanish war, had been used as a substitute for manila hemp, and to throw their trade toward the Central American fibers instead of back again to manila.

Mr. SCOTT. In what sort of packages do those fibers come?

Mr. COVILLE. I have not seen the packages. The gentleman who made the investigation brought back these samples.

Mr. SCOTT. They are probably baled.

Mr. COVILLE. I presume so. Otherwise it would be very easy to inspect.

That, gentlemen, in view of the lateness of the hour, is all I care to say to the committee.

Mr. SCOTT. I would like to ask if you have done anything along the line of introducing the culture of ramie fiber in this country?

Mr. COVILLE. We understand the character of the problem, yes. Ramie will grow here perfectly well.

Mr. HENRY. Is it grown here to any extent?

Mr. COVILLE. No, it is not grown commercially at all. The difficulty in ramie plants is the extraction of fiber from the plants. It has to be extracted, so far as our knowledge of the case to the present time goes, from the green plants. When the plant is dry the fiber is brittle and is broken in the extraction, and no machine has yet been

invented which will clean the enormous amount of green stem which is required in order to handle the crop.

Mr. SCOTT. I saw one of the stores down there advertising underclothes made of ramie fiber.

Mr. COVILLE. That is all imported fiber from China scraped by hand.

**STATEMENT OF PROF. B. T. GALLOWAY—Continued.**

Mr. GALLOWAY. There are now two other items in our appropriation that can be briefly discussed, if you wish me to discuss them. We have "Experimental gardens and grounds." The present appropriation is $25,000, and we have asked an increase of $5,000. We want to undertake some work in the matter of certain problems connected with the growing of crops. There are between $40,000,000 and $50,000,000 invested in that class of work, and there are many very intricate problems that have not yet been determined. The methods of propagation, the questions of heat—all those are questions that can not be well worked out by the growers, and they are of such a nature that they can not be well worked out by the experiment stations, because we do not have the facilities.

The work of "gardens and grounds" is of such a nature that a considerable portion of the expenses—a large per cent of the expenses—are what we call fixed expenses, for the maintenance of the grounds themselves. In addition, the men on the gardens and grounds work in connection with the Congressional seed distribution, where the matter of plants comes into distribution, and where the question of distribution of plants and seeds from foreign countries is also under consideration. Plants from foreign countries that are to be grown and distributed by the men on "gardens and grounds." This year we are to pay for the fuel, which is going to cost us about $4,000 or $5,000. Heretofore it has been paid out of the contingent fund, which is not this year the case. This $5,000 we are asking for——

The CHAIRMAN. Why has the contingent fund turned that over to you?

Mr. GALLOWAY. The disbursing officer claims that while the Department has been growing constantly for the last few years the contingent fund has not been changed, and the contingent expenses of the Department have been constantly increasing, and he is forced to put some of the expenses that have been borne by contingent expenses on the various divisions and bureaus.

The CHAIRMAN. Each bureau takes care of its own rented properties?

Mr. GALLOWAY. Yes, sir.

The CHAIRMAN. I do not see where the contingent fund could have grown very largely.

Mr. GALLOWAY. Well, that is the stand they have taken. We have been buying our own fuel, and we buy about 5 tons of coal a day in connection with our greenhouse work.

Mr. BOWIE. What is the present appropriation?

Mr. GALLOWAY. $25,000. We want it increased to $30,000.

Mr. BOWIE. Where are these experimental gardens and grounds?

Mr. GALLOWAY. At our Department. We have 40 acres; and our greenhouses are for experimental purposes. Whereas we have experiment gardens at other places—on the Arlington farm and on the flats—

we consider and call these grounds the experimental gardens and grounds, and we conduct on these grounds lines of work that are related to all other branches of the Bureau. That is, the pathologist who is doing work on the diseases has a greenhouse; and the maintenance of those greenhouses, and the fuel, we pay for out of the "gardens and grounds" fund. Then we have the maintenance of roads, keeping up lawns and caring for grounds, and planting of trees, and all work of that kind; and in addition——

Mr. BOWIE. Is not this $5,000 increase simply a transfer from the contingent fund to this fund?

Mr. GALLOWAY. It is not a transfer at all; for in the contingent fund they are asking the same as before.

Mr. BOWIE. It is a transfer of expenses?

Mr. GALLOWAY. Largely.

Mr. BOWIE. It prevents them from asking that much increase?

Mr. GALLOWAY. They will not probably ask for any increase. I do not think they have.

We have an appropriation now of $15,000 for the Arlington experiment grounds. This farm has now an acreage of about 500 acres, and we have been three years getting it into shape. A large part of it has been drained, and the plots laid out in such a way that the work can be carried on in purely experimental fashion. Certain buildings have been put up; we have erected two dwelling houses for the men. We have inaugurated in the last year definite experimental work. Its object is, briefly, to give an opportunity to the Department to carry on investigations and experiments along nearly all the lines which you have heard discussed here—for example, the nitrogen work that was discussed here yesterday. The first demonstration work on that has been done at this farm. There we worked out the first experiments and first data before we made any attempt to put it into operation in other parts of the country.

Then we had something like 40 acres of different forage crops there. We carried on experiments in the matter of testing kiln-dried versus air-dried corn; and there we have experimental orchards and vineyards, where we can carry on investigations, not only in the line of diseases of plants, but in combating insects. In short, it is a place where Department men can go and get practical results in connection with subjects of departmental work. The main expense that has been involved over there has been due to getting the thing in shape. The Arlington farm for twenty years was a mule pen, and was used largely by the War Department for pasturing mules. So far, the planting of cow pease, and drainage, and so forth, have taken most of our funds.

We have asked for an increase of $10,000, and that money is to be used as follows: $2,500 in the increase of our labor roll, to carry on the work we are doing over there; $5,000 we propose to use largely for the erection of certain necessary buildings—greenhouses; and for a central heating plant for the establishment we have now, $2,500. The last we propose to use in increasing our demonstration work, or the experimental work we are conducting, and in finishing up certain necessary permanent improvements that will have to be made on the lower part of the farm. That is principally what the $10,000 is laid out to cover. That covers the remaining items in our Bureau where increases are asked. We still have remaining the seed work.

Mr. BOWIE. I want to ask you one question. Does the Arlington farm produce any revenue to the Government? Are any of the products of the farm sold?

Mr. GALLOWAY. No; the products are not sold. The only revenue is, we grow our own feed there for our stock. And we have 60 acres on the river bottoms that belong to the War Department, but are turned over to the Department of Agriculture, and we are growing down there quite many of the crops that can not well be grown at the Arlington farm. We are testing there quantities of seed that come in for Congressional distribution, for purity and vitality.

The CHAIRMAN. How about the tea-culture item?

Mr. GALLOWAY. We have just inaugurated the tea work in Texas. We have practically finished the work in South Carolina, with the exception that we are now carrying on certain investigations in the matter of determining the things which give the variation in quality of tea. We are making there this year, or have made last year, something like 9,000 pounds of tea—it would have been 12,000 pounds if the season had been favorable—and we are just beginning to turn out a high grade of green tea; and that has been made practicable by the work that has been done by the plant physiologist, who has worked out certain problems connected with the fermentation of tea. It is practicable to ferment tea in a way to make a high-grade green tea. Some of the tea we sold on the market for $2.50 a pound.

Mr. SCOTT. How much of the work have you done on the South Carolina plantation and how much expense have you borne?

Mr. GALLOWAY. A small part of the expense. The main expense has been borne by Doctor Shepard, who owns the farm, and who has put all the money into the buildings and improvements. The money we have expended there has been in the direction of the purchase of experimental machinery, some of which has proved of value and some of which has proved of no value.

Mr. SCOTT. Has it been a profitable investment for him?

Mr. GALLOWAY. He will just about make expenses this year.

Mr. SCOTT. He is encouraged to follow the work up?

Mr. GALLOWAY. Yes.

The CHAIRMAN. In your judgment is it a commercial success?

Mr. GALLOWAY. It is, there. The fact can be shown by the way the people near there are taking hold of it. In fact, there is one firm that is preparing to put out several hundred acres near Summerville. They eventually plan to put out 2,000 acres. What has checked the work, and put a rather serious check on it, has been the taking off of the tariff, which makes quite a serious difference in the matter of handling it. There was a war tariff of 12 cents on tea. All other countries besides ours take off the tax on tea.

Mr. LEVER. Do you have any difficulty in getting the right kind of labor down there?

Mr. GALLOWAY. There is no trouble in South Carolina with labor. We can grow tea there for about 15 cents a pound.

Mr. SCOTT. Is it a thing that can be handled in a small way?

Mr. GALLOWAY. It can be handled in a small way in this fashion, very much like sugar beet. A factory with a capacity of handling 1,000 acres would probably cost about $5,000. It is less expensive than sugar-beet work.

This factory in Texas is handled in this fashion: The owner of the land furnishes the land, he irrigates it, and he furnishes all the buildings. The Department simply puts an expert there to grow the tea. He does the planting and starts the factory work, and when the work is completed all the machinery that is installed will come back to the Government—that is, that the Government pays for—and then, of course, the tea and the factory buildings and what goes with it go to the owner, and the owner is privileged to sell the tea under Government control, so that we know what the profits are.

The CHAIRMAN. How much longer do you think that work will have to continue?

Mr. GALLOWAY. It will take, probably, about three or four years; but I think after this year that appropriation can be cut, probably one-half—that is, after we get the installation there. We propose to put out 300 acres, and the work in South Carolina can be reduced to probably $1,000, largely for this advanced technical investigation in the line of determining the method of the varying quality of tea by different methods of fermentation.

The CHAIRMAN. That closes your Bureau.

Mr. GALLOWAY. I would like to make a few statements about seed work. I would like to say, first, just a few words in regard to the present methods of purchasing seeds. The Government now purchases all of its own seed, and we find we get very much better seed by so doing, and we can do it cheaper than where the seed was furnished by contractor.

Mr. BOWIE. You do not take it from the lowest bidder, necessarily?

Mr. GALLOWAY. No, sir; we found that was a very fatal way of doing the thing. We now endeavor to purchase in the open market, and from stocks in hand, about one-third of the seed we use. It takes for the Congressional distribution alone about 135 carloads of bulk seed, and it takes about eight months getting ready for the four months' strenuous effort we will have to put in in getting that seed into bags.

The CHAIRMAN. How many carloads will that make, packed for distribution? Twice as many?

Mr. GALLOWAY. More than that. It may magnify ten times. The post-office people here never think of measuring it up by carload lots. Sometimes they have the room there full, and they have to pick out other things from under the piles. On the average they go down there at the rate of 100,000 packages a day, and it runs 100 packages to one of these big mail sacks; so you can get some idea of it. One Congressman's quota would about fill this room—12,000 packages.

Mr. HENRY. How do you make distribution of what you term select seeds?

Mr. GALLOWAY. We abandoned that for the reason that we could get but very few people to take an interest in it. We selected choice seed and best seed; it laid around there, and members did not know what they were and did not come to get them, and so we had most of them left on our hands.

Mr. BOWIE. I have no doubt in the world that if that certain thing were continued for awhile they would order more out.

Mr. GALLOWAY (continuing). We spent for the Congressional—for the bulk—seed last year $101,000, and our contract for doing the work was forty-two and some odd thousand dollars, which makes it something like $143,000 for the work.

This year we had a man in Russia studying flax. He has secured many fine varieties, which will be planted during the coming year. We have worked on macaroni wheat until that is practically finished. We are putting on the market, dates. The rice work is very well along, and this year there will probably be 500,000,000 pounds of rice in this country, just about what we consume. We will begin to export rice next year. There are many questions in connection with rice that we can work out in our own way. We are trying to demonstrate that we can grow our own rice seed in this country.

Mr. HENRY. How large an increased area has been grown this year?

Mr. GALLOWAY. Probably 100,000 acres; there are about 200,000 acres of rice land put in Texas this year alone. It is the most profitable crop they have down there. It has taken the place of cotton in the southern section of that country, where cotton has been wiped out by the boll weevil. It nets them about $20 an acre.

Mr. BOWIE. Is it as expensive to cultivate as cotton?

Mr. GALLOWAY. Not nearly. The rice work in Texas and Louisiana has been made successful from the fact that the methods of growing wheat in the Northwest have been introduced there—self-binders and all such things are used.

Mr. BOWIE. Have we any suitable rice land in Alabama?

Mr. GALLOWAY. Yes, sir. We are growing some upland rice which is proving quite successful.

Most of you are familiar with the methods we adopt with new and rare cotton seed and new and rare tobacco seed. If we find a variety that has a good record we endeavor to get up a stock of that—it may take a little time—and we distribute that in a limited way the first year, and if we find it effective we distribute it more extensively the next year. We have distributed a number of cottons, and pick out five or six new ones each year, and get up enough to make a general distribution, and we send out with each package of seed that goes out, one of these circulars, which describes the length of the fiber and a description of the variety itself, so the planter himself can go ahead and get up a stock of seed. And we do the same thing with tobacco. In that way we are gradually diverting more and more of the general Congressional fund—rather in that direction than with miscellaneous garden seeds.

The suggestion has been made—and probably we will put it into operation in many cases—that the members will prefer to have these special things rather than these miscellaneous things. That is wholly optional with them, but we will have to know it a year in advance.

Mr. SCOTT. How have you been making that distribution this year? You stated a moment ago that the members did not want their special seed.

Mr. GALLOWAY. I meant special garden seed. They were not special field seed, or anything of that kind.

MR. SCOTT. These varieties of cotton, tobacco, etc., are distributed to the member in the usual way?

Mr. GALLOWAY. Each member living in the cotton belt gets 80 pecks of this cotton seed. With tobacco growers we divide the country up into districts, and we send to each district the type of tobacco that ought to succeed there. We send 110 packages such as this [exhibiting] to each member, and one of those packages will plant about a quarter of an acre [showing package]. This happens to be Sumatra

tobacco, which we send to Connecticut. Cuban tobacco we send in the same way. We are endeavoring to secure a higher grade of these seeds by the selective methods described here yesterday. That is expensive. We can grow by general selection cheaper than by special selection; but after a while we can grow specially selected seed as cheap as the other.

As to sugar-beet seed, we imported something like $500,000 worth, and we have been endeavoring to get that grown for us in certain parts of the West. Last year we distributed 10,000 pounds, and we sent that in most cases out through members living in the sugar-beet belt; but in a number of instances we distributed it in 100-pound lots, to be planted side by side with foreign-grown seed, and in nearly all of the reports we are getting the American seed is reported as superior, not only in quantity of sugar that the beets yield, but in the vitality and per cent of germination. The fact is, we get only about a third-grade seed from abroad. There was a gentleman here yesterday that grows 60,000 pounds of sugar-beet seed, and he sells it as soon as it is grown, to California growers.

The CHAIRMAN. How much is it worth?

Mr. GALLOWAY. Ninety cents a pound.

The CHAIRMAN. How much does he sell it to the California people for?

Mr. GALLOWAY. He has a contract with the Spreckels people. We have been trying to get a contract with him, but he sells it all to them.

Among special lines of seed work is the Berseem and Turkestan alfalfa, that is valuable in the low bottom lands. It is a great crop of the Nile Valley, and has grown there for hundreds of years. It is a clover, and one of our foreign explorers secured the seed, and we are now developing it. We are endeavoring to place it in the hands of reputable men, and make a contract with them to grow for us certain quantities of the seed, so that we will not have to go to the source of original supply.

Mr. GRAFF. That would not grow on the low lands of Illinois, would it?

Mr. GALLOWAY. No, sir; it is not hardy there. It is undoubtedly one of the most valuable introductions that has been made, for the South—not the extreme South; it will grow where temperature falls to 25°.

Considerable work with cereals, new introductions of cassava; these flax varieties; the Japanese bamboos. Considerable work has been done in the latter direction, for the purpose of planting them in the South where the lumber is scarce, and where the bamboos can be used for not only the manufacture of furniture, but in the construction of houses. We introduced quite a number of them last year.

Mango, that is a southern crop. And there are a number of other crops which are not necessary to mention here. These all have to do with seed work, and the work is all paid for out of the general appropriation for Congressional seed and for foreign-seed introduction. There has been no increase asked for in that work.

That is all, I believe, Mr. Chairman.

At 4.30 o'clock p. m. the committee adjourned.

SATURDAY, *January 9, 1904.*

The committee met at 11 o'clock a. m., Hon. J. W. Wadsworth in the chair.

## STATEMENT OF PROF. WILLIS L. MOORE, CHIEF OF THE WEATHER BUREAU.

The CHAIRMAN. We will take up your increases in order.

Professor MOORE. Very well.

The CHAIRMAN. The first item is, "Four professors of meteorology, at $3,000 each, for duty in the city of Washington, or elsewhere, as the needs of the Bureau may demand" (one additional submitted).

Professor MOORE. Yes, sir.

The CHAIRMAN. Please tell us about that increase.

Professor MOORE. That increase of one professor of meteorology brings us to the river and flood service. I can show the necessity for that increase.

The CHAIRMAN. It is not actually an increase; it is simply a promotion of one professor from $2,500?

Professor MOORE. We dropped one district forecaster at $2,000. This change is necessitated by our desire to reorganize the river and flood service.

Mr. BOWIE. Is not that really to provide a first-rate, competent man to have charge of your affairs in your absence?

Professor MOORE. No, sir. It is to make the river and flood service a separate division of the Weather Bureau, instead of being a small part of a division. That change is very important. If you will permit me, I will read a few pages from my report:

The work of the river and flood service, owing to the recent numerous and disastrous floods, has of necessity been a very prominent feature of the year. Several of the floods were the greatest of which there is authentic record, and were remarkable both for their wide extent and destructive character. In no instance was the coming of a dangerous flood unheralded. The warnings were uniform, prompt, and timely, and in the main remarkably accurate. The forecasts of the great floods of March, April, and June, 1903, afford noteworthy examples of the efficiency the river and flood service has attained, and are later made the subject of more extended mention. The following extract from an editorial in the New Orleans Times-Democrat of April 12, 1903, testifies to the value of the work:

"We have been placed this year under another obligation to the Weather Bureau for its high-water news and predictions. It has kept the people of the lower Mississippi well informed of what they may expect in the way of high water, and its predictions have been subsequently verified by the facts. * * *"

I read this because our warnings enabled the city of New Orleans to raise its levees 2 feet, and those warnings, too, saved the city from going under water, as they did once before, in 1897.

Mr. SCOTT. Permit me to interrupt you to inquire if you know how much higher the levees are now at New Orleans than was thought to be sufficient at the time they were constructed?

Professor MOORE. I believe that 4 feet have been added in the eight years that I have been at the head of the Weather Bureau.

Mr. SCOTT. At that rate, in the course of things, the bed of the river will be over the city.

Professor MOORE. No; the bed of the river has not changed; but the confining to the channel of all flood waters by the extension of the

levee system has made it necessary to raise the levees at New Orleans to provide for the increase in the height of the water.

Professor Moore resumed reading:

"It has predicted within a fraction of a foot the height the river would reach at various points, and been very close to the date of maximum high water. * * *

"The day that the high water would reach New Orleans was stated with remarkable accuracy, for it was between three and four weeks after this warning that the wave crest reached here."

We can estimate on New Orleans about three weeks ahead.

"That the warning had a good effect, like that of an approaching freeze, none can doubt. It let the levee boards, planters, and public generally know what to expect in the way of high water and warned them to prepare accordingly; and they did prepare, raising the levees to the height sufficient to withstand the flood which the Weather Bureau warned us was coming. In this way, therefore, it contributed not a little to the energetic and generally successful campaign against the flood carried on this year."

The importance of the river service to the transportation interests of the Ohio River has been dwelt upon at various times. It is only necessary now to say that upon the efficiency of the one largely depends the prosperity of the other, and that the Weather Bureau has contributed much to the latter by maintaining in its river forecasts a high degree of accuracy, both during flood and the almost equally important low-water periods. These remarks apply with equal force to the remaining river districts, where very successful work has been somewhat overshadowed by the floods in the three great interior rivers.

The best recommendation that can be given work of this character is a demand for the broadening of its field of operations and the extension of its benefits to localities not yet favored. Such demands have been constant and persistent, yet lack of the necessary funds has rendered it impossible to meet more than a small percentage of them. In several instances the limitations placed upon the work by lack of funds have seriously handicapped its efficiency and thereby caused loss of lives and property that might otherwise have been saved.

I would like to have you listen to this report on the flood service:

The recent flood in the Kansas River was an unfortunate, yet none the less instructive, case. Had the Weather Bureau been able to maintain an adequate river service over this district it is practically certain that more accurate forecasts of the coming flood could have been issued and many lives and much valuable property saved as a result thereof.

It has been found to be practically impossible in recent years to obtain even moderately accurate estimates of the property saved through flood warnings. Formerly the warnings, owing to their very general nature, did not command the attention that the later and more specific ones compel, and interests were easily centered upon any marked benefits. But in these days the many and diverse interests that are more or less concerned with river stages have come to look upon the river forecasts of the Weather Bureau, both daily and special, as a legitimate and necessary portion of their business, an always available, if not a tangible, asset. It is impossible to make a record in dollars and cents of the benefits derived. However, general estimates can be made.

Mr. GRAFF. Can you tell me what aid, if any, was rendered to the East St. Louis people?

Professor MOORE. I will come to that in a minute.

The great floods of the year were those of the Red River in November and December, the Ohio and lower Mississippi in March and April, and the lower Missouri and upper Mississippi and their tributaries in May and June. The first overflowed a territory in southwestern Arkansas and northwestern Louisiana approximating 200 square miles in extent, and the property loss amounted to over $500,000. This flood began about November 26 and continued throughout the following month. On November 23 the central office at Washington advised that "all necessary precautions should be taken for the removal of stock and property liable to be damaged by flood." These warnings were thereafter repeated daily, gradually becoming more specific as to time and height of the crest stage expected, until all danger had passed. The warnings were issued from seven to fourteen days in advance of the floods, and the crest stages in various localities were correctly forecast to within a small fraction of

a foot. Mr. H. Hawkins, secretary of the Shreveport (La.) Board of Trade, wrote as follows:

"The flood warnings sent out by the Weather Bureau before and during the overflow were so accurate and timely that all had ample time to protect themselves. In consequence of said warnings there was no loss of live stock and practically no loss of movable property. We have no data from which to compute the actual value of property threatened from the overflow, but it runs into the hundreds of thousands. Certainly the Weather Bureau did wonderful work."

This is but one of the many commendatory letters and press notices relative to this flood that were received.

The flood of March and April in the lower Mississippi River was the greatest in the recorded history of that section, and its culmination was awaited with feelings of deepest apprehension and concern. Although the aggregate volume of water was less than in the great flood of 1897, yet the extension of existing levees and the building of new ones had still more restricted the natural channels, and the outcome of the new conditions was difficult to forecast. The test of actual experience was necessary. Despite these difficulties the warnings of the Weather Bureau were characterized by an almost absolute accuracy, and were issued from four days to four weeks in advance. With stages of water higher than ever before known, and with the prevailing uncertainty as to the effects of the new levees, the maximum difference between the forecasted stages and those actually recorded was only three-tenths of a foot, that being at New Orleans, where four weeks' notice had been given of the coming flood crest. The forecasts, however, were conditioned upon the levees remaining intact, and had they not broken in a few places even this difference, slight though it was, would probably not have occurred. The following table shows in a concise manner the stages forecast and those actually reached:

*Forecasts of lower Mississippi River flood and stages actually reached.*

| Stations. | Forecast stage. | Actual stage. |
|---|---|---|
| | *Feet.* | *Feet.* |
| Cairo | 50.5 to 51 | 50.6 |
| Memphis | 40 | 40.1 |
| Helena | 51 | 51 |
| Arkansas City | 53 | 53 |
| Greenville | 49 | 49.1 |
| Vicksburg | 52 | 51.8 |
| New Orleans | 21 | 20.4 to 20.7 |

Mr. BURLESON. How many employees of the Department did it take to make those observations and estimates?

Professor MOORE. Each of the employees of the service contributed a little.

Mr. BOWIE. All of the Mississippi Valley employees?

Professor MOORE. Yes, sir.

Mr. BURLESON. Did it require any increase of force to make those observations?

Professor MOORE. They were all made by the present force.

Mr. BURLESON. We have a river in Texas which runs through a very rich agricultural section. It overflows nearly every year and destroys a vast amount of property. It is the Brazos River, and I thought if, without any additional expense and without increasing the force of the Weather Bureau, that system of reporting, which I know does result in a great saving, could be inaugurated on that river, it would be very desirable.

Professor MOORE. We have had an inspection made of that river with a view to inaugurating the service there. We have a skeleton service there now, but it is not sufficient.

Mr. BURLESON. I had one schoolmate who lost several thousand dollars worth of mules and cattle in Washington County, and I know that if he had been given only two or three hours' notice he could have saved his property.

Professor MOORE. In 1897 the live stock was driven out of the Yazoo Valley by a five-day warning. The last census showed $7,000,000 worth of live stock in that valley.

Mr. GRAFF. What was the proportion of rainfall last year, the last calendar year; you take it by the calendar years?

Professor MOORE. Well, yes; we take it by the day and put it together by months and years.

Mr. GRAFF. I merely wanted to compare the present year with last year.

Professor MOORE. Do you mean generally?

Mr. GRAFF. The rainfall in the Mississippi Valley; that would cover a large number of States?

Professor MOORE. I can not answer that question offhand.

Mr. BURLESON. There has been no increase in the rainfall in the Brazos Valley, or the country tributary, but there is a rapid rushing of the current of the water in the later days which did not obtain formerly.

Professor MOORE (reading)—

The floods of late May and early June, 1903, in the upper Mississippi, the lower Missouri, and the Kansas rivers, were by far the most destructive, and, with the exception of that of 1844, the greatest ever experienced in these localities. The warnings for the upper Mississippi were equally as accurate as those for the previous flood in the lower river. Ample time was afforded to everyone to make all preparations that might be necessary, and if some delayed until too late, their failure to act more promptly certainly can not be attributed to lack of emphatic and accurate warnings. At St. Louis, on June 5, one week or more after the flood warnings were begun, a special warning was issued that in about four days a stage of water in the neighborhood of 38 feet might be expected, the gauge reading at that time being 33.5 feet. On June 10 the water reached the height of exactly 38 feet and then began to recede.

That area was inhabited by over 5,000 people, and under that warning the houses were deserted and property removed.

The floods in the Kansas River and in the Missouri in the vicinity of Kansas City could be forecast only in a general way, owing to the fact that no river service was maintained on the Kansas River, it having heretofore been found impossible to obtain sufficient funds for that purpose. The warnings issued stated that serious floods were probable, higher than had occurred for twenty years or more, but no definite forecasts could be made on account of lack of information of any description from points above the threatened districts.

We failed to make a warning of that flood in the Kansas River, and it created great destruction, as Mr. Scott knows.

Mr. BOWIE. Do you not state in your report that it amounted to millions of dollars—the destruction at Kansas City?

Professor MOORE. Yes, sir.

Mr. SCOTT. The estimate of the cost of the destruction of that flood through Kansas, including Kansas City, in the State of Kansas, put it at not less than $20,000,000.

Professor MOORE. Yes, sir.

Mr. BOWIE. How much damage could have been mitigated if such a notice had been given?

Professor MOORE. A good many lives could have been saved, and probably a fourth of the loss was movable property that could have been saved.

Had the Weather Bureau possessed an adequate river service within the State of Kansas during the recent flood, there is not the slightest doubt that, while some lives might have been lost, others that were lost would have been saved by the warnings that could have been issued, and property to the value of hundreds of thousands of dollars rescued from the general ruin. It is strongly urged that Congress

provide the necessary funds for the river service so greatly needed in Kansas and many other localities.

The demands for the extension of the river and flood service are utterly beyond the ability of the Bureau to supply. The majority of these demands are necessary for the well-being of the agricultural and commercial interests of the country, and the cost thereof would be comparatively insignificant. A new service should be at once inaugurated on the Kansas and its tributaries, on the Delaware, and in other localities, and additional stations supplied to many of the already existing districts. The telegraph service should also be extended in order that the daily reports, so necessary in many localities for accurate forecasting, may be furnished the various river centers.

The work of the service should also be broadened so as to embrace other and very necessary coordinate branches. The volume of water in the rivers corresponding to given stages in feet from the lowest water level to the highest flood plane should be measured. Information of this character affords a truer index of the real conditions than do the ordinary expressions in feet, which are at best the measured height of the water above arbitrarily assumed points, and are used chiefly because they are the most convenient vehicle for the conveyance of information to the general public. During recent years no connected series of discharge observations has been made in the large rivers of the country. An opportunity for doing a great service was lost through want of money during the spring floods of 1903, and it is hoped that another instance will not find us unprepared.

I am strongly of the opinion that the time has come when the river and flood service should be raised from its position as a part of a division and given the rank of a division, with such a complement of officials and clerks and such an increase in the funds allotted to its purposes as will enable it to still further perfect and extend the river and flood work so as to meet the needs of agriculture and commerce. The new division—

We now come to the necessity of the $3,000 man—

if created, should, as is now the case, be closely affiliated with the forecast division, and the official in charge, in so far as the issuing of flood warnings is concerned, remain under the general supervision of the professor in charge of the forecast division. I therefore have the honor to recommend that Congress be asked to appropriate for one additional professor, at $3,000; one clerk, at $1,800; one clerk, at $1,200; one clerk, at $1,000, and one copyist, at $840. But $17,000 is now spent for the pay of special river and rainfall observers and for the building of river gauges, and there are no measurements made of the sectional discharge of rivers. In order to extend the river and flood service, as hereinbefore outlined, I would also recommend that Congress be asked to increase the amount allowed for "general expenses" of the Weather Bureau outside of Washington by $30,000. This additional amount will enable the Weather Bureau to do a splendid service for the interior commerce of our country.

The plan recommended would give to the chief forecaster of the Bureau $3,000, and the $2,500 professorship now held by him would be given to the chief of the new river and flood division, and one district forecaster at $2,000 would be dispensed with.

The CHAIRMAN. You recommend that the chief of the division be increased to $2,750?

Professor MOORE. No, sir; that is another case entirely.

The CHAIRMAN. Where does that appear in the estimates, the one you propose to promote?

Professor MOORE. This is a new professor. You will find a little farther down on the page the $2,000 forecaster whom we propose to drop.

The CHAIRMAN. I am referring to the division, $2,750.

Professor MOORE. We ask for an additional professor at $3,000, and we cut out a district forecaster at $2,000. The $3,000 position will go to the chief forecaster of the Bureau, and the $2,500 to the chief of the river and flood service.

The CHAIRMAN. Where have you estimated for him in the estimates? I see "one district forecaster, a decrease of one"?

Professor MOORE. Just above that.

The CHAIRMAN. That is the same as last year, with the increase of one?

Professor MOORE. Yes, sir.

The CHAIRMAN. Are these estimates given in conformity with your recommendations?

Professor MOORE. Yes, sir; entirely so.

The CHAIRMAN. There is one additional at $3,000, the one that you have spoken of; I understand that. The other two professors come in the same as last year. I take it that you promote one of the professors to $3,000, and take one of your district forecasters and give him $2,500.

Professor MOORE. That is correct. The estimates are in accordance with that statement. If you take one of the men at $2,500 and increase him to $3,000, you do not decrease the number of $2,500 professors, because a district forecaster moves up to that position.

The CHAIRMAN. You do not increase the number, only the salaries?

Professor MOORE. That is all you do. We want to inaugurate a complete flood division in the Weather Bureau, and I think that recent disasters, both in Kansas and other places, show the need of such a division. It is of great importance to the country.

Mr. BOWIE. Does that necessitate any increase of salaries for the men doing the same work?

Professor MOORE. The officials referred to are men of high scientific attainments; they have seen many years of arduous service and study; neither of them has been engaged in the work for less than twenty years, and they are in the front rank of their profession. They are the chief forecasters of the Weather Bureau, and upon the character of their work must rest, in a great measure, the value of the weather service. Their responsibilities are tremendous. At times the balance between life and death hangs upon their judgment, to say nothing of the saving or loss of millions of property. The warnings of a single storm moving up the Atlantic seaboard save hundreds of lives and from $3,000,000 to $5,000,000 of property during each storm, and there are a number of these storms each year. Since so much depends upon the skill and judgment of these men, it would certainly seem a wise economy to pay them a fair salary for their work—one even larger than recommended.

Neither one of these men has mentioned the subject of an increase of salary to me.

Mr. BOWIE. I think you made a good case for them; I just did not understand it.

Professor MOORE. I am going quite fully into that.

Mr. BURLESON. I would like to know, before you go ahead, if this provision is made for the flood service, whether it is going to embrace the Brazos river?

Professor MOORE. Certainly. We have already sent an inspector down there.

The CHAIRMAN. You are not increasing the force, only the salaries of the force?

Professor MOORE. Yes, sir. In another paragraph you will see that we have asked for $30,000 for this flood work, and we propose to make a division here with five clerks where we have only one, and we propose to have a professor in charge of that work, to take up the work more thoroughly than has heretofore been done.

The chief of the proposed river and flood division will be charged with the supervision and proper conduct of the river service of the entire country, which, even in its present partially incomplete state, maintains over 300 river and rainfall stations.

Our river stations cost us about $7 a month for the report. We established a gauge, and then we employed some man living right on the river front and he reads the gauge every morning and telegraphs the reading.

Losses by a single flood, such as the Kansas River flood of 1903, where no service is maintained on account of lack of the necessary funds, amount to more than the entire expenses of the river and flood service would amount to for a generation; and, conversely, the value of property saved by flood warnings where adequate service is maintained, such as that on the Ohio and Mississippi rivers during the spring of 1903, amounts to as much or more. These instances of the value and usefulness of this service are by no means isolated ones, but are repeated in greater or less degree several times annually. In the spring of 1897 the value of property saved during the Mississippi River flood as a result of the Weather Bureau warnings amounted, according to competent authority, to over $15,000,000, and during the present year even these enormous figures were exceeded.

No one can doubt the tremendous importance of this work or belittle its effect upon the economic progress and development of the country. The watershed of the Mississippi River alone comprises two-fifths of the total area of the United States proper, within its confines dwell more than 40 per cent of our population, and the great bulk of our staple crops are grown here. It is easy to perceive, therefore, that whatever effects the well-being of this vast area will be reflected, now for good and now for evil, throughout our entire domain. To properly conduct a service of this character demands ability, both scientific and executive, of a high order. It is a work that requires many years of education and study, a life work in reality, and it is not fair to expect that a capable man should continue in it with the extremely small salary of $2,000 a year, a compensation much smaller than that given to many other Government officials whose duties are much less arduous and whose reponsibility for each day ends with the close thereof.

I am making an earnest appeal for those two men because of the high talent we exact from them—the long years of study. They are not time servers. These men often work from eight to twelve hours a day. They are enthusiastic in their work and the importance of the flood service to the country demands that we properly treat them.

Mr. SCOTT. I think it would interest the committee if you would tell them briefly, what you have told me personally, in regard to the man in charge of your river business at Pittsburg and the police of that city being under his control.

Professor MOORE. We have 18 river districts, each in charge of a local forecaster. I will describe the Pittsburg river service. The river at Pittsburg is formed by the junction of the Allegheny and the Monongahela. We have about 20 river or rainfall reporting stations in the Pittsburg district. There is no patronage in it for us or anybody else. Each morning at these 20 stations the men measure the rainfall, if any, and read the gauge, and these readings go right into the Pittsburg office; they do not come to me, because they are of no importance, except to the river commerce of the headwaters of the Ohio. The messages cost about 10 cents each; we get a good rate. The rainfall on the watershed indicates when a dangerous height of water is imminent at Pittsburg.

Often we can only give to the people a warning of from six to twelve hours. At such times the official at Pittsburg is right in his office and has a telephone, and the whole police is under his direction, absolutely under his direction for distributing flood warnings. Every man with property along the stream has somebody who is designated to immediately go to work when he gets notice from the patrolman on his beat. Through the cooperation of the police force, the Pittsburg papers say that we often have saved millions' worth of property between midnight and daylight. In the last spring there were several big mills, employing large numbers of men, which were notified a few

hours in advance that the water would cover their machinery. They stopped work and covered their machinery with a coating of grease, and when the floods came the machinery was protected, and when the flood receded the grease was wiped off and the machinery went on. Without that warning, in all probability, the machinery would have been idle a long time. That is one of the illustrations of the importance of giving these warnings directly to the people interested. I only wish we could make the weather predictions as accurate as we can make the flood warnings.

Mr. BOWIE. Will you tell me right there about the accuracy of the weather predictions?

Professor MOORE. I will come to that directly, if you will permit me.

Now, you see, I have asked for the promotion of these 2 officials and for 5 additional clerks. I want to call your attention to that.

The CHAIRMAN. Where are the 5 clerks?

Professor MOORE. Immediately following.

The CHAIRMAN. The first is at the top of page 3—"Five clerks of class 4 (1 additional submitted)."

Professor MOORE. Yes, sir.

The CHAIRMAN. That is only 1 additional clerk?

Professor MOORE. Yes, sir.

The CHAIRMAN. "Twenty-five clerks of class 1 (1 additional submitted)." That is another one?

Professor MOORE. Yes, sir; that makes 2.

The CHAIRMAN. "Eighteen clerks, at $1,000 each (3 additional submitted)." That makes 5?

Professor MOORE. Yes, sir.

The CHAIRMAN. "Seven copyists or typewriters, at $840 each (3 additional submitted)."

Professor MOORE. That makes 8.

The CHAIRMAN. "Two copyists or typewriters, at $720 each (1 additional submitted)."

Professor MOORE. That makes 9.

The CHAIRMAN. One painter, at $1,000. That is all?

Professor MOORE. Yes, sir. That accounts for 9 clerks and typewriters. Five of them are for the flood service and 4 of them are for another purpose. The 4 clerks do not concern this discussion, and we will consider them later. In regard to the increase of 9 copyists and typewriters——

The CHAIRMAN. Let us first take up the chief of the division.

Professor MOORE. If you will, kindly skip the chief of the division. That is an entirely different case from what I am trying to describe.

The CHAIRMAN. All right.

Professor MOORE. I am trying to show the necessity of the river service.

I think right here it is germane for me to say that in 1895 the number of employees was 198, and on the 1st of last July the number was 180. My first estimates I submitted recommended the cutting out of $13,000 of statutory salaries. In the next year I think that I recommended a still further reduction, and so at the present time, with an increase outside of Washington of about thirty stations since you have been chairman of this committee, our central office force is 18 less than in 1895. The force has been adequate for our work for the last two or three years. Now I am reaching the point where we want

extensions, and if I recommended a decrease, then I cite that as an evidence that I do not ask for any increase now unless the Department really needs it. If you will give us these 9 men now we would still have 9 less than we had in 1895. Because the men were not needed at one time is no argument that they are not needed now. I need these men and I hope that you will favorably entertain the proposition, at least for the flood service; that is the most important matter.

Mr. BURLESON. At the instance of a number of gentlemen in my district, I desire to bring to the attention of the committee the necessity for this flood service on two rivers in Texas. The Colorado River and the Brazos River have been subject to rapid rises and devastating floods, I suppose, owing to the fact that the timber has been cut off the headwaters, and that the water accumulates more rapidly in the two streams, and owing to the fact that adjoining these rivers are some of the most valuable farms in Texas the floods have caused the greatest amount of damage. Whereas I do not want to ask for any increase in the force of the Weather Bureau, if the service can be extended there it would save hundreds of thousands of dollars of property every year because these floods occur every year.

Mr. SCOTT. At the proper time, when the committee is considering the allowances to be made, I desire to emphasize the recommendation which has been made in the report of Professor Moore that this service be extended to the Kaw River in Kansas. I can only say that Professor Moore has told me personally that the service can be extended in Kansas and carried on there at a cost, approximately, of $1,200 a year; and it seems to me, when there is a possibility of saving millions of dollars of property by expending so small a sum, that it ought not to be deferred.

The CHAIRMAN. How do you install that service?

Professor MOORE. I send the chief of this service up the river to locate a number of places where, in his judgment, we should get observations.

Mr. BURLESON. And gather data?

Professor MOORE. Yes, sir. He determines how many gauge readings we shall need in order to detect the beginning of a flood, and to give warning of the flood as it moves down the river. We establish certain special rainfall stations on the watersheds that control the floods, besides our regular telegraphic stations.

Mr. BOWIE. Why is it that it costs so little?

Professor MOORE. We get an intelligent man who lives right on the bank of the river. He may be the clerk in some store, or a steamboat man, and if we give him $7 a month for a matter of five minutes' work each morning he will attend to it. If they do not attend to it, we send an inspector there to put them out and select some other person.

The flood service has doubled within the past six or seven years, and these letters and communications I have here, for instance [indicating], are requests that we can not meet, and we will have to have more money if we go ahead.

Mr. LEVER. Down in South Carolina last year we had a terrible flood that destroyed a cotton mill completely and almost completely wrecked two others. The river rose 40 feet in one hour.

Professor MOORE. Yes, sir.

Mr. LEVER. Do you have any way of predicting those disasters?

Professor MOORE. If the flood is due to a cloud-burst, we may not be able to give warning to those near the place where the burst occurs.

Now, I will read some extracts from editorials in regard to the value of the flood service.

The CHAIRMAN. I think there is no dispute as to the value of that service.

Mr. WRIGHT. What have you on the Delaware River, if anything?

Professor MOORE. We have made a preliminary survey. We will inaugurate the service if we get the money.

As a result of that flood in South Carolina we established a few stations down there, but we have not money enough to go ahead with the work.

Mr. LEVER. I went out to see that flood. That river is only 20 feet wide, and it rose 40 feet in twenty-four hours and destroyed three mills. You can not predict cloud-bursts?

Professor MOORE. No, sir.

You see why I am asking for money for this flood service. My own reputation in part depends on the work of the two men whom I want promoted; they have not asked me to plead before you.

Mr. HAUGEN. You have quite a number of high-priced men?

Professor MOORE. That is true.

Mr. HAUGEN. I do not know the importance of the places.

Professor MOORE. We have a big service; we have 1,400 employees. We cover 3,000 miles, north, south, east, and west.

Mr. HAUGEN. You spoke of the lives lost in Kansas; how does the number compare with those lost at East St. Louis?

Professor MOORE. At East St. Louis there was a population of probably 20,000 people, and they were moved without the loss of one single life.

Mr. GRAFF. I think the population of East St. Louis must be 30,000.

Professor MOORE. That is right; I was mistaken. There was no loss of life; but during the flood of the Kaw River there were many lives lost.

The CHAIRMAN. How many lives were lost on the Kaw River.

Professor MOORE. It is the Kaw River I am speaking of. I think there were about 100 lives lost.

The CHAIRMAN. At East St. Louis there was a scattered population?

Professor MOORE. It was all city population. I am not speaking of the country districts.

Mr. SCOTT. We only took into consideration the lives that were lost in Topeka, the capital of the State, and in Kansas City, Kans.

The CHAIRMAN. Now we will take up the chief of division.

Professor MOORE. I do not like to come before you with a request for increase of salary. This man is the chief of the climate and crop division. I will have to tell you about him. It will not be a long story.

The chief of the climate and crop division has charge of some of the most important work of the Bureau, viz, the climate and crop service and the distribution of forecasts and special warnings. Fifty-two of the higher station officials are partially engaged in work under his general supervision. Paid observers at 293 stations of the corn and wheat, cotton, sugar and rice, and fruit services are under his exclusive direction, and nearly 30,000 persons serving gratuitously in the capacity of crop correspondents, forecast distributors, and voluntary observers contribute to the work under his charge. Approximately, one-third of the Bureau's appropriation for telegraphic purposes is expended annually in the collecting and disseminating work under his division. He writes the National Climate and Crop Bulletin, a work

requiring skill in the handling of meteorological statistics and in the construction of temperature and precipitation charts, as well as ability to understand and intelligently discuss the effects of weather on growing crops. The State sections of the climate and crop service are under his supervision. There are 42 sections, each publishing monthly climatic reports the year around, and weekly climate and crop bulletins during the period of planting, cultivating, and harvesting of the more important staples.

I want to say that I consider him one of the ablest crop writers in the world. For years he has done that work, and there has never been any material criticism. There never has been a time when there was any leak in the weather service, but many times the weather is the dominant factor on the market. It is the understanding that dismissal will result from even visiting bucket shops, or any place where there is speculating in grain, and the burden of proof is on the employee to show that he was not there for any improper purpose. The integrity of the chief of the climate and crop division is beyond question, and it is of the highest importance to the Bureau that it should be so.

I take this occasion to express my acknowledgment of the very valuable and efficient service of Mr. James Berry, chief of this division. His work in the climate and crop service demands a high order of intelligence and the utmost integrity, qualities which he possesses in an eminent degree, and which, when taken in conjunction with the importance of the work and his long experience of twenty-five years in the service of the Bureau, give him the strongest title to promotion. He now receives $2,000, and I earnestly recommend his promotion to $2,750.

The CHAIRMAN. Right along beside this gentleman there are three chiefs of division?

Professor MOORE. The reason that I do not recommend their promotion is that the line of work does not justify any further salary. They are not doing work that entitles them to any more money; that is good pay for them. You have been giving to the Department of Agriculture $2,750 for a number of scientific division chiefs. I believe that there is not a man there, and I am not depreciating them either, that is more valuable to the Government than this man, Mr. Berry, and more than that, I can say to you that he has not asked for this promotion. He has been there for twenty-five years, and is about 50 years old, strong and hearty, and so in love with his work that in all probability he would remain even if you reduce his salary.

The CHAIRMAN. Those chiefs of division are getting their salaries from the lump sum appropriation?

Professor MOORE. No, sir; there are probably a half dozen of them.

The CHAIRMAN. How much do they get?

Professor MOORE. Some get $2,750.

The CHAIRMAN. Do they get their salaries from the lump sum appropriation?

Professor MOORE. No, sir.

The CHAIRMAN. Here it is on pages 10 and 11.

Mr. BROOKS. And on page 9, there is one pathologist at $2,750.

Professor MOORE. There is Mr. Hyde, the statistician of the Department, you have put his salary up to $3,500.

The CHAIRMAN. We did not do it.

Professor MOORE. This man for whom I ask promotion is a modest man; he is not clamoring. He is in love with his work. You will not lose him. If you cut his salary down, he will stay there; but as a matter of justice we are asking for the advancement of this man and

three others. I am not recommending the promotion of the other division chiefs, because the salaries are sufficient for the places they occupy--$1,800 and $2,000 are all the positions justify; but I say this man is one of the most important men in our Bureau, and in all the other departments of the Government service this class of work is paid very much higher. This man is without an equal in this line of work. I hope you will agree to give him the $2,750, and not cut that estimate a cent.

The CHAIRMAN. What have you to say about the painter at $1,000.

Professor MOORE. That is the next item. We used to have that work done by our laborers. I always try to keep inside of the civil-service rules. They have ruled that I can not do this work with our laborers, and that we must have a skilled mechanic.

Mr. BURLESON. Why can not the laborers do it?

Professor MOORE. Because it is skilled work, and we can not employ a laborer at $50 or $60 a month to do it.

Mr. HENRY. Does he have to pass an examination?

Professor MOORE. We will have to get a skilled painter from the civil-service eligible register to do that work in the future. Heretofore we have had it done by our laborers.

Mr. WRIGHT. Is that change to be made at the instance of the unions?

Professor MOORE. No, sir; at the instance of the Civil Service Commission.

Mr. HAUGEN. Where is he to do this work?

Professor MOORE. Around the building, in the interior and on the exterior.

Mr. GRAFF. This position will be filled by the Civil Service Commission?

Professor MOORE. Oh, yes.

The CHAIRMAN. Is the man who has been doing that work going to be appointed as a painter?

Professor MOORE. No, sir. I have been dividing that work up among our laborers, but in the last month we have not been doing much painting except what we have had done by contract, simply because we did not have the man to do it. If you pay ordinary men to do skilled labor, the unions will get after you, and very properly so. I believe they are right in that. The Civil Service Commission will object if I put a laborer at that work, and so there is nothing for me to do but to make an estimate for a painter.

The CHAIRMAN. The next item is "Fuel, lights and repairs, Weather Bureau."

Professor MOORE. An increase of $3,000 is asked for that item. I want to call your attention to the fact that in 1894 the amount appropriated was $10,000; that included the hire of laborers. In 1895 you reduced the amount, but to-day the amount requested is less than it was years ago.

The CHAIRMAN. We took away one expense.

Professor MOORE. That is just what I am saying. There was $4,000 that was taken out and put into classified places.

The CHAIRMAN. Four thousand dollars of expense?

Professor MOORE. Yes, sir.

The CHAIRMAN. That left $6,000.

Professor MOORE. Yes, sir. So that the expense of caring for the building is less than before.

The CHAIRMAN. Not by $4,000?

Professor MOORE. No, sir; but there is less spent for this purpose now than formerly. The cost of coal alone has increased $500. The total amount required for fuel and gas is $3,500, leaving only $2,500 for repairs to the buildings and grounds.

The CHAIRMAN. Many of the buildings are new?

Professor MOORE. Yes, sir; but we have quite a large plant there and we require considerable repairs. There has been an increase in cost to keep these buildings and grounds in good condition. We try to keep them clean and in shape, but everything is increasing in cost. For fuel alone there is an increase of $500.

Mr. HENRY. But paints and oils cost less?

Professor MOORE. Yes, sir; but that is an immaterial item.

You will find for "Contingent expenses" that an increase of $3,000 is asked. The reason for that is the necessity of supplying the necessary furniture for the equipment of the central office during the next fiscal year. During 1894 the appropriation was $13,700, entirely too much.

The CHAIRMAN. Then we took something off, we transferred some of the labor?

Professor MOORE. Not there. I am going way back to 1894, when there was no labor allowed on this fund. We ask for $3,000 for furniture and supplies here in the central office. In 1894 the amount of appropriation was $13,700, since which time it has been reduced; it has been decreased $5,700 from the amount allowed eleven years ago, and I am of the opinion that I recommended a decrease several years ago. The Weather Service has expanded, and the cost for supplies has increased from 20 to 30 per cent, but we are now spending $5,000 less than we did in 1894. Many of the rooms in the main building need furniture, and I hope you will allow us some increase. We need it.

The CHAIRMAN. The next item is "Salaries, Weather Bureau, outside of the city of Washington," and you ask for an increase of $40,000 over the appropriation of last year?

Professor MOORE. Yes, sir; $20,000 of that increase is for salaries and for the printing and distribution of maps, and $20,000 is for new stations.

The CHAIRMAN. The equipment of new stations?

Professor MOORE. No, sir; the manning of the stations.

The CHAIRMAN. The manning of the stations?

Professor MOORE. Yes, sir; the salaries, etc.

Mr. RODEY. I would like to inquire whether you intend to establish any new stations down in our section of the country?

Professor MOORE. We intend, if this appropriation is allowed, to establish a station at Roswell.

Mr. RODEY. You have two stations there now—one at Santa Fe, N. Mex., and one at Flagstaff, Ariz. Then there is a section as big as France and Spain put together without any at all. A station established in that section would give the real climate of the country. The reports from Santiago and Flagstaff do not give any idea of what the climate or conditions are down there.

Professor MOORE. Roswell ought to have a station.

Mr. RODEY. There is a station at Santa Fe, and then there is a section of the country southeast to Texas, some 700 or 800 miles, where there is no station whatever.

Mr. BROOKS. Does not that have a wider application than simply the interests of New Mexico?

Professor MOORE. Oh, yes.

The CHAIRMAN. $20,000 of the $40,000 asked is for salaries outside the city of Washington, and the other $20,000 is for what?

Professor MOORE. New stations.

The CHAIRMAN. That is, manning new stations?

Professor MOORE. Yes, sir.

The CHAIRMAN. What is the other $20,000 for?

Professor MOORE. We propose to go out to Madison, Wis.—that is midway between——

The CHAIRMAN. I do not think it necessary for you to tell us the names of the stations you propose to establish. What is the $20,000 for?

Professor MOORE. Eight new stations. Then the other $20,000 is for better printing and the more thorough dissemination of weather maps.

The Weather Bureau issues each morning, excepting Sundays and holidays, about 25,000 maps that present graphically and by text and tables the weather conditions throughout the United States and Canada at 8 a. m., seventy-fifth meridian time. About 50 per cent of the maps are prepared at 23 of the larger stations of the Bureau by what is known as the chalk-plate process.

That is the map here [indicating]. It is written in chalk, a plate cast, and printed on an ordinary printing press.

The others are prepared at 71 of the less important stations by the milliograph, or wax-stencil process. That process is illustrated by this map here [indicating], printed at Wichita, Kans. That is the cheap process. It is a poor print. It is not creditable to a Government department. If this work is worth doing at all, it is worth doing well.

Mr. BURLESON. That is very plain.

Professor MOORE. Yes, but that is the very best print that I can get. This is a sample that was sent in to me. A little later, I want to show you why I want to fill in these maps with a full list of reports. Wichita gets but a small list of reports.

Mr. GRAFF. Are these maps printed by your own people?

Professor MOORE. Yes, sir.

All of the maps issued at stations are about 11 by 16 inches in size. The chalk-plate process of map making has proved satisfactory. By this process the mechanical part of map making can be expeditiously performed, and an unlimited number of maps can be issued. The milliograph process, while fairly satisfactory as regards the character of the work that can be performed, admits only of a small edition of maps, and is therefore unsuited to the requirements of large stations.

Experimental work in preparing chalk-plate maps of a larger size than those now issued at the more important stations has been conducted with a view of meeting an increasing demand from all sections of the country for maps that contain more complete weather data than can be published on the small maps now issued. The result of this work has been a practical demonstration of the feasibility of making maps about 22 by 16 inches in size (corresponding in size and make-up to the map issued at the central office at Washington) that will contain reports from all Weather Bureau stations, and also present graphically, by symbols, lines, and shadings, the wind and weather, barometric pressure, temperature, and rainfall throughout the entire region of observation.

The demand upon the Weather Bureau for maps of this character comes from commercial, agricultural, marine, and other interests; from educational institutions, and the general public. It can be met by equipping 20 of the more important stations of the Bureau with outfits for issuing the large chalk-plate maps and transferring the present chalk-plate equipments to smaller stations, there to replace the milliograph process.

The approximate cost of equipping 20 stations for the issue of large chalk-plate maps and 30 stations with the small chalk-plate map, including printing material and presses, stereotyping outfits, rent, power, and pay of printers, is $110,000, of which $40,000 is for assistance.

As the weather maps afford the only effective means possessed by the Weather Bureau for promptly placing before the public its daily observations and summaries, the improvement and extension of the maps along the lines indicated is urgently recommended. To carry out during the next fiscal year one-half of the plan outlined above it is recommended that $35,000 be added to the appropriation for "general expenses" outside of Washington, and $20,000 to the appropriation for salaries.

That is where the $20,000 for salaries comes in. Here is the Washington map [exhibiting map]. You know what this is? This is a lithograph map—a very expensive map. I have been experimenting with the chalk process, and I can make a map almost as good as that at probably one-quarter that cost. It is our desire to issue that map with the observations of the whole country in tabular form, showing the distribution of temperature and pressure at 10 of the larger cities, Boston, New York, Philadelphia, Chicago, St. Louis, Denver, and San Francisco—cities of that size, 10 of the most important—and then to take the 10 small printing outfits that do that work [exhibiting] and transfer them to places doing printing like this [exhibiting map]. That is our plan. In order to improve the character of weather maps and put a complete map in 10 of the larger cities of the Union would require an increase in the appropriation.

The CHAIRMAN. Then that increase of $20,000 is for manning new stations, and $20,000 for labor in improving the weather map?

Professor MOORE. Yes, sir. If you cut at all, cut one or the other. You see how much is intended for each one.

Mr. SCOTT. How much of the $20,000 would be expended in the further dissemination of the maps, and how much in putting in the new plants?

Professor MOORE. In putting in the new plants we would disseminate probably twice as many maps, because we could run them off by power where we now do it by hand.

Mr. SCOTT. You do that simply by an increase of mechanical facilities without additional cost for the dissemination?

Professor MOORE. No, sir; there is the paper. But we will get the maps out in the same time.

Mr. GRAFF. The cost of transportation does not amount to anything?

Professor MOORE. No, sir; we use the frank.

The CHAIRMAN. How is the Washington map distributed?

Professor MOORE. Only at Washington.

The CHAIRMAN. You do not distribute that map in New York at all?

Professor MOORE. Washington is the only city in which that map is printed. We send it daily to such places as can be reached by mail. Then we send the map to a good many educational institutions. They bind them and keep a complete set of them. Many of the professors in the high schools asked us to send them the maps. We issue 5,000 a day.

The CHAIRMAN. Now comes the other kind.

Professor MOORE. Of this map [exhibiting map] we print an edition of 25,000 a day.

The CHAIRMAN. Are they printed in Washington?

Professor MOORE. No, sir.

Mr. SCOTT. That is, 25,000 all over the United States?

Professor MOORE. Yes, sir.

Mr. LEVER. Where are they sent?

Professor MOORE. Usually only to such places as can be reached before 4 o'clock in the afternoon.

The CHAIRMAN. Is that the map issued at 8 o'clock in the morning?

Professor MOORE. Yes, sir.

The CHAIRMAN. That does not get to all of its destinations within twenty-four hours?

Professor MOORE. We only send the maps to such places as can be reached early in the afternoon.

The CHAIRMAN. Do you mail the maps to the post-offices?

Professor MOORE. Yes; we mail them, and post them up in the principal hotels of the town. We send them to the commercial organizations, the principal business houses, schools, and anywhere that we think they can be made use of. We give them to some individuals.

Mr. HENRY. Do you wait for application?

Professor MOORE. Yes. In most of the places we can not fill the demand that is made. In public places we go around and select our positions ourselves, like hotels, railroad stations, etc.

Mr. WRIGHT. Do you not also publish those reports in connection with the rural free delivery?

Professor MOORE. Yes, on a little slip; we will come to that later. The distribution of these maps is revised every six months. There are people who will take the Government reports for nothing, just because they can get them for nothing, and when they have no further use for them they will not discontinue them. Every six months we send a card to every recipient, asking him if he desires the map sent any longer. If he does not return the card his name is cut off the list.

Mr. BOWIE. Can you frank the return card?

Professor MOORE. Yes. sir. All he has to do is to fill in the card and sign it.

The CHAIRMAN. The next item is "General expenses, Weather Bureau" and you ask an increase of $135,000?

Professor MOORE. As you will see, $35,000 is for the material and the supplies to improve the distribution of maps.

Mr. SCOTT. Is not that just what you were talking about?

Professor MOORE. Yes, sir.

The CHAIRMAN. For the item we were just considering, $20,000 is for manning the eight new stations, and $20,000 is for the labor in the printing and improvement of the new maps, and $35,000 of the $135,000 is for the materials?

Professor MOORE. For the maps, materials, and supplies, everything, new presses and supplies for the printing of the maps.

The CHAIRMAN. What proportion of that amount is for new presses?

Professor MOORE. I can not tell you. I had those figures all worked out separately when I made the estimate. There is a certain amount that would not need to be appropriated the second year, the amount for presses, etc. It would not have to be a permanent appropriation.

Mr. GRAFF. Can you tell us approximately how much that would be?

Professor MOORE. $25,000, I should judge. If you would allow the full amount now, when I come next year I would bring the bills for

presses and that much you could cut out of the next appropriation. I should say that there would be $25,000 expended for presses.

Mr. SCOTT. If we allow this $135,000, then you do not want the $20,000 for salaries?

Professor MOORE. Yes, sir.

The CHAIRMAN. How much increase in maps do you propose to have under this appropriation?

Professor MOORE. I can not answer that question now, but I can say anywhere from two to four times the distribution.

The CHAIRMAN. You would double the distribution?

Professor MOORE. Yes, sir.

The CHAIRMAN. Is there a demand for that? Do you think the Weather Bureau is supplying information where the people want and need it? I never had any difficulty to find a weather map.

Professor MOORE. That is true, but you are spending $1,250,000 a year in gathering information, and this is a matter of the dissemination of that information. I would say that you had better spend a little more money and put the maps in proper shape.

The CHAIRMAN. Do you not think the map is disseminated very thoroughly?

Professor MOORE. It is very well disseminated now, but it could be improved.

Mr. BURLESON. You say that with this increased appropriation you can put the map into hands of double the number?

Professor MOORE. Yes, sir; twice the number.

Mr. BURLESON. Do the people desire the map and will they appreciate it?

Professor MOORE. Yes, sir; I believe they do desire it, and that they can make good use of it. The country is growing all the time. One industry gets the report and the other industry wants it. The produce man gets the report and uses it, and in comes his neighbor and sees it and says: "Where do you get this map? I want it. Now if I want to see it, I have to run over to Smith's."

The CHAIRMAN. I never look at the weather map except when I look at the newspaper. The daily papers all over the country contain the information.

Professor MOORE. The shippers of produce are very much interested in the map. Most of the maps go to the shippers of produce. We do not push them on to anybody, but the shipping man of any importance gets the map, and his competitors all want the map. We can not give it to them; we have reached the limit of distribution.

The CHAIRMAN. You think it is necessary to increase the distribution fourfold in order to get the map into the hands of the people who really need it?

Professor MOORE. I know that we can not meet the demand that is legitimately made. With the improved process we may meet it. Most of the demand is legitimate. There are a great many people who ask for maps whose requests we do not honor; there are thousands of those requests that come in annually.

Mr. SCOTT. Do you think that you could meet the demands by cutting out the hotels?

Professor MOORE. The hotels are very important, as are also the prominent business houses. The men who can use these maps most profitably are those who are engaged in produce—produce that they want to ship to different parts of the country.

Mr. SCOTT. The ordinary traveling public would not have any occasion to examine these maps except for mere idle curiosity.

The CHAIRMAN. Here is the Washington Post. It gives the thermometer in a great many cities and the rainfall for twelve hours at 8 o'clock p. m. last night at Boston, Chicago, St. Louis, Cincinnati, Denver, Des Moines, Galveston, Indianapolis, Jacksonville, Little Rock, Memphis, Omaha, Pittsburg, Salt Lake City, St. Paul, Buffalo—I just look at that sheet and see Buffalo and I know what the conditions are at my home. That list is published in all the dailies of the United States?

Professor MOORE. No, sir.

Mr. BOWIE. Does the Associated Press carry it?

Professor MOORE. No, sir; we distribute it. The Associated Press does not handle it. That information is sent from our local offices.

The CHAIRMAN. The newspapers are the best means of dissemination. The rural free delivery has increased the circulation of the daily newspapers a hundredfold. You insert that information in the daily newspapers and it is better than all the flags or slips.

Mr. GRAFF. Does not the Associated Press handle it?

Professor MOORE. We must send the reports to our stations, and therefore the Government disseminates the information and distributes the maps.

Mr. BOWIE. And it costs nothing to deliver them?

Professor MOORE. No, sir; we frank them. We are already making a good distribution of this report. There is no country in the world that attempts to make such a distribution of meteorological information as we do.

The CHAIRMAN. That accounts for $35,000 of your increase. Now, what have you to say as to the other $100,000?

Professor MOORE. The map business just boils itself down to this: We are making a fair distribution of the maps to-day, but we are only printing a portion of the maps in a thoroughly legible form. Thirty-five thousand dollars and $20,000 in the previous item for salaries are for the better printing of the weather maps and their more thorough dissemination. These [exhibiting] papers are demands for weather maps, or river service.

Mr. WRIGHT. Demands that you have received which you are unable to supply?

Professor MOORE. Yes, sir.

Mr. BOWIE. What would it cost to establish the flag service?

Professor MOORE. I can not answer that question.

Mr. BOWIE. It is a small fraction of the other cost?

Professor MOORE. Yes, sir.

Mr. BOWIE. Why could not you experiment with that before taking up the other?

Professor MOORE. I could.

Mr. BOWIE. How much appropriation would you need for that purpose?

Professor MOORE. I can not answer that question at this time.

Mr. BOWIE. Could you give us an estimate?

Professor MOORE. Yes, sir; I can give you an estimate in a day or two.

Mr. BOWIE. You say there is a difference in the accuracy of the weather forecasts and the flood forecasts; what percentage do you estimate you attain in the weather forecast?

Professor MOORE. About 17 per cent of error, or about 83 per cent of accuracy.

Mr. BOWIE. That is pretty close?

Professor MOORE. Yes, sir.

Mr. BOWIE. How can you beat it?

Professor MOORE. I am of the opinion that we can never beat the present accuracy of the weather forecast with our present knowledge of the mechanics of storms—without further discovery and research.

Mr. SCOTT. Does not the percentage of your failures run higher in some places than in others?

Professor MOORE. Yes, sir.

Mr. SCOTT. At some parts of the country the weather is more variable than at others?

Professor MOORE. Yes, sir. Take Dakota and Montana where the storms develop so suddenly.

Mr. BOWIE. What is the percentage in Alabama?

Professor MOORE. I am of the opinion that it is about 88 per cent. The frost warnings and cold-wave warnings are good for over 90 per cent.

Mr. LEVER. That holds good for the southern cities generally?

Professor MOORE. Yes, sir.

The CHAIRMAN. Most of these papers I have been looking over are suggestions for little changes, not so much demands for maps?

Professor MOORE. They are all requests for the distribution of information.

The CHAIRMAN. They are mostly requests for having additional names put on the maps?

Professor MOORE. I was mistaken, sir; those are not requests for maps. Requests for maps are addressed to the local stations; they would not come to me. Those are demands for the general extension of information; they are the only requests that reach my desk.

Let me read you a letter from the New York Cotton Exchange:

NEW YORK COTTON EXCHANGE,
*New York, July 11, 1903.*

Prof. WILLIS L. MOORE,
*Chief United States Weather Bureau, Washington, D. C.*

DEAR SIR: May we ask that central station observers at Wilmington, N. C.; Charleston, S. C.; Savannah, Ga.; Atlanta, Ga.; Augusta, Ga.; Mobile, Ala.; Montgomery, Ala.; Memphis, Tenn.; Little Rock, Ark.; Vicksburg, Miss.; New Orleans, La.; Galveston, Tex., be instructed to wire us daily, at our expense, the maximum temperatures and rainfall whenever the latter occurs?

Appreciating your courtesy in the matter,

Very truly,

WILLIAM V. KING,
*Superintendent New York Cotton Exchange.*

Then, here is a request from the secretary of the Memphis Cotton Exchange for the daily rainfall at the various stations in the Galveston (Tex.) district, during the remainder of the season:

If practicable, I respectfully request that the official at Galveston be directed to telegraph the above data to this office.

Here is a request from the Maritime Association of the port of New York for a large weather map similar to the one here at the Capitol.

The CHAIRMAN. Why do they want the Washington map?

Professor MOORE. In the interest of shipping, and to learn of the approaching storms.

The CHAIRMAN. What kind of map do you give New York now?

Professor MOORE. A little one like this; this is the New York map [exhibiting map].

The CHAIRMAN. On that map, at the bottom, what are the names of the points at which you give the thermometer and rainfall?

Professor MOORE. It is a very complete map; it covers about 160 stations.

Mr. HAUGEN. What do you figure as the percentage of accuracy as to these forecasts?

Professor MOORE. The accuracy averages about 83 per cent.

Mr. HAUGEN. Have you any printed material on that point in your report?

Professor MOORE. We have nothing printed but we average the work very carefully, and I have a section of one of my divisions devoting its entire time to the verification of the work of the local forecasters. Each six months the report of every man's work comes to me. I will give you the result of the last six months. As a result four men were commended because their work was of such a high character as to merit special mention. Those four local forecasters had exceeded the State forecasters. Five were given "excellent" for having exceeded the State forecasters. Twenty-five were notified that their work was satisfactory—about equaled the State forecasters. These are forecasts for the particular localities made after the forecaster gets the information from the central office for his State. Twelve had their authority to make forecasts revoked. It is a cold-blooded survival of the fittest. They will never be allowed to make forecasts again unless they are reinstated. A number were cautioned that their work was below the standard of accuracy, and unless better result was shown in the next six months their authority would be revoked. That is the discipline of the Bureau.

The CHAIRMAN. Is the lake region more difficult of forecasting?

Professor MOORE. Yes, sir; right on the border. There is a difference between the lake temperature and the land temperature near the water that complicates matters.

The CHAIRMAN. I was thinking of the State of Michigan, between the two large bodies of water.

Professor MOORE. Yes, sir; it is difficult under those circumstances.

The CHAIRMAN. Now we will go back to this increase of $135,000, of which $35,000 is for maps. What do you intend to do with the balance?

Professor MOORE. $35,000 for maps; $30,000 for floods; $20,000 for new stations.

Mr. GRAFF. That item was in the previous paragraph?

Professor MOORE. No, sir. Now add $50,000 for telegraphic services, and you have all the items that go to make up that $135,000 increase.

The CHAIRMAN. Tell us about the $50,000 for telegraphing.

Professor MOORE. Nearly all of these requests [exhibiting papers] are for extension in the way of more reports. For an illustration, on this map [exhibiting map] we do not give reports from Fort Worth, Taylor, San Antonio, Pueblo, Los Angeles, Red Bluff, Roseburg, etc. This is a very incomplete map. The commercial interests ask for complete maps, and I think it would be advisable to spend more money annually for the dissemination of more reports. That is only one illustration of many of our other maps. The $50,000 are for telegraphing weather information.

Mr. SCOTT. You want this appropriation whether you get the new stations or not?

Professor MOORE. Yes, sir. If you do not give us the money to print the maps more perfectly, I would say give us this appropriation or a portion of it, so that we can answer the requests from the business and maritime interests, and in order that the map may contain reports from more stations.

Mr. BURLESON. Is Taylor, Tex., not shown on that map?

Professor MOORE. There is no observation printed on this map from Taylor. The map is not complete.

Mr. GRAFF. You have not at that point telegraphic information from the station?

Professor MOORE. We could give them all the information from the other stations if we had the money.

Mr. GRAFF. The money to send telegrams?

Professor MOORE. Yes, sir.

You may cut out entirely the improvement of the map, for which $55,000 is estimated—$35,000 for supplies and $20,000 for salaries. If you wish to cut that out, then consider the $50,000 for the telegraphing of more reports. Telegraphing is more important than the better printing of the maps.

Mr. HAUGEN. What rate do you get from the telegraph companies?

Professor MOORE. We have a varying rate. It depends upon the number of words and the conditions.

Mr. SCOTT. You have a code by which you can very much shorten the telegrams?

Professor MOORE. Yes, sir. If we did not have a code $1,250,000 would not pay the telegraphing. We send an average of 50 words in five in the collection of weather reports.

The CHAIRMAN. Do you not get a rate of a cent a word?

Professor MOORE. We send 20 words or less for 20 cents.

Mr. HAUGEN. Any distance?

Professor MOORE. Yes, sir.

Mr. HAUGEN. Clean across the mountains?

Professor MOORE. Clear to the Pacific coast.

The CHAIRMAN. Do you not consider that a cheap service?

Professor MOORE. It is ample.

The CHAIRMAN. Ample recompense to the company?

Professor MOORE. Yes, sir. We send thousands of messages for only 10 cents, within a distance of 300 miles.

Mr. HAUGEN. The same number of words?

Professor MOORE. No, sir; only 10 words. The other rate is 20 cents for a message of 20 words or less to any part of the United States. The rate is liberal and it is fair. Our relations with the telegraph companies are very pleasant.

The CHAIRMAN. Is the Department satisfied with the contract it has with the Western Union or whatever company you employ?

Professor MOORE. Yes, sir; I think the arrangement is fair. I had some considerable trouble in the beginning. Our service was not living up to its contract. We were not taking advantage of our contract, and when we made new regulations there was some little conflict, but there was not much trouble over it. Our relations have been pleasant ever since. The Wanamaker rate, which was made when Mr. Wanamaker was Postmaster-General, was always fought by the Western Union Telegraph Company, and they never receipted for pay "in

full" on our business, only "on account," and afterwards, three or four years ago, I had to get out all of the records, on which the Court of Claims decided that the Western Union Telegraph Company was entitled to a considerable increase over the old Wanamaker rate.

Mr. WRIGHT. What companies do you deal with—both or one?

Professor MOORE. We deal with all of them. We gather all of our reports just as completely as we can over the Western Union. We gather by circuits. What I mean is that we gather at Chicago, for instance, many short messages, and then we put them into one message and the whole report is sent over a long circuit, and copied off at several points simultaneously as it goes through.

Mr. BROOKS. It is like the Associated Press?

Professor MOORE. Yes, sir; it is highly essential that we should have the good will and cooperation of the telegraph companies.

Mr. BOWIE. Do they give preference to your business over the business of private persons?

Professor MOORE. Yes, sir.

Mr. HAUGEN. Does the Agricultural Department make a special arrangement or is the arrangement made for all the Departments?

Professor MOORE. We have a special rate. I make a contract with the Western Union, and when it is signed by the Secretary of Agriculture that is the end of it.

Mr. BOWIE. Why did Postmaster-General Wanamaker make the rate?

Professor MOORE. Congress gave the Postmaster-General the right to establish a Government rate for all Government business.

Mr. HAUGEN. Are you doing anything with wireless telegraphy?

Professor MOORE. Somewhat.

Mr. BOWIE. You discussed that question before. Have you changed your opinion from what it was then as to the practicability of the service?

Professor MOORE. No, sir.

Mr. BOWIE. Has there been any distinctive improvement in it?

Professor MOORE. You very lately gave us money to build a cable to Farallone Island, California. We have laid the cable and constructed a building there. I have a picture of the building in my book. The island is 30 miles from shore. We report the passing of all vessels, and we display our warnings out there. We have also just connected that island by the wireless system, and on the first day of the new year we sent the first message through. That is a wireless system to take the place of the cable when the latter is out of order. We no sooner got the cable working and giving the maritime interests the service they demanded, when a steamer came along and picked up our cable and cut it—maliciously, we believe. We are now prosecuting them through the Department of Justice.

Mr. SCOTT. What motive would they have for maliciously cutting it?

Professor MOORE. They claimed that the anchor got caught in the cable and that it was necessary to cut the cable to save the vessel. It would take time to free the cable without cutting it, but it is a simple matter to send a man over the side of the ship and cut it. It costs about $2,000 to mend the cable.

The CHAIRMAN. Have you no redress against steamship companies?

Professor MOORE. We are prosecuting them through the Department of Justice, but I do not think it will amount to much.

Mr. HENRY. Have you identified the vessel?

Professor MOORE. Yes, sir. We have put the matter in the hands of the Department of Justice, and the United States district attorney has been directed to prosecute them. That is the status of the case.

Mr. SCOTT. Is the prosecution civil or criminal?

Professor MOORE. I do not know anything as to the character of the prosecution. We asked that they be prosecuted vigorously, but what the character of the prosecution is I do not know.

The CHAIRMAN. In your estimate for salaries you provide $20,000 for manning eight stations?

Professor MOORE. Yes, sir.

The CHAIRMAN. And in the general expenses of the Weather Bureau you provide $20,000?

Professor MOORE. Yes, sir; for equipment of those stations, general maintenance, supplies, and all that sort of thing.

The CHAIRMAN. On page 5 of the estimate, under "Buildings, Weather Bureau," you make an estimate for "five buildings," but you include in that estimate "the purchase of instruments, furniture, supplies, flagstaffs, and storm warnings to properly equip these stations?"

Professor MOORE. Yes, sir.

The CHAIRMAN. And by that language you can build thirteen new stations?

Professor MOORE. No, sir; those 5 buildings will be erected probably where stations now exist.

The CHAIRMAN. Then why do you say "including the purchase of instruments, furniture, supplies, flagstaffs, and storm warnings, to properly equip these stations?"

Professor MOORE. I will tell you. Because then if we have a little money left over on the building we can use it in more properly equipping; that is, something in addition to the other fund. The Treasury will not pass our accounts for equipment unless we have the wording in the bill that gives us that authority. Sometimes we start on a building that is to cost $8,000, and we may get it up for $7,500. Then we will use the $500 for instruments which otherwise would be paid for from the other fund. That gives us a little leeway. We have turned back a little of this money on buildings—$1,700, I think—year before last.

The CHAIRMAN. My idea was that the appropriation should only cover the buildings, the equipment to come from the other appropriations.

Professor MOORE. That can be done. If I have a little money left over after a building is constructed, it has been our custom to use it in more completely equipping the building. The Treasury has ruled that we can not buy ground or erect buildings under the authority which you have just read. That is, the Treasury has ruled that they will not pay from our general fund any vouchers that include the purchase of land or the erection of buildings. I know, because once that question arose, and I sent down to the Treasury Department and found out.

Mr. SCOTT. I can understand that, when this clause is in the bill providing for this particular purpose; but if this particular clause was not in the bill, then you would have the construction put upon the other clause by the chairman?

Professor MOORE. If you cut out this paragraph, and under the head of "General expenses" you say, "purchase of buildings and grounds," you could leave out this second paragraph entirely by adding to the amount under "General expenses" the $50,000 named in this paragraph.

The CHAIRMAN. Please give us the names of the 8 stations that you propose to establish under the increased appropriation, indicating your judgment as to the needs of the service.

Professor MOORE. This list may be subject to a little revision, but at the present time I would suggest these stations. The plan of procedure is for me to recommend to the Secretary and he approves the recommendation, but you know that we have usually told the committee where we expected to establish the stations. The first one is Madison, Wis.

The CHAIRMAN. Is there no station there now?

Professor MOORE. No; there is a university.

The CHAIRMAN. And are you going to connect the station with the university?

Professor MOORE. Yes, sir; in the university building. We will probably get rent and heat free. Our local man will lecture to the classes in physics during the college term in the evening in addition to his regular duties. The next station is Roswell, N. Mex.

The CHAIRMAN. Is that a very advantageous location?

Professor MOORE. Yes, sir. The next station is at Honolulu.

Mr. SCOTT. Have you no station there?

Professor MOORE. No, sir. It is our intention to have a section of our climate and crop service there, to study the climatology of the islands and to publish a weekly crop bulletin from that office. It will be of some use to the Pacific coast.

The CHAIRMAN. That is not a section of many storms, that portion of the Pacific?

Professor MOORE. No, sir; but we need to study the climatology of Honolulu—as we are doing for Porto Rico—and we will print a weekly crop bulletin there. The next station is at Providence, R. I.

The CHAIRMAN. Have you no station there now?

Professor MOORE. No, sir. The board of trade has asked for this; has asked that they be given as good a service as is given to cities of like size. Hartford, Conn., is in the same category. Heretofore we have not established stations so closely together. Mr. Henry did not urge this. The commercial interests there do not get their weather maps until very late in the afternoon from Boston, and they think they are large enough and their industries are of sufficient importance to warrant the establishment of this station.

Mr. HENRY. The board of trade and the business men in both of those cities have asked for stations.

Professor MOORE. Yes, sir; that is right.

Then there is to be one established in north central Illinois, at some city in the north central part of the State. Then comes Durango, Colo., and Sitka, Alaska.

The CHAIRMAN. What have you in Alaska at the present time?

Professor MOORE. Nothing. General Greely will have a cable through there within a very few months, and by cooperation with the Canadians we will get observations that are located north of British Columbia, and four or five hundred miles north of our territory. We

are getting observations from these northwestern stations that are very valuable, especially in the matter of making forecasts of cold waves for the Upper Mississippi Valley. Now, in connection with the Canadian system the Sitka station will be valuable. Then there is a demand for a station at Joplin, Mo. I have only estimated for eight stations. Joplin has become very important in its mining interests.

Mr. BURLESON. What is the average distance between these stations?

Professor MOORE. For observation purposes we want stations not much closer than 100 miles. Joplin, Mo., is not so very far from Springfield. That fact militates against it.

Mr. GRAFF. That would increase the number to nine.

Professor MOORE. Yes, sir. In order to take care of Joplin you will have to increase those two sums by $2,500 each.

The CHAIRMAN. Is there any need for a station at Joplin, when you have stations at Springfield and Kansas City?

Professor MOORE. There is some need, but possibly not enough to justify the expense.

The CHAIRMAN. What have you in mind for new buildings asked for on page 5 of the estimate—what places?

Professor MOORE. I have here a list of places where Weather Bureau buildings should be erected, in cities having less than 25,000 population. In this list of stations—I have not counted them, but there must be fifty—we are paying $21,000 for rent.

Mr. HENRY. Places where there are no public buildings?

Professor MOORE. Yes, sir; and where the population is less than 25,000. The total cost of rent is $21,000, which is 4 or 5 per cent interest on the amount which would be required to erect the buildings. The $50,000 will only erect five buildings. There is Abilene, Tex.; Alpena, Mich.; Asheville, N. C.; Baker City, Oreg.; Birmingham, Ala.; Boise, Idaho.; Cape May, N. J.; Cheyenne, Wyo.; Columbia, S. C.

The CHAIRMAN. Is not there a public building at Columbia, S. C.?

Mr. LEVER. Yes, sir.

Professor MOORE. In some of these places they have public buildings, but on account of the congested condition we can not get into them or the roofs are so constructed that we can not use them.

Mr. GRAFF. You want to be in a position so that you can erect these buildings only at the points where they are necessary by reason of the situation?

Professor MOORE. Yes, sir; that is it.

Winnemucca, Nev., I had in mind as a place where we must maintain a station; and then there is Shrevesport, La., and Nantucket, Mass.

Mr. HENRY. Is there any difficulty at Nantucket?

Professor Moore. No, sir; except it would be advantageous to erect a building there.

The CHAIRMAN. Is there not a public building there? I thought there was.

Professor MOORE. I do not think so; there may be.

Mr. BOWIE. How much do you estimate for new buildings?

Professor MOORE. Fifty thousand dollars.

Mr. BOWIE. You made that same estimate last year?

Professor MOORE. Yes, sir.

Mr. BOWIE. When you erect your own buildings, you will get very much better buildings?

Professor MOORE. Yes, sir.

Mr. HAUGEN. In northern Iowa there is a large space without a station—nothing between Des Moines and St. Paul, a distance of about 500 miles.

Professor MOORE. Yes; that is true.

Mr. HAUGEN. Do you not think that the people there are entitled to one?

Professor MOORE. There are not any very important cities.

Mr. HAUGEN. There is Mason City, a town of about 7,000. We purchased a site there for a Government building.

Professor MOORE. If there was a city of 50,000 population or of larger size, the local needs of the city might require a station.

Mr. HAUGEN. Mason City is one of the coming cities of Iowa.

Professor MOORE. I know; yes, sir.

Mr. HAUGEN. I wish you would consider that?

Professor MOORE. I will. I have not considered it; I am only reporting the cases I have considered. These are some of the buildings that we have constructed [exhibiting a book of photographs]. We construct buildings particularly designed, by roofing and other appurtenances, for our work.

Mr. GRAFF. Is there any advantage in having a meteorologist do his work where he lives?

Professor MOORE. In many places where the man lives in the station we can get along with one man; otherwise we need two. It is because the apparatus works twenty-four hours, and there must be some one there to attend to the instruments. In that way one man will do the work instead of two, if he lives in the observatory.

Mr. GRAFF. Then it is not an increased cost?

Professor MOORE. It is a direct saving to the Government.

The CHAIRMAN. The next item is, "Cables and land lines: For the purchase and construction of cables and land lines to connect Fort Canby, Wash., with Flavel, Oreg.," etc.

Professor MOORE. I will give you the items there in a second. If you will turn to page 17 on my Annual Report you will find this language:

> The total mileage of telegraph and telephone lines controlled by this Bureau was increased from 367 miles, at the date of last report, to 421 miles, by the construction and equipment of the following new sections:
>
> (1) From Pacific City (Fort Canby), Wash., to North Head, Wash., 2 miles; completed August 1, 1902. This section connects the observation and storm-warning display station at North Head with the general telegraph system, and its value may be judged by the following extract from an editorial in the Portland (Oreg.) Oregonian of November 11, 1902, viz:
>
> "With the exception of the light-house service along the Oregon and Washington coasts, no greater aid to shipping bound for the Columbia River has ever been extended than by the recent establishment of a reporting station at North Head. * * * The work of the Weather Bureau in this direction has been of great benefit to the agricultural and shipping interests of this district, but no branch of the service has shown its value more effectively than has the reporting station at the mouth of the Columbia River."
>
> Vessel and weather reports are now telephoned direct from North Head to Portland, Oreg., for distribution.

Then on page 46 you can get all the detailed information you desire. "For cables: South Manitou to North Manitou, Michigan, $2,000." Last year we built a cable over to South Manitou from the mainland and connected it with the island. It is an important harbor in the

northern part of Lake Michigan. We display storm warnings there now.

Mr. HENRY. Can not you use wireless telegraphy?

Professor MOORE. Yes; but the cable is better. We are asking for $2,000 to connect North Manitou with South Manitou; that is an island a short distance above, and we could do that with very little additional expense.

The CHAIRMAN. That service is all closed in the winter?

Professor MOORE. It is closed three months in the year.

The CHAIRMAN. How long is it open?

Professor MOORE. That service closes the latter part or middle of December and opens again the first of April.

The CHAIRMAN. That cable is entirely in the interest of the shipping industry?

Professor MOORE. Yes, sir; and it is connected with the Light-House Service and the Life-Saving Service.

The CHAIRMAN. Is there a light-house at North Manitou?

Professor MOORE. Yes, sir. I say in my report:

> In connection with the South Manitou Island line, it should be mentioned that the employees of the Light-House and Life-Saving services and other residents are very desirous of having this Bureau extend its cable line from South Manitou to North Manitou Island. While on the ground Mr. Robinson made inquiry as to the benefit such a line would be to lake navigation—

That matter was brought to my attention by one of the Representatives, Mr. Bishop, I think—

> and learned that it would be useful in reporting and conveying orders to vessels that seek the North Manitou harbor, and that the island would also be a valuable point for the display of storm warnings. By utilizing the spare cable stored at Charlevoix the connection could be made and a steel tower erected on North Manitou for $2,000 or less.

I therefore recommended the appropriation for that purpose.

Telegraphic connection with Tatoosh Island, Washington, was reestablished during November, 1902, by means of a steel span wire, in lieu of the old submarine cable that failed in 1898; but the extraordinary difficulties encountered in the construction and maintenance of a land line to Cape Flattery, which for the past twenty years have rendered telegraphic communication with this important outpost exceedingly precarious, in spite of our best efforts, call for different methods of meeting the urgent demands for regular, uninterrupted weather and vessel reports from Tatoosh Island. An all-cable line from Port Angeles to Tatoosh Island offers the only practical solution of the problem of keeping open communication along those straits permanently. This, together with a cable from Flavel, Oreg., to Fort Canby, Wash., which is necessary for the betterment of the North Head weather and vessel reporting service, calls for an appropriation of $90,000.

So we built a vessel-reporting station at the mouth of the river, and we find that we have difficulty in getting the reports to the rest of the country because of the defective communication across the mouth of the river. It therefore becomes necessary to ask for this appropriation.

The CHAIRMAN. Are there no telegraph lines, either the Western Union or the Postal?

Professor MOORE. No, sir; we go over and connect with the Western Union.

The CHAIRMAN. Are those two points on opposite sides of the river?

Professor MOORE. Yes, sir. There was a cable that belonged to the Signal Corps and we used it. When we established this building there a couple of years ago—this is one of the five buildings that you authorized us to construct—we used the cable, but then the cable broke, and since then we have been using a telephone line, a roundabout way, and we get the report part of the time, and part of the time we do not.

The CHAIRMAN. Why did not the Signal Corps replace their cable?

Professor MOORE. They had no use for it.

The CHAIRMAN. What use did they have for it?

Professor MOORE. They used it years ago; I do not know what they were doing with it.

The CHAIRMAN. How much business is there at that point?

Professor MOORE. An enormous business.

The CHAIRMAN. Is there any commerce?

Professor MOORE. The whole commerce of the mouth of the Columbia River. We report all that goes on, but since the breaking of the cable we have only had imperfect telephonic communication, and, therefore, our reports for the commerce of the Columbia River are now sometimes delayed.

The CHAIRMAN. Is this right at the mouth of the river?

Professor MOORE. Yes, sir; I will bring the map up and show you where the cable is going to be laid.

The CHAIRMAN. I do not see how you can build a cable there for $15,000.

Professor MOORE. I am not absolutely clear in my mind as to the exact location.

The CHAIRMAN. The mouth of the Columbia River must be 15 or 30 miles wide.

Professor MOORE. I should say that it was 15 miles wide. We can lay that cable for $1,000 a mile; probably for less than that.

Mr. HAUGEN. Between what points is that cable to be laid?

Professor MOORE. Fort Canby, Wash., with Flavel, Oreg.

The CHAIRMAN. The other $10,000 is to repair the telegraph line running from Norfolk, Va., to Hatteras, N. C.?

Professor MOORE. Yes, sir. That line will run from Cape Hatteras to Cape Henry, down outside of Albemarle Sound. Near the center of Albemarle Sound is Roanoke Island. We carried on the wireless experiments there. There are about 5,000 people on that island, mostly engaged in fishing and the fishing industry. It is quite an important place and a very prosperous community, but they are cut off entirely from our storm warnings.

The CHAIRMAN. Is there a telegraph station there?

Professor MOORE. No, sir.

The CHAIRMAN. No telegraph station and 5,000 people there?

Professor MOORE. That is right.

Mr. BOWIE. What is the reason that the telegraph companies do not go over there?

Professor MOORE. I do not know any reason. I think there are no towns or landing places on the east. Elizabeth City is quite a distance away and it would be very expensive to build a cable there. So these people have been left without storm warnings. With a little expenditure we can run our cable over there and establish a telephone service,

and for $10 a month, paid to a displayman, we will be able to hoist the signals. It will bring that whole island into communication with the world and it will give all of those thousands of fishermen the benefit of the warnings. They have a good many storms down there and sometimes quite a number of people are drowned.

The CHAIRMAN. There are a great many places in the United States where the same reason would apply?

Professor MOORE. There are not many places where we own part of the telegraph service. Most places have telegraphic communication through the Western Union or some other company. Here the Government owns the telegraph line.

The CHAIRMAN. What is the nearest telegraph station?

Professor MOORE. Kitty Hawk.

The CHAIRMAN. How much do you estimate the cost of that line?

Professor MOORE. $10,000, and we asked for $3,000 or $4,000 for improving the line generally.

Mr. SCOTT. Where you have stretches of cables, do you do any commercial business?

Professor MOORE. Yes, sir.

Mr. SCOTT. On what terms?

Professor MOORE. My report shows that we turned in a little over $5,000 last year. We do not use that money and can not use it. We turned in a little over $5,000.

Mr. BOWIE. You will please submit an estimate next week in regard to weather flags for rural mail carriers.

Professor MOORE. Yes, sir. Last year you said, Mr. Chairman, there had been no request made on the committee in regard to that service. I have in this large bundle of papers [exhibiting papers] letters asking for the flag service on the rural free-delivery service. Here [exhibiting papers] is a list of the requests, with the names of the places from which the requests have come. There are only two from Alabama, one from East Tallassee and one from Mr. Garrett, at Oxford.

Mr. BOWIE. How many are there from Alabama?

Professor MOORE. One from the postmaster at East Tallassee and one from Mr. Garrett, at Oxford. You can see from the index list of the letters the number of places for which this service is asked. There is a whole page for Illinois. These are the requests that have come in. There is a whole page for Indiana. For Iowa there is half a page; for Kansas, about half a page; Kentucky, so many; Maine, so many; Massachusetts, so many; Michigan, not very many; Missouri, Nebraska, New York, North Carolina, Ohio. We do more in Ohio than in any other State in furnishing the rural carrier with forecasts for delivery on their routes, and still you see that the requests take two full sheets just to index them, allowing one line to a place.

Mr. SCOTT. What are you doing now in supplying that demand?

Professor MOORE. We are reaching about 100,000 farmers.

Here [exhibiting papers] are requests from Senators and Members of Congress that the daily forecasts follow the rural free delivery.

Mr. SCOTT. By what method are you reaching those people now?

Professor MOORE. The simple method of sending a printed slip.

Mr. HAUGEN. How is the slip supplied?

Professor MOORE. It is printed at the local station.

The CHAIRMAN. In a great many cases the slips are 24 hours late.

Professor MOORE. If you decide to furnish all carriers with forecasts, 90 per cent would be forecasts that are based on the observations made the night before, at 8 o'clock.

Mr. SCOTT. Would it not require a large amount of telegraphing to send this information?

Professor MOORE. No, sir.

Mr. BOWIE. What would be the total expenditure?

Professor MOORE. To do this we would have to send out daily over 1,000,000 slips of paper not as large as that [exhibiting] from our different offices or from the post-offices, and it would cost about $50.000 for the slips of paper alone. We are sending out about 100,000 now, and to keep pace with the Post-Office Department it would require about $100,000 for paper and labor.

The CHAIRMAN. Under what authority do you do that?

Professor MOORE. The same authority that allows us to send maps. We have been sending these cards out for years.

The CHAIRMAN. You have not been sending the cards out on the rural free delivery for years?

Professor MOORE. We have been sending them by mail or any way that we could send them, and when the rural free delivery was inaugurated we took advantage of that to reach 100,000 farmers, but can not keep up with the rapid extension of the rural delivery without more money.

The CHAIRMAN. Do you send the cards to individuals?

Professor MOORE. We are sending forecast slips to about 100,000 farmers.

The CHAIRMAN. These slips?

Professor MOORE. Yes, sir; not quite as large as that.

The CHAIRMAN. Are these cards posted?

Professor MOORE. Yes, sir; in their offices and places of business.

Mr. LAMB. Do you not think that before the reports can get to the persons that there would be no benefit accruing to them because it would be too late?

Professor MOORE. That is a question for the committee to decide. I will say this: The 100,000 farmers that we reach now mostly receive the morning forecast. Most of these carriers leave at 7 o'clock in the morning, and in order to increase our distribution of forecasts through their agency we will have to use the last night's forecast. It would have a value, but the same information could be received in the daily paper. There is a very general demand for it. I took the position at the beginning that we had better not attempt to send out the night forecast the next morning, but the people seem to demand that we do it. If the carriers generally left at 10 a. m., so that we could supply them with morning forcasts, I should strongly urge that each carrier distribute the forecast slips to all houses on his route.

Mr. HENRY. What is the result when they find that the forecast is practically valueless? Will it not bring discredit upon the whole Weather Bureau? The forecasts in the morning papers, I believe, discredit the Weather Bureau in a great many instances. They are misleading to the people who read them.

Professor MOORE. I have not estimated for the service in my report and I have not recommended it. I have only brought these papers to show you what has been demanded. Here [exhibiting papers] are re-

quests from Senators and Members of Congress who think that we should distribute the information.

The CHAIRMAN. The Congressmen have just simply referred the request to your Bureau; they have not recommended the establishment of the service.

Mr. HAUGEN. How are they supplied with these cards; do you telegraph to the post-office and then does the postmaster mail cards?

Professor MOORE. If the rural free-delivery carrier leaves from a city in which we have an office, our observer stamps the forecast on a certain number of cards, and he delivers them to the carrier. If we have no office in a city we telegraph to the postmaster, and he sends out the cards.

The CHAIRMAN. Then you have a bill from the postmaster for increased compensation?

Mr. BOWIE. What proportion of the service can be reached by the 8 o'clock forecast in the morning?

Professor MOORE. We are reaching all that can be reached by the morning forecast now.

Mr. BOWIE. Throughout the country?

Professor MOORE. Yes, sir.

Mr. HAUGEN. Do I understand that wherever they make an application for the service it is granted, if the carrier starts out later than 10 o'clock?

Professor MOORE. I think we are sending the information out over every route where the carrier leaves after our forecast is made in the morning.

The CHAIRMAN. How much is that costing?

Professor MOORE. About 100,000 slips.

The CHAIRMAN. In money—give us that estimate offhand.

Professor MOORE. I presume, probably, $10,000 a year.

Mr. BOWIE. Those are the only people actually benefited?

Professor MOORE. Those are farmers.

Mr. BOWIE. Farmers on the rural free-delivery service?

Professor MOORE. Yes, sir.

Mr. HAUGEN. How much does a set of flags cost?

Professor MOORE. A set of flags costs about $5; there is no use to buy cheap ones.

Mr. BOWIE. And there are about 20,000 carriers?

Professor MOORE. I think so.

Mr. BOWIE. That would be an expenditure of $100,000?

Professor MOORE. Yes, sir.

Thereupon, at 2 o'clock p. m., the committee adjourned to meet Monday, January 11, 1904, at 2 o'clock p. m.

MONDAY, *January 11, 1904.*

The committee met at 2 o'clock p. m., Hon. James W. Wadsworth in the chair.

Dr. H. W. Wiley appeared before the committee.

The CHAIRMAN. We have before us this afternoon the Chief of the Bureau of Chemistry of the Agricultural Department.

## STATEMENT OF DR. H. W. WILEY, CHIEF OF THE BUREAU OF CHEMISTRY.

The CHAIRMAN. Now, Doctor, in looking over your item I find you have made some little changes in the wording of it, so it will give you a little more authority, particularly in regard to the imports. I see there is no change in the salaries recommended in the statutory roll; but on page 16 there is a change in the expenses of the Bureau of Chemistry. The first change is, "To investigate the adulteration of foods, condiments, beverages, and drugs, when deemed by the Secretary of Agriculture advisable, and for all necessary expenses of every kind connected therewith." What do you want to cover under that? Why do you put in "and for all necessary expenses of every kind connected therewith?" Did you find anything you could not do under the present language of the bill?

Mr. WILEY. No, sir.

The CHAIRMAN. You have inserted there "and for all necessary expenses of every kind connected therewith;" that is new.

Mr. ADAMS. And "condiments, beverages" is new, is it not?

Mr. WILEY. Yes.

The CHAIRMAN. I supposed the language of the bill of last year gave you all the necessary authority.

Mr. WILEY. I do not think there is any item I could specify regarding which we have not authority already.

The CHAIRMAN. Who drew up this item?

Mr. WILEY. I suppose I did; but I do not remember inserting that. I imagine it was inserted at my suggestion, because in some cases it has been specified in the bills just what kind of expenses money is wanted for in certain investigations, and there was nothing of that kind said about this. So I think, perhaps, it was put in to cover the whole thing; a clause like this was inserted without specifying that it was for freight and express and telegraph expenses, and so on. I do not think there was any additional authority needed.

The CHAIRMAN. And there is no use in piling up the bill, then?

Mr. WILEY. No; I would have no objection to that going out.

The CHAIRMAN. A little further on the committee will introduce an amendment. The words "or incompletely," which you will see there in italics, I think the committee will understand, so that it will read, with this amendment, "or which shall be falsely or incompletely labeled in any respect in regard to the place of manufacture, or the contents of the package." Passing further along, here is something new, in italics: "To introduce testimony before the Secretary of Agriculture, either in person or by attorney or by writing, in all cases where the examination conducted by the Secretary of Agriculture discloses any reason for believing that the product in question should be excluded."

Mr. WILEY. I will tell you the reason for inserting that. Because a number of the importers understood from the wording of the old law that their testimony was to be introduced before the Secretary of the Treasury, and there was uncertainty as to where the testimony should come and when it should come. The question with the importers was, shall we introduce testimony at the time the inspection is made, before the analysis has been made at all? If so it might be useless,

because the inspection might show that there was nothing contraband in the goods. In the second place, shall it be before the Secretary of the Treasury or the Secretary of Agriculture? And in order that there might not be any misunderstanding as to where the testimony was to be given or when it should be offered, this wording was put in. While not necessary, it seems very convenient in the interpretation of the act that that information should be given to the importers.

If I may be allowed a word, Mr. Chairman, if we inspect an invoice and if it is found all right, then they do not need any testimony of any kind; and it is not necessary to give testimony until an invoice has been found wrong. This specifies that point.

The CHAIRMAN. The next point, I think, for you to explain is the language here——

*Provided*, That the importer of said foods, condiments, drugs, and beverages may remove under bond any invoice held for inspection in accordance with regulations to be prescribed by the Secretary of the Treasury, in which he shall agree to return the shipment to the custody of the Secretary of the Treasury, in case it shall be found unsuitable for entry.

Mr. WILEY. I think I can explain that, Mr. Chairman, in a few words. It came up in the actual process——

The CHAIRMAN. That is to avoid holding the goods on the dock pending examination.

Mr. WILEY. The goods either had to be held on the dock pending examination or had to be stored in a Government bonded warehouse at the expense of the importer. They object to paying this charge and also to having it exposed in the warehouses. They can not have control of their goods in the warehouses, under the conditions under which it is kept there, because sometimes there is such a high temperature in the warehouse and sometimes such a low temperature in the warehouse that the extremes are injurious to those products. So they wanted an opportunity to take the goods immediately when they are landed, as they are allowed to do now in the payment of customs. A person bringing goods into this country is allowed to remove them under bond before the liquidation of the entry, giving bond to double the value of the goods. He pays a certain part of the duty, which is estimated, and when the duty is finally adjusted if there is any additional duty to pay he pays it, too, and the bond is canceled; and in the meantime he has possession of his goods and can use them, if necessary, because he only agrees to pay double their value in case there is objection to their going through the custom-house.

Mr. ADAMS. It would seriously hamper trade if this provision was not in here.

Mr. WILEY. It did hamper trade very seriously until the Secretary of the Treasury allowed them to take the goods under the regular bond temporarily until some more ample provision should be given.

The CHAIRMAN. What goods did you run across that could not be stored in bonded warehouses?

Mr. WILEY. In winter weather if the temperature is below freezing there are many goods that are injured. That is the case with olive oil, although olive oil will melt out afterwards. It is the case with almost every fruit product, unless it is fruit which is intended to be kept in cold storage.

The CHAIRMAN. Is the temperature in these bonded warehouses below freezing?

Mr. WILEY. Sometimes it is below freezing and sometimes it is not.

The CHAIRMAN. Do they not have a special division in the bonded warehouse in which they put perishable goods?

Mr. WILEY. Yes; they have those divisions.

Mr. ADAMS. But does not the greatest necessity for this provision lie in this fact: There are often merchants that want to get their goods on the market by a given time, and without some such provision as this they can not do that?

The CHAIRMAN. But they can not sell these goods; the merchant simply gives a bond for their safe-keeping, and if the United States Government finds anything deleterious in their composition he agrees to return the identical bonded-warehouse goods to the Treasury?

Mr. ADAMS. Is that the bond—to return the identical goods?

Mr. WILEY. Yes. The old bond required to give an indemnity, which we do not care for.

Mr. ADAMS. I think the best policy would be to make them store them at the United States bonded warehouse and not let them take them in their possession.

Mr. SCOTT. I was going to inquire whether that means pending the inspection of the goods that may be taken and introduced into the market.

The CHAIRMAN. No; they agree to return the identical goods in case the United States Government finds they contain something injurious.

Mr. GRAFF. There is a penalty in the bond, and if they do not return the goods all they can do is to collect on the bond, and the only penalty would be paying double; but it would not pay for the business house to engage in that business right straight along.

The CHAIRMAN. Do you seriously think there is any situation that might arise when the United States bonded warehouse would not meet this case? My point is that they remain in the hands of the United States Government; you do not have this detail about the bonds to be gone into, and the bonds are very necessary, as you know, and the goods are treated exactly like other things being imported to this country and put in the United States bonded warehouses.

Mr. WILEY. The law now allows the goods to go directly into trade, and when you consider that the great majority of the inspected invoices are within the limits of the law, it would entail the additional expense of a double moving of the goods, and also the storage during the time of the inspection, also storage during the time duties were to be entered and liquidated. It requires usually about ten days to liquidate an ordinary entry at the custom-house.

Mr. HAUGEN. This would save considerable expense then?

Mr. WILEY. This would save considerable expense and annoyance to the importer to allow him to take his goods under bond.

Mr. SCOTT. Does this same bond cover the duty also?

Mr. WILEY. It provides for full payment of duty and in double the value of the goods.

Mr. SCOTT. Or are there two bonds made, one to the Treasurer and one to cover the inspection?

Mr. WILEY. One is to the Treasury and one is to return these goods if they are found to be contraband goods.

The CHAIRMAN. Most bonds are made to the Treasury.

Mr. WILEY. Both are made to the Treasury; yes.

Mr. SCOTT. They are two separate bonds?

Mr. WILEY. Yes, I think so; but I may be mistaken. I will say, since this has been suggested, that this arrangement has been made, which has worked satisfactorily, and it might be well to let it stand. That the Secretary of the Treasury has decided that this bond can cover both the duty and the goods, because he takes this view: That no dealer would undertake to sell goods that we had found contraband anyway, because it would ruin his trade, and allowing him to take the goods, if he should dispose of some of them innocently or without thinking that they were contraband, he would pay double their price, and he would not likely repeat the offense; and the result is that they are keeping the goods intact until the entry is liquidated.

Mr. GRAFF. That is under existing law?

Mr. WILEY. Yes; that is under existing law.

Mr. HAUGEN. He would have to pay three times the price, then, would he not?

Mr. WILEY. Two prices to the Government and one price to the person who brought them there—yes, three times the price.

Mr. SCOTT. He would only pay double the price to the Government in case the duty was not paid?

Mr. WILEY. He would only pay double the price then; or, if the goods were found contrary to law, double the price to the Government.

The CHAIRMAN. If found to be contrary to law, they would be returned to the Treasury Department and given back to the country from which they came?

Mr. WILEY. If you will allow me to say a word, I think I can clear the matter up. I will make this additional statement: That the Secretary of the Treasury has instructed the collector and appraiser not to liquidate any entry at all until inspections are completed; so that the bond holds perfectly good, and we have had no trouble at all since this form of bond was allowed to cover the goods during inspection, and in only one case have we required the return of the goods, and they were found to be intact.

The CHAIRMAN. In all your examinations you have only found one case——

Mr. WILEY. No, I mean under this particular procedure, which has just gone into effect. Goods were all stored in bonded warehouses at the expense of cartage and storage to the importer until the inspections were completed. We have only lately made this new arrangement, and under the new arrangement, which is perfectly satisfactory to the importers, there has been only one case where there has been a return of the goods.

Mr. SCOTT. Why not strike this out, then?

Mr. WILEY. That was what I was about to propose. If I had known of the adoption of this method that has been adopted then the language in this bill would not have been proposed.

Mr. GRAFF. What are the conditions of this bond they have to give now?

Mr. WILEY. It is arranged by the Secretary of the Treasury. I do not understand it very well, but they give a bond in double the value of the goods that they will pay the full duties. They make an estimate of what the duties are at once and pay a certain amount and take the goods away, and then they give a bond that they will pay all duties assessed on the goods on liquidation, and upon that bond they take their goods away.

Mr. ADAMS. Is not this an explicit authority for the Secretary of the Treasury to do what he is doing?

Mr. WILEY. Exactly, but for a little different purpose.

Mr. GRAFF. But they have to pay their duties if they take their goods out and keep them. This bond has simply to do with the duties and nothing to do with anything else?

Mr. WILEY. It is construed now to cover both duties and inspection.

Mr. GRAFF. Then, supposing a party concluded that he would sell the goods and pay the duty, that is what he would have to do in any case, whether they were pronounced contraband or not. Well, they would not have to pay any duty if they were contrary to the provisions of this law; but he would sell them, and if he sold them he would have to pay the duty——

Mr. WILEY. Then this would happen. If we should ask the return of the goods under this bond, and a part had been disposed of, he would have to return what was left and pay double the full value of those that he had disposed of.

Mr. HAUGEN. And the duty besides?

Mr. WILEY. And the duty besides.

The CHAIRMAN. I believe in making this severe, so as to stop it right off. The moment they find that there are going to be severe measures adopted by us to prevent the disposing of this kind of goods—goods injurious to health—they are going to stop it; they can not continue to send those goods over here. Their agents over here will write back and say to them "Don't send any more of that stuff; we can not do anything with it," and it will not pay them to send any more over.

Mr. WILEY. You will understand that what we are trying to get at are the parties that are offending, and we can not tell until we inspect; we do not want to put a penalty on the parties who are entirely innocent. That is what we are doing when we send these goods to the bonded warehouses under the old provision.

The CHAIRMAN. Right there, if I may interrupt you, perhaps it would be proper to tell the committee something about these goods; the idea was to prevent the importation of goods which were contraband in their own country where they were manufactured and goods that were injurious to health, was it not?

Mr. WILEY. And in addition to that, Mr. Chairman, goods that are falsely labeled in any respect.

The CHAIRMAN. Yes; goods that are falsely labeled also?

Mr. WILEY. Yes.

The CHAIRMAN. What have you done in that line?

Mr. WILEY. I have some interesting statistics which I will present first. The average daily number of invoices which have reached us since this act went into effect, July 1, have been 114—that is, there have been that many separate shipments of food products coming into the United States every day from all countries, from all quarters of the world. We found at the beginning, and now with a diminishing percentage, that about 10 per cent of the inspected cargoes were contrary to law in respect to adulteration of a chemical nature, which we could detect in the laboratory.

The CHAIRMAN. Those things being contrary to the law in the countries from which they came?

Mr. WILEY. Contrary to our law, and in most cases contrary to the

laws in the countries from which they came. In some cases the country from which they came had no laws on the subject.

That shows about the percentage of actual chemical adulteration which you can detect in a laboratory. We have not gone at all into that other question of false branding when not revealed by chemical examination, because that is so big a question we could not undertake it at present; we had all we could manage with the small force we had to inspect 6 per cent of the invoices which came in a chemical way.

Mr. SCOTT. You inspected all of them, did you not?

Mr. WILEY. No; we only inspected those that we had suspicion about or that might be subject to suspicion.

Mr. SCOTT. How were you guided in that?

Mr. WILEY. By previous experience. We know where to look; we may not always find cases of adulteration or violation of the law, but we have an idea where they are most likely to be found.

Mr. SCOTT. Then of these 114 daily shipments you inspected but 6 per cent?

Mr. WILEY. Six or 7 per cent.

Mr. SCOTT. Was it 10 per cent of the 6 per cent that you found to be adulterated?

Mr. WILEY. Ten per cent of the 6 per cent we found to be adulterated.

The CHAIRMAN. That is a pretty small percentage, is it not?

Mr. WILEY. It is a much larger percentage than we expected to find.

The CHAIRMAN. It is?

Mr. WILEY. Yes, because you must remember that there is a certain percentage of articles that we never expect to find adulterated at all, such things as rice and nuts and unbroken foods of all kinds.

The CHAIRMAN. You can not adulterate a nut.

Mr. WILEY. No; and as I have said we do not expect to find adulterations in such things, but they are counted in the invoices. Then, we have not made any inspection of fish, either fresh fish or preserved fish.

The CHAIRMAN. I do not think that 10 per cent of the 6 per cent is very high, considering what some people call adulteration—and some people do not.

Mr. WILEY. It is a little higher than we anticipated from our previous work. We had inspected before under the old law.

The CHAIRMAN. I believe there is a good deal of difference of opinion as to what constitutes an adulteration, even among the chemists.

Mr. WILEY. Yes; and among other people as well as chemists.

I will tell you the lines we took up. We took up the easier things first in order to get our hand in, we might say. We did not want to attempt any very difficult problems until we learned something of the working of the law. One of the first things was olive oil, because we had been led to believe that there is a good deal of adulteration in olive oil coming into this country. That being so, we have held up, maybe, 25 per cent of all the shipments of olive oil that have been sent to us since the 1st of July. In olive oils we have found, probably, more adulterations than in any other one thing. That adulteration consists chiefly in the admixture of other vegetable oils which, although we believe them wholesome, and we do not object to them on that

ground at all, are sold at the high prices which olive oil should command.

Mr. ADAMS. Cotton-seed oil?

Mr. WILEY. Cotton-seed oil is one. We have no objection to that as a salad oil. We believe in it as a salad oil, and will do what we can to promote its use under its proper name. The same is true of peanut oil; and sesame oil is another oil used in the same way. Those are the three that we have found coming in under the name of olive oil and sold as olive oil.

The CHAIRMAN. They are not injurious to health?

Mr. WILEY. No sir; we do not exclude them on the ground that they are injurious to health but on the ground that they are adulterations.

The CHAIRMAN. They are not sold for what they really are?

Mr. WILEY. They are not what they pretend to be.

The CHAIRMAN. The same as the oleomargarine and butter case over again.

Mr. WILEY. Yes.

The CHAIRMAN. That is it exactly.

Mr. WILEY. Yes. In the goods from some firms we have found adulterations quite frequently, and in the case of other firms we have found no adulterations. It seems to be a habit of some firms. I do not want to mention any names invidiously in this connection, but there was one firm especially, from which every single invoice that we inspected at first was found to be mixed.

Mr. SCOTT. What did you do in a case of that kind?

Mr. WILEY. Under the instruction of the Secretary the practice was when a misbranded article was found which was not injurious to health to admit it, provided they would change the labels under the control of the Treasury Department, and in such way that they could not be taken off—that is, to have the same position on the packages that the original labels had.

The CHAIRMAN. On each bottle?

Mr. WILEY. Yes.

Mr. SCOTT. How would you brand oil which was mixed in that way?

Mr. WILEY. If it was mixed with cotton-seed oil, we made the label say so; if it was mixed with peanut oil, we made the label say so, and if it was pure peanut oil or cotton-seed oil it would have to be so marked.

The CHAIRMAN. How did they take to that?

Mr. WILEY. They took to it all right, but the people did not take to it afterwards. The people would not buy them.

The CHAIRMAN. I did not suppose so.

Mr. WILEY. Only yesterday an attaché of the Italian embassy came down to ask if we would not permit those people to take those new labels off, because, he said, they could not sell those oils with those labels.

Mr. BURLESON. As a matter of fact cotton-seed oil is as wholesome as olive oil, is it not?

Mr. WILEY. As a matter of fact it is, in my opinion.

Mr. BURLESON. It is quite as palatable, too, is it not?

Mr. WILEY. I think so; but that is a matter of taste. I am a great believer in cotton-seed oil.

Mr. BURLESON. So am I.

Mr. SCOTT. Do you know whether they try to sell those oils at the price of olive oil or at a cheaper price?

Mr. WILEY. They sold them at the high prices of the pure olive oil, but not of the highest grades. That bears out the contention that our California friends have made all along, that they can not afford to make pure olive oil and compete with these oils which we get from abroad; but they say if we will secure the importation of olive oil as olive oil only, and not allow the importation of these other cheaper oils as olive oils, that then they will be able to compete.

The CHAIRMAN. Is the test for discovering cotton-seed oil or peanut oil an expensive test?

Mr. WILEY. Not very expensive.

The CHAIRMAN. Do you have to make a regular analysis?

Mr. WILEY. Yes, sir; we have our work so organized that when a sample comes in in the morning, say, from New York, we will have that sample, as a rule, ready to report on by 2 o'clock that afternoon, so that we can send word to the Treasury that night whether to release that sample or hold it, because the sample that is to be released we want to have released as soon as possible; and all those that show by the preliminary tests that they are to be released we are able to report favorably on by 2 o'clock and let them be released; and then, if we find a sample that is suspicious—that is, if we find anything wrong with it—we go ahead and make a complete analysis of it.

Mr. SCOTT. Do you investigate as to domestic oils?

Mr. WILEY. No; we do not do that under the law.

Mr. BURLESON. Suppose there is peanut oil or cotton-seed oil produced in California and sold as olive oil; there is no Federal law that would control that adulteration?

Mr. WILEY. No, sir; not if sold in the State.

The CHAIRMAN. When you examined specimens of oils and found they were not adulterated and said so, and the invoices were released, did you find any disposition on the part of the importers to advertise that fact?

Mr. WILEY. They would have done so if we permitted it.

The CHAIRMAN. How did you stop it?

Mr. WILEY. We did not inform them about our examination; we simply released their goods.

The CHAIRMAN. If they wanted to advertise the fact that their goods were Government proof they could do so?

Mr. WILEY. They could advertise that particular cargo as Government proof, but that would not apply to any other cargo.

Mr. SCOTT. After these oils have passed your inspection do you have any assurance that they will not be adulterated before they are put on sale?

Mr. WILEY. The only supervision, then, is the supervision of the State itself. After we pass them our jurisdiction ceases. But this very case, where the attaché came to ask our permission to take those labels off, shows that they had not been taken off, and they promised that they shall not be taken off. They are put on under the supervision of the Treasury; an official stands by and sees it done.

Mr. BURLESON. Have you any knowledge of the fact whether domestic oils are sold under the correct label?

Mr. WILEY. We have bought a good many California oils, and we have found a few adulterated.

Mr. BURLESON. And some sold under French labels?

Mr. WILEY. No; I think not. They are sold under California labels.

We could not tell by the analysis whether an oil is a California oil or an Italian oil. Our own people have been practicing some of these same tricks in regard to selling the cheaper oils for olive oil, but to a very limited extent.

Mr. HAUGEN. These firms that are held up continue to make those inferior goods?

Mr. WILEY. No; that is the point. When we find a cargo that is wrong we give the man time to introduce evidence; we condemn no man without a hearing. We inform him officially that his cargo has been inspected and found to contain so and so contrary to the law, and we give him reasonable time to introduce evidence, either in person or by attorney or by letter, and we say to him, if you do not answer by such and such a date the case will be decided without taking any further evidence; and if we do not hear from him we decide it without any further hearing, or going into the matter further.

The CHAIRMAN. Then you insist on the goods being returned to Europe?

Mr. WILEY. Yes; to Europe or somewhere else. Our instructions require them to be shipped beyond the jurisdiction of the United States; we do not say where they shall go.

Mr. SCOTT. Have you ever had a case where the man presented his evidence and secured a different verdict from the one you have rendered?

Mr. WILEY. We have had a great many cases where men have presented evidence and a few in which they have secured different verdicts or modifications. The evidence is usually this: "Our firm has been established for 150 years and has never before been charged with selling an adulterated article." We do not accept that evidence against our own analysis. Then when we insist upon our position and finally convince them that our analysis of their goods is correct they write that they have found that our analysis is correct and that their own chemist has found it so, but that it was adulterated accidentally.

The CHAIRMAN. I dare say that a lot of them do not really know that their goods are adulterated, for they must get them in different ways.

Mr. WILEY. Yes; they buy them in different lots. The second time an offense occurs we require the return of the goods, and we do not permit a man to import twice under the concession which has been made. The result is that this one firm which we speak of, in which every one of the invoices was found to be wrong, has in the last month sent the genuine articles. Every one of the invoices from that firm during that time has been found to be all right.

The CHAIRMAN. How many ports have you applied this work to?

Mr. WILEY. The following: Mostly New York, of course, because perhaps 85 per cent of all the imports are made at the port of New York; Boston, Philadelphia, Charleston, New Orleans, San Francisco, Chicago, Cleveland, Minneapolis, St. Louis, and Denver.

The CHAIRMAN. The bulk of the oil comes in through New Orleans, does it not?

Mr. WILEY. A great deal of olive oil comes to New Orleans, and a large quantity of the wines imported, but most of them come in at New York. Even when they go to those other ports eventually they often pass through New York, Philadelphia, or Boston in the first instance, and then are consigned under bond to those other ports.

Now, while on this subject—because it seems to me this is the most

important one before this committee to-day, because this is one we are asking additional money for—another thing which we have examined very carefully is wine. That is another class of imports in which adulteration is very largely practiced. There are two kinds of adulteration of wine. One we have not touched at all and the other is the chemical adulteration. That is, the addition of preservatives, etc. Now, the old Latins were accustomed to hang up before every wine house a green bush to show that there was wine for sale. Hence the origin of the term, "A good wine needs no bush," because when you find where good wine is sold people go there anyway.

So the advertising of the purity of a wine is a stock in trade which should be safe-guarded by the persons who are entitled to use it, and a good wine does not only need no bush but it needs no preservative. So we are perfectly confident by actual experience that the preservatives are added to the wines which are so poor in quality that they will not bear transportation without such preservatives. Hence the presence of a preservative in wine, aside from the fact that it is injurious to health in itself, is an indication that the wine itself is of inferior quality. Therefore, especially in countries where the laws forbid it—that is France and Germany, and those are the great wine countries—preservatives are not used, and we do not allow any wines to come into this country that have a preservative in them, except in one case. There is one case where we do allow a preservative to be used in wines, and that is the case of white wines, where the universal treatment has been for years to burn sulphur in the cask before the wines are put in. That is the universal practice in the case of certain white wines of the Sauterne type and others, not only in Italy but in France and in Spain, and also in California. We have determined by analysis just how much sulphurous acid is introduced in the wine by that process, and then we have fixed a standard, under authority of Congress that allows the Secretary of Agriculture to do so, above the maximum which we have found, so that we certainly include all genuine cases of wines that are made in this way. We admit that much sulphurous acid as a correct trade practice.

Mr. ADAMS. Do you find preservatives in any beer imported into this country from Germany?

Mr. WILEY. We have not taken up that subject at all.

The CHAIRMAN. I will say, Mr. Adams, that this law has been operative only since the 1st day of July, only six months.

Mr. WILEY. We find only 6 or 7 milligrams—to use an expression we are familiar with, and which is allowed by act of Congress now, of sulphurous acid or dioxide—the fumes of burning sulphur; that is what it is—in 100 cubic centimeters. That is about an ordinary glass of wine, such a drink as would ordinarily be taken by a man, in a small wine glass; that is the maximum found when wines are treated this way. But we have fixed our standard, following the Swiss and Austrian and German standards, at 20 milligrams, which allows a wide latitude. Now, if white wines come in with more than 20 milligrams to 100 cc. we exclude them, because it is evident that the sulphur has been put in there in a different way from the legitimate treatment—put in there for the purpose of preserving a poor stuff. We have found 60 or 70 or 80 milligrams in 100 cc.; that is we have found the wine almost saturated with the sulphurous dioxide; you can smell and taste sulphur in it, and it is unfit for use.

The CHAIRMAN. Where does that go in the trade?

Mr. WILEY. Almost anywhere. You buy that kind of wine almost anywhere—in Washington or elsewhere.

The CHAIRMAN. In the cheaper places?

Mr. WILEY. Almost every place; in the best places. If you order a bottle of sauterne wine in almost any restaurant, as a rule you can smell the sulphur in it. They have sent those wines over here because they will not use them in other countries. That is causing friction because it strikes a good many importations of France and Germany and Italy. But now they are having their wines analyzed before they send them over here, and we are getting certificates along with the invoice saying that the wines have been inspected and do not contain more than so much sulphur.

The CHAIRMAN. A government inspection?

Mr. WILEY. Usually some municipal or government analyst.

The CHAIRMAN. Do you accept that certificate?

Mr. WILEY. No; we do not accept it as final, but we take it as prima facie evidence.

The CHAIRMAN. Do not we ask them to accept our certificates?

Mr. WILEY. I think not; they are simply prima facie evidence over there.

The CHAIRMAN. I think they accept them; that the certificates as to our beef and pork, and so on, are accepted over there.

Mr. WILEY. They may do so; I do not know. If we have an invoice of fifty wines and we find ten of those wines with government certificates, as a matter of fact we will not inspect those. We have a right to inspect them but we pass those as a rule, although we might inspect them once or twice to be sure that they are all right. We take those wines that come without certificates, and try those. All wines that contain salicylic acid we exclude anyway, because all the governments where the wines are made exclude those wines themselves.

Mr. SCOTT. What are the wines that are most commonly adulterated with that?

Mr. WILEY. There are a very few of those coming in here now. The red wines are the ones that usually contain salicylic acid.

Mr. SCOTT. I see Colorado wines advertised at a dollar a gallon.

Mr. WILEY. I wish our California friends could get half that for theirs; they could make a good big profit.

Mr. HAUGEN. Are sparkling wines generally adulterated?

Mr. WILEY. We have not examined them yet; we have not gone into them at all.

Mr. LAMB. What is California wine worth?

Mr. WILEY. You mean red wines?

Mr. LAMB. Yes.

Mr. WILEY. Common red wines there command now from 20 to 40 cents a gallon. They were much lower than that a few years ago.

The CHAIRMAN. What is the adulteration of champaign?

Mr. WILEY. We have not undertaken that inspection, but I think there is very little adulteration in sparkling wines. They are the poorest wines made; they have no chance to ripen at all, they are fermented in the bottle, and the higher alcohols have no chance to oxidize. On the score of health they are the poorest wines made, by far; they

have nothing to commend them like good red wines that have remained in the cask and the bottle for some time.

Another thing which we have examined particularly is manufactured meat or meats that are so chopped up that we can not distinguish their origin. For instance, pâté de foie gras, which perhaps may be innocent of a single goose liver and made of some other kind of liver. I see but one way in which that evil can be remedied, aside from having an inspector at the place where they are made—as is done by many reputable firms in England now in order to get their own goods—and that is to require the old-fashioned method of boxing and tinning this meat, requiring that the livers shall be in pieces large enough to identify. These packages of goose livers sell for high prices; they are very expensive. If finely ground, of course we can not tell them from other livers. It requires either a microscopic or chemical examination to determine it.

The CHAIRMAN. A few years ago a representative of one of the packing houses in Chicago appeared before this committee, and he stated that hogs' livers were exported abroad and sent back to us in the form of pâté de foie gras; that a certain portion of the goose's liver was mixed with the hog's liver, and sent back as pâté de foie gras. Could you discover that fraud?

Mr. WILEY. We could if the fragments were sufficiently large for the examination.

The CHAIRMAN. You know pâté de foie gras is usually in the form of paste?

Mr. WILEY. Yes, usually; but formerly it was not so; the livers were only cut into small pieces. Then there are sausages; that is another instance where we have found a lot of adulterations. In the first place, we can not inspect the carcass.

The CHAIRMAN. You refer to bologna sausage?

Mr. WILEY. To any kind of sausage.

The CHAIRMAN. Do we import sausages?

Mr. WILEY. Not fresh sausages, but preserved sausages.

The CHAIRMAN. Smoked?

Mr. WILEY. Yes; and imported in brine, great quantities of sausages. We can not, of course, inspect the carcass from which they come, and to try to inspect the thing itself after it has been mixed in this way is practically impossible, because you would have to inspect every part. For instance, you do not know where the trichina is likely to be found, but you would in a fresh carcass. So we have to rely on the certificates furnished with these invoices that they have been properly inspected, and we insist on that and accept that because we can not gainsay it. But sometimes they contain preservatives which we believe to be injurious, and so we have excluded a great many cargoes of sausages, and they are now trying to find a haven of rest somewhere, because at least one of the countries will not allow them to reenter.

It is against their laws that any of these cargoes should be reentered, and hence, like the Flying Dutchman, they are somewhere on the ocean seeking a place of rest. This curious thing happened. If a cargo of sausages comes from Germany preserved, say, with an injurious preservative, contrary to the German law, and as we believe injurious to health——

Mr. BURLESON. Boracic acid?

Mr. WILEY. Yes, or salicylic acid; and is excluded on that ground

we require its reshipment, and they can not take it back, because the law prevents its reentry. No mince meat can be reentered in Germany cut up into pieces less than 8 pounds in weight; none less than that can enter the ports under any circumstances, on the ground that they can not inspect it. I do not question their law; I think it is all right. But the fact appears that these sausages they send us can not go back to where they were made under any pretext whatever.

The CHAIRMAN. One example of that would settle that business, would it not?

Mr. WILEY. Yes, it probably will.

Mr. ADAMS. You do not refuse all those?

Mr. WILEY. No; we admit a great many.

Mr. ADAMS. Are they preserved with salicylic acid?

Mr. WILEY. Not always; usually with boracic acid and nitrate of potash, and, by the way, a new preservative has sprung up they call "viandol." The first shipment of viandol we refused, because we did not know what it was, and we were justified in believing that it might be injurious to health. We required them to state what its chemical composition is, and we find it is the acetate of alumina, which is about as bad a form of alumina as you can get into the human system. We excluded it because we decided it to be injurious to health.

Mr. SCOTT. We do not export sausages to Germany, then?

Mr. WILEY. No; it is contrary to the German law.

Mr. SCOTT. Or to any other country?

Mr. WILEY. Very little, I think.

Mr. SCOTT. Not to amount to anything?

Mr. WILEY. No; I believe not.

Mr. RODEY. We can not send canned meats to Germany?

Mr. WILEY. Nothing that is less than 8 pounds in size—4 kilograms.

Just one other item, and I shall not take up any more time of the committee on this, although I want you to understand what we are doing and why we want the money we have asked for next year.

The canned vegetables and fruits we get we find largely adulterated; we get a great deal of that kind of food from Europe. We find that the use of glucose is quite common in those fruits, and artificial colors are used almost universally. As far as glucose is concerned, we do not intend to raise the question that it is injurious to health, provided it is made in accordance with the provisions imposed in the country where it is manufactured. But when it is not manufactured in the right way there is likely to be some such result as happened in England several years ago where they poisoned 8,000 people, 600 of whom died and a great many were injured permanently for life, by reason of the arsenic which the glucose contained. This glucose being used in the manufacture of food products, I should insist rigidly always on the examination of these articles for arsenic before they were allowed to come into the country. But unless they are named on the label they are misbranded and could not come in under the law.

Then, as I have said, they are almost universally artificially colored. The use of artificial colors is a matter of taste, and we reserve our decision in regard to injury to health in all these cases for future consideration, but unless the label specifies that they are artificially colored, and says what they are colored by, we exclude them on the ground that they are mislabeled; because the law says "in any respect

as regards the contents of the package," and that covers that point, I think, without question. At least no one has seen fit to apply to the courts to require the issuance of a mandamus compelling the Secretary of Agriculture to permit the entry of these goods; they take them away without any such proceedings in every instance.

Mr. SCOTT. When you get a cargo of these vegetables do you make any effort to inspect every package?

Mr. WILEY. No, sir. Under the rule laid down they take packages at random. We have nothing to do with taking the samples at all; that is done by the Treasury Department while under their control, and then these are labeled by the Secretary of the Treasury under forms which we furnish, giving necessary information on each one, and then they are sent to us by express.

Those are the principal things.

Now, Mr. Chairman, what we want is this. We want money enough to put some chemists and a laboratory at these various ports; the Secretary of the Treasury has very kindly said that he would give us the laboratory rooms and everything he could free of charge, because every port has its laboratory for the appraisers' use. I have consulted with Assistant Secretary Armstrong in regard to the laboratory in New York, and the room has been selected; we have everything ready except the means to move these laboratories.

The CHAIRMAN. How would you do in the other ports?

Mr. WILEY. We have already appointed a chemist at San Francisco, because it is impracticable for us to send things back and forth across the continent. We want to establish——

The CHAIRMAN. How about New Orleans?

Mr. WILEY. We want to establish a laboratory in New York first, with force enough to handle the bulk of the work, because there is where nearly all of it comes, and in order to release everything promptly that has to be released, and send to us at Washington all the samples that are to be held, and we want one man at least at Boston and one at Philadelphia and about four or five in New York.

The CHAIRMAN. Right there, Professor, has the United States laboratories at all those places now?

Mr. WILEY. Yes, it has; it has one in every port. I have charge of those laboratories to a certain extent under a commission of the Secretary of the Interior.

The CHAIRMAN. Why could not they do these preliminary——

Mr. WILEY. They are worked full on Treasury business even to the extra half hour, Mr. Chairman, in the classification of goods for duties. All the goods that come into this country which are judged by chemical composition are examined by the chemists before the duties are assessed. They can not classify them without doing that.

Mr. RODEY. You could do both things at once if you had the laboratory?

Mr. WILEY. We do not have anything to do with the classification for dutiable purposes; we simply have to do with an examination or analysis with the subject of adulteration in mind; that is in an entirely different line. And then in the California laboratory we want a man all the time. We have one man part of the time there now. And we want enough money to take up this other part of the work, to secure immunity from false labeling where the constitution of the matter is not at stake. That is most important, and the only way we can do that

is to have an agent, say at Bordeaux, a man well skilled and one who would be a man to whom we would have to pay a good salary, but it is just as important to us, and more so, to have such a man as it is to have the special agents of the Treasury that are over there. We want one at Mayence, in Germany, and may be at Hamburg, which is one of the great ports, and probably one in Italy. I do not think it would be necessary to have one in Spain, because our imports from there are not sufficiently great. But it is important, if we are going to enforce this law and protect our people against misbranding, that this should be done.

Now, you may not know that the Secretary, at my suggestion, three years ago sent a special agent for this very purpose over to Europe to see if it were necessary that such an inspection should be made, and he went to France, and the testimony which we collected is something surprising. The Secretary, very wisely, I think, never published this, because it was confidential; but it is the universal practice, as it was learned from this agent, to misbrand and mislabel, and I have brought with me some illustrations of it. You take the wines of these countries—of the Rhine and the Moselle and the Gironde, the great wine-producing region of the world. In France there are about 38 vineyards that have the right under the Government to bear a special name. They are called classed vineyards or classed wines, and have the right to bear certain names. Every wine almost that we get in this country bears one of those names. The same is true of the Rhine and of the Moselle. There are certain vineyards which, under the authority of the Government, have a right to bear particular names. As I have said, nearly all the wines we get bear those names. We know very well that most of the wines are not entitled to bear those names, do not come from those vineyards; but we can not prove it. If we undertook to say that these were violations of the law, we would have to have evidence; we would have to prove it.

The CHAIRMAN. How are you going to get the proof by your agent?

Mr. WILEY. We would put an agent there who is an expert, and every invoice that came over here would have to bear his visé. They would make what you might call a studbook. When you import a fine stallion or bull, you require that he shall bring his pedigree with him, or he will not be admitted free of duty for breeding purposes.

The CHAIRMAN. That is their Government certificate.

Mr. WILEY. So it is——

The CHAIRMAN. Not an agent of our Government. It is their own Government that gives us that certificate, and we abide by it.

Mr. WILEY. They have their regular herdbooks, as we have, of course. What we want is this certificate, and we want a competent expert who will be able to pass upon that and say whether these warrants are what they pretend to be.

The CHAIRMAN. How is your agent going to get that information?

Mr. WILEY. That is the simplest thing in the world. In the first place, these vineyards are well known. They make a vintage every year; they have a sale at auction, and they sell nearly all the wine at the end of the vintage, or the next vintage, perhaps, because they keep it a year or two; but they sell their vintages at auction. These are bought by great houses at Bordeaux and other places, and so it is known where all that wine goes. A tun of wine goes to a certain place, and that is known. There is where the trouble begins. The

way they do that is this: They take a tun of wine and they draw off all of it, except maybe 10 gallons. Then they fill it up with a cheaper wine, although a similar one, and they draw that off and call that the original wine. That is what they call stretching. Sometimes they stretch a second time, until, finally, they may adulterate the wine so that almost none of the original wine is there. They make no bones about selling that as the original wine, under the name of the original wine, when not even a fraction of the original wine is present.

Mr. BURLESON. Have you any idea how the people on the British Isles are protected against these misnomers, this false labeling of goods?

Mr. WILEY. Yes; I have quite a good idea, because I have investigated that on two or three different occasions. I have had the good fortune to study these things in Europe for several years. I have done that at my own expense, because it was the only way I could do it, and I did not like to ask the Secretary of Agriculture to pay my bills. I have been over there and studied this problem in all those countries, and especially in England, for the past two years. I have been over there in consultation with the great merchants, who have their own agents at all these places, just as I hope we may be able to have one from our country. They have a merchandise mark act in England which makes it a penal offense to put a false brand on any article of merchandise. But at the same time no one is specially charged with seeing that the law is enforced. The great houses, however, take it up and see that it is enforced; there are no Government officers charged with the enforcement of the act. There are some of the great firms, especially the army and navy stores, which have a great reputation to hold up, and their trade all over the world is due to the fact that they use every precaution to guarantee to the purchaser that he gets exactly what he purchases when he buys from them. They trace every one of these wines——

The CHAIRMAN. How can they do that?

Mr. WILEY. It is the simplest thing in the world.

The CHAIRMAN. It sticks me how an agent could follow these different shipments, and keep track of them, and advise this Government?

Mr. WILEY. Of course the people there would aid him in every possible way.

The CHAIRMAN. Do you think they would?

Mr. WILEY. Every man that sells the genuine wine wants this done; but he can only certify as to his own wines; he can not prevent another man from misbranding.

The CHAIRMAN. I think if a man would come over here from France or Germany and go around to our merchants trying to find out about their business and prying on their methods, you might say that he would not receive a very warm welcome.

Mr. WILEY. This is what is done. The merchant who trades in these articles certifies every wine direct from the vintage to the purchaser.

Mr. RODEY. Does it not sometimes occur that they put just as good wine in those casks as the genuine wine, that they simply want the reputation of the name?

Mr. WILEY. No; that is not so, because these wines are of especially fine character; but they are similar wines which they put in.

Mr. RODEY. Would it increase the sale of those government protected wines; and if so, would that be any benefit to our people?

Mr. WILEY. It would result this way: We would not be compelled to pay the prices of fine wine and get poor wine.

The CHAIRMAN. Do not the poor wines go into certain lines of trade, to certain grocers, and the better wines go to a better class of trade?

Mr. WILEY. You will be surprised to find how few of those best wines are to be had.

The CHAIRMAN. For instance, there are some stores that would only sell the best wines if they guaranteed them as such. There are Park & Tilford in New York; they would not sell a customer a wine under a false brand, just as your army and navy stores in London would not do it.

Mr. WILEY. I do not know about that; but I do know this: Every one is sent out branded with one of those names—Pontet Canet, Chateau Lafitte or Chateau Yquem, or some other such brand—and I know we sent our own man to a large importing firm in New York and he asked for a dozen cases of red wine. He tried some of the casks around there and finally found one he liked, and said, "That suits me and I think that will suit my customers." So he ordered some of that. "Now," he said, "some of my customers want something like this and some want something different." The man from whom he was purchasing replied, "Here are these thirty-eight kinds of labels; help yourself." So he chose the labels and took them away with him. That wine did not come, perhaps, from within a hundred miles of the vineyard it was represented to come from.

Mr. SCOTT. Reverting to the question asked by the chairman a moment ago, can not you tell the committee just what you would do if you were sent over there as the agent of this Government to trace up these wines?

Mr. WILEY. I could not do much, because I am not an expert in that kind of work.

Mr. SCOTT. Assuming you are an expert?

Mr. WILEY. I would not do anything in secret. I would simply go openly to the merchants and say: "If you want to send these wines to the United States, you must certify before the consul, and to my satisfaction, that they have come straight from the vineyards they are represented to come from, and you can not send them under wrong names."

Mr. SCOTT. Do you think that certificate would be worth anything?

Mr. WILEY. I think so.

Mr. SCOTT. Would not a man who would adulterate a wine and brand it falsely, and sell it for something that it was not, make a false certificate as to what wine it really was?

Mr. WILEY. What I want is evidence which will enable me to exclude a wine that comes in here with a false name upon it. If we could have evidence under the present law we could exclude these wines; what we lack is the proof.

Mr. BURLESON. You could exclude them on the ground of false labeling.

Mr. WILEY. That is it, on the ground of false labeling; we do not need any legislation; we have that.

The CHAIRMAN. Suppose they would come with a government certificate that they were correct. You would have to accept that. Your

analysis would not show whether it came from one vineyard or another vineyard.

Mr. WILEY. No; of course the government certificate would be of great benefit in such a case.

The CHAIRMAN. I think I can state with truth that they do take our certificates over there in ninety-nine cases out of a hundred.

Mr. WILEY. Perhaps they do take them.

The CHAIRMAN. In other words, one government could not afford to refuse to take the certificate of the other government or question its veracity; that would raise a row right off. Now and then they might investigate that certificate and see if it is correct, by chemical analysis or otherwise; I do not say they might not do that.

Mr. WILEY. You know, Mr. Chairman, that under the law as it stands now the Secretary of Agriculture is furnishing certificates for export food products to foreign countries, and so far as I know they have not been refused.

The CHAIRMAN. I know that is so; they test those products on the sly, as it were, sometimes, but they accept them.

Mr. HAUGEN. Do foreign governments send chemists here to analyze and inspect our products?

Mr. WILEY. The Italian Government has a chemist in New York, Mr. Rosatti, who looks out for the interest of his people in this country. He does not do that secretly; he is there in his office, and has been in my laboratory. He is a skilled chemist, and in fact he helped me in the examination of some of these Italian oils that he thought ought to be all right.

Mr. HAUGEN. Practically, that is what you propose to do over there?

Mr. WILEY. Yes.

Mr. SCOTT. What amount do you ask for for this agent?

Mr. WILEY. For the whole expense next year, $50,000 is the sum we have asked.

Mr. SCOTT. About what proportion of that amount will go to that man you propose to send over to Europe?

Mr. WILEY. I should say that we could not get men of value for less than $3,000 apiece, and we ought to have three of those men there.

The CHAIRMAN. You have asked for $78,000——

Mr. WILEY. $50,000 is for that special purpose.

Mr. SCOTT. About how many of those agents at approximately $3,000 would you expect to send over there?

Mr. WILEY. About three.

Mr. SCOTT. That would involve an expenditure of about $10,000, and what this committee wants to know, I think, is what assurance you can give us that we will get any practical results from the expenditure. We would like to know how you are going to accomplish what you wish to accomplish. I do not see how these men are going to get at this thing in a practical way.

Mr. WILEY. I will tell you what put this idea in my head. It was my consultation last summer with Mr. Pheysey, who has charge of the wine department of the army and navy stores. I went into his store without announcement. He is an old friend of mine, and I knew him well. I said to him, "I came in to pay my respects, but I

am also here for information. I want to know how you secure the purity of the labels on the wines that you sell in this store."

Mr. BURLESON. That was in London?

Mr. WILEY. That was in London.

Mr. BURLESON. That is the point I wanted to know a while ago.

Mr. WILEY. "It is very curious," he said, "because I have such a case on the hooks. A while ago we were offered a big invoice of wines under the name of a first-class quality and we thought it was impossible that they should be sold in such quantity. We did not believe so much existed and we sent our expert to Bordeaux to investigate it, and he found out, as we suspected, that those wines were stretched, and our agent obtained that proof and so we have refused them."

Mr. SCOTT. He did not tell you how he got that proof?

Mr. WILEY. By the agent he sent who was skilled in that kind of work.

Mr. RODEY. Suppose he succeeded in securing a market for those particular Government vineyards over here, and then the other wines were sold afterwards in the country for a cheaper price, those cheaper wines would take their place, would they not?

Mr. WILEY. The result I have in view is to prevent the cheaper wines being sold at the higher rates.

Mr. RODEY. Why would not the effect of this be to raise the price of the government vineyard wines?

Mr. WILEY. I was about to explain that.

The CHAIRMAN. Please go ahead with your story about the army and navy stores. How did he find out, or how did his agent find out that those were not the wines that they purported to be?

Mr. WILEY. I could not tell you. He simply told me he sent his agent to investigate that and his agent got the proof. I have referred to a man that we sent over to Europe. He was a Frenchman and he knew the trade well. He went right to the people and asked them what he wanted to know. He said "I am a special agent of the Department of Agriculture; there is nothing secret about this, and I wish you would tell me what you do." He went to one place and he found that they had taken down the wall of an old wine house because the casks of Spanish wine that they brought there were too large to go in the door. He went in there and found them mixing Spanish wine and selling it for three or four times as high a price as it was worth.

The CHAIRMAN. We are mixing California champagne with eastern champagne and selling it as eastern champagne. Referring to Mr. Scott's question, I wish you would tell us how this man can trace those goods, and how he is going to let you know just what goods they are that you must look after. They are on the steamer in different packages and fastened in different kinds of boxes in different ways, and I do not see exactly how you are going to get at them—how he is going to let you know that there is a parcel of goods on such a steamer misbranded. How is he going to get the information that they are misbranded when they are boxed up in the way they will be?

Mr. WILEY. He must have knowledge of the dealers in the genuine articles. He knows who they are and where these wines that are entitled to be branded as these special classed wines go; and I want to say here that these high-classed wines do not go out into the general trade to any extent. They go largely into private cellars for indi-

viduals almost exclusively, and only a few go out generally into the trade.

Mr. SCOTT. Is it necessary to spend $10,000 to find out who is handling these high-grade wines?

Mr. WILEY. If we want to exclude those that are misbranded we have to have evidence on which to base our exclusion. Suppose I take a wine that I am absolutely certain is falsely branded and endeavor to have it excluded. They may have a mandamus issued compelling us to show proof, and we have to have the evidence to exclude it.

The CHAIRMAN. Is not wine largely a matter of taste? As long as there is no substance in it injurious to health do you not think that we have gone far enough in simply seeing that it is free from substances deleterious to health?

Mr. WILEY. Certainly; but the object of all these food acts is much more than simply to guarantee wholesome products.

The CHAIRMAN. A man who likes a certain kind of wine may be willing to give a good price for that wine, and yet it may be really a cheap wine, and to a connoisseur it may not be worth the money this man pays for it; but still the man may be glad to buy it at that price.

Mr. WILEY. And the same way with the man who likes oleomargarine. It is a good wholesome food, and why should you prevent a man selling it for butter?

The CHAIRMAN. That is a forbidden subject.

Mr. WILEY. Excuse me, I withdraw my offensive remark; but it is a good illustration.

Mr. WRIGHT. If you had your agent there and he stamped the packages of those wines that were what they purported to be would not the merchants in this country insist upon having wine with this agent's stamp upon it?

Mr. WILEY. I think they would, in order to protect themselves.

Mr. ADAMS. And would not the producers of the genuine wines entitled to these names be glad to have the stamp on it?

Mr. WILEY. I think they would.

Mr. ADAMS. I would like to ask one other question. Do you recall the value of the importations of the classed wines of which you have been speaking?

Mr. WILEY. Several million dollars in this country every year; but I do not recall the exact amount.

Mr. BURLESON. As a matter of fact, if these wines are not injurious to health what is the purpose of excluding them?

Mr. WILEY. Because it is a fraud to bring them in, as is done, under names they are not entitled to bear.

Mr. BURLESON. But they are not injurious to health.

Mr. WILEY. Perhaps not——

Mr. LEVER. Your proposition is not to exclude these inferior wines, but simply to relieve the people from paying these high prices for them?

Mr. WILEY. Yes.

The CHAIRMAN. What might be considered an inferior wine by you would be a wine that would be considered superior by another gentleman. Is it not largely a matter of taste?

Mr. SCOTT. But what the doctor is getting at now is that part of the law that requires all products to be correctly labeled.

Mr. WILEY. What I am after is to secure means to execute this law. I am not after a new law.

Mr. HENRY. We have recently passed a law affecting the maple sirup made in Vermont and elsewhere.

Mr. SCOTT. This is not designed to keep out these cheaper wines because they may not be of good quality, but because they may not be properly branded—may not be truly branded.

Mr. WILEY. We want the opportunity to protect our people some way against false brands, and that is one of the ways I have suggested. It may not be the best way, but a part of the money I asked for I had intended for that purpose.

The CHAIRMAN. I may be stupid about it, but I can not see how your agent can get at this information. That is what I would like to understand.

Mr. WILEY. We did not know how to get at executing this law we have until we passed the law, and then we worked it out.

The CHAIRMAN. But you did that on your own shores?

Mr. WILEY. Yes.

The CHAIRMAN. You have your own agents in this country to inspect, and they have the right to go ahead and do whatever is necessary, even so far as breaking bottles, if that is necessary; but over there I doubt whether your men would have any right to go ahead in that way.

Mr. WILEY. They would not have to do that.

The CHAIRMAN. How could your man tell whether it was misbranded just by looking at the bottle?

Mr. WILEY. He could not. If that could be done of course it would not be necessary to send him over there, he could look at it in this country; but the only way to tell whether those wines are misbranded is by having men over there and having them find out where these labels are put on, and tracing those classed wines and seeing where they go.

The CHAIRMAN. How many thousand vineyards is this wine coming from?

Mr. WILEY. This classed wine comes from only about 38 vineyards in France. There are such vineyards in Germany also.

Mr. RODEY. Your man might attend that big auction you spoke of and see what houses bought the wine?

Mr. WILEY. And then follow it up; yes.

Mr. HENRY. I suppose your man might find out that a big wine vendor was receiving Spanish wine in large quantities and selling wine with a French brand on it and you would come to the conclusion that he was doing a fraudulent business?

Mr. WILEY. Yes, certainly; but I can not know that by simply looking at the brand. We can not prove it without some evidence, which must be obtained over there.

Mr. LEVER. It seems to me you might trace these wines from the vineyards to the wine houses.

Mr. WILEY. Yes; we could do that. I have no doubt that most of those wines go direct to the consumer. What we want to get at is to find out where these immense quantities of inferior wine are put up and branded as classed wines.

Mr. RODEY. In our country they have large wool sales, and at those sales it is always known where each big ranchman's clip goes, and I suppose it is the same way in regard to the sale of these classed wines.

The CHAIRMAN. I have been thinking about how such an inspection as you propose would apply to our own country. We export a tremendous amount of stuff. Suppose a foreign government should send a representative over to this country, in a way spying upon us; I do not believe the American manufacturers would tolerate it. Are they doing that kind of thing over here?

Mr. WILEY. Yes; they have their commercial agents everywhere. I spoke about the Italian agent who is over here. But I do not know of any food products that we send out mislabeled to-day; I do not believe we send out mislabeled products.

The CHAIRMAN. There probably are some.

Mr. WILEY. Yes; of course there is a lot of stuff sent out everywhere.

The CHAIRMAN. There is a lot of stuff sent to the West Indies labeled "butter" which is not butter.

Mr. WILEY. Of course that can be told without an inspector coming over here; butter can be told from oleomargarine by examination. Excuse me for mentioning that subject. I have told the committee frankly what I want a part of this money for. I want the other money for the enlarged work I have spoken of.

The CHAIRMAN. I doubt if you could do that for $50,000, or even $500,000.

Mr. WILEY. I wish I had that report which our special agent made to the Secretary of Agriculture which I have referred to and which is confidential.

Mr. BROOKS. Referring to that man you sent over there, if he was appointed an agent of the Government, and was known as an official investigator sent by this Government, would he not be unable to get the data which he did get, going as he did in his private capacity? You said he found out about the different wines, that he got that information by asking for it. If he were known as the special agent of the United States, sent there to bring about certain results with reference to the blending of Spanish and French wines, would he not then meet with obstacles in his investigations?

Mr. WILEY. Of course the people who are putting those false brands on wines would try to circumvent him.

Mr. LEVER. But he would have the help of all the honest men?

Mr. WILEY. Yes. These houses that are entitled to brand their wine with these names would be able to tell him where the adulterations take place and would be glad to help him.

Mr. BURLESON. But would they be very much interested in it, because, as you have said, they sell their entire output to private consumers?

Mr. WILEY. Yes, I believe they would be interested in it, because I believe every man who has an established reputation is interested in preventing others from imposing upon the consumers by selling inferior wines under these established names.

The CHAIRMAN. Those dealers have their remedy at law. They would have their remedy in this country, and in every country I take it they would have that same remedy. If I label my goods with your label you can recover from me for using your trade-mark.

Mr. WILEY. Yes; that is true.

Mr. WRIGHT. If this law had the cooperation of the honest manufacturers over there, and your agent was allowed to put his stamp upon

their wine, that would be sufficient notice that all others were imitations, would it not?

Mr. WILEY. Yes; I think it would. If they did not bear that stamp that would be an indication that they had no right to those labels.

Mr. WRIGHT. It seems to me that would be simple.

Mr. WILEY. Yes; we would not have to go any further than that.

Mr. HENRY. You say you have not taken up the matter of beer inspection?

Mr. WILEY. No; we have not.

Mr. HENRY. Is that because you have not had time?

Mr. WILEY. We have not had time or the necessary force to do that.

Mr. HENRY. Is it necessary to take up the time to do that; do you think it is necessary to inspect beer that is brought in here?

Mr. WILEY. Yes; undoubtedly so.

Mr. HENRY. You propose to do that when you can?

Mr. WILEY. Yes; we propose to do it; I think it is very necessary to inspect beer, that it is necessary to have a complete enforcement of this law in relation to all food products. That is why I have asked the amount of money I have asked for. I believe we need it, because our previous examinations have shown a great deal of adulterated beer. They were made three or four years ago.

Mr. HENRY. But you have not had time to do that recently?

Mr. WILEY. We have not touched beer under this law.

Mr. SCOTT. Do I understand you that you want this $50,000 for conducting this foreign work?

Mr. WILEY. Oh, no; we will only require about $10,000 for that; the rest of this $50,000 is for the various ports and the necessary expenses connected with that.

The CHAIRMAN. I thought you wanted $50,000 for these inspections over there?

Mr. WILEY. No; only about $10,000.

The CHAIRMAN. But the salaries of three men would come to about $10,000, and I thought you required the rest of the $50,000 to pay their expenses.

Mr. WILEY. No; we would let them pay their own expenses except their traveling expenses.

The CHAIRMAN. They would have to travel a good deal.

Mr. WILEY. No; not very much. That section of the country is not very great in area, and most of this work would be done at Bordeaux, Mainz, and Hamburg, and in a territory not covering a great area. If those three places are looked after the rest of it is so insignificant I do not think it would amount to very much.

Mr. ADAMS. Have you made any investigation of the canned foods imported into Germany?

Mr. WILEY. Yes.

Mr. ADAMS. Those beautiful specimens of strawberries are colored with carmine, are they not?

Mr. WILEY. Yes.

The CHAIRMAN. And those French peas are colored with copper?

Mr. WILEY. Yes.

Mr. ADAMS. What else is used?

Mr. WILEY. In one case we found sulphite, but glucose is the principal thing used in fruits.

Mr. ADAMS. That is used in the most expensive brands?

Mr. WILEY. Yes; and they are all colored artificially.

Mr. HAUGEN. Is there not danger of this extensive inspection giving offense to foreign countries and leading them to retaliation?

Mr. WILEY. I wish I had brought letters which I have from people over there. I have many letters praising us for our efforts in this direction, and saying that they hope we will succeed in accomplishing this, because they want to get rid of the stigma which is attached to their trade by reason of the adulterations on the part of their competitors.

The CHAIRMAN. We have gotten rid of their objections to our exports by giving a Government certificate. Now, why not let them do the same thing in regard to their exports?

Mr. WILEY. If they will do it——

The CHAIRMAN. They will do it for their protection.

Mr. ADAMS. It is undoubtedly the fact there, as it is in this country, that you go into one of our States and you will find the best sentiment of the State and the sentiment of the business community is in favor of honest food products. Every country is anxious to maintain the reputation its leading houses may have throughout the markets of the world, and I do not think there would be any danger of their resenting our efforts to secure honest branding of goods, or any danger along the line suggested by the chairman.

The CHAIRMAN. The danger of what?

Mr. ADAMS. Of retaliation; of any effort to retaliate.

The CHAIRMAN. I do not think so, but I think they ought to give us a certificate of their own goods, as they force us to do in regard to ours.

Mr. ADAMS. Of course it would be well if they would do it.

Mr. LEVER. If they do not give that certificate then we have to protect ourselves the best way we can.

Mr. WILEY. But you see we are helpless now.

Mr. GRAFF. Doctor, could you tell us approximately the value of these adulterated food products which came in during the past six months?

Mr. WILEY. I could by going to the Treasury.

Mr. GRAFF. You spoke, you know, of 10 per cent of the 6 per cent of the goods were found to be adulterated. Of course that looks like a small fraction of the entire imports, which is true; but that small fraction, it has been suggested, might be a very large quantity of goods, and I thought you might give us some idea of the amount of those adulterated goods, by giving us a notion of their value or amount in some way.

The CHAIRMAN. You can get that at the Treasury Department.

Mr. WILEY. Yes; it can be obtained there.

Mr. GRAFF. I thought you might give us some substantial idea of it.

Mr. BURLESON. As I understand it, what you want with these agents over in Europe is to prevent false labeling; it is not to prevent adulteration?

Mr. WILEY. That is correct.

Mr. BURLESON. So far as adulterations are concerned, you can attend to that on this side?

Mr. WILEY. Yes; if they are of a chemical character.

Mr. BURLESON. As a matter of fact, the only purpose of these agents, as far as the people of the United States is concerned, is to prevent

the people of the United States from paying too much for those articles. Do you think that is a proper function of government—to exercise guardianship over the people and prevent them from paying too much for a particular article?

Mr. WILEY. I do not know that I could bring in political economy or my opinion in regard to that. While it will result in that, my idea is that it will promote honesty and straightforwardness in regard to trade; that it will put trade upon a high plane, so that people will know that they are getting what they are paying for. It seems to me that is one of the things that the law ought to do.

Mr. GRAFF. In other words, the people have no way to protect themselves.

Mr. WILEY. No; the people can not protect themselves; there is no way except as the whole body of the commonwealth that this protection can be secured.

Mr. HAUGEN. Then it is the Government function to protect them against deception?

Mr. WILEY. Yes.

Mr. SCOTT. As I understand it, if Congress passed the law requiring honest labeling of all food products that are imported into this country——

Mr. WILEY. Yes; that is the object of the law.

Mr. SCOTT (continuing). The enforcement of that law would be put into the hands of the Secretary of Agriculture?

Mr. WILEY. Yes.

The CHAIRMAN. That has not been put in yet?

Mr. WILEY. Yes; it is in the law now.

The CHAIRMAN. You add to this bill this year, "labeling."

Mr. SCOTT. And Doctor Wiley, in the matter he has presented here, is simply seeking to insure the correct labeling of wines, just as he is using other means to insure the correct labeling of olive oil.

Mr. WILEY. Exactly.

Mr. SCOTT. He stated he required a certain oil importer here to have the olive-oil label removed and another label put on stating the exact contents of the package.

Mr. WILEY. Yes.

Mr. SCOTT. So it is not really a question of saving money for the people or of protecting them from foreign productions in that way, in a financial way?

Mr. WILEY. I think Mr. Scott has stated that in a very succinct way that where it is possible to determine by inspection and analysis whether these importations are what they purport to be we do not ask help. It is only where it is impossible from the chemical composition to judge that we ask help. And I would not like to see the law put too much on a mercenary plan. To me it is not a matter of dollars and cents, although it can be made so; but I look at it from a different point of view. I would like to see a feeling of confidence established among our people in the character of things which they purchase, that they may be relieved of that apprehension which everybody now feels that he is being imposed upon, that he is buying certain articles of food and is not getting what he is paying for, and we can not control some of those articles now coming from foreign countries.

Mr. BURLESON. That constitutes a small per cent, however, of what the people of the United States consume, does it not?

Mr. WILEY. You would be surprised to see the value of food products that are imported. I think their value is something like $135,000,000 annually.

Mr. BURLESON. Still that is a small percentage.

Mr. WILEY. It is something.

The CHAIRMAN. Most of those are delicacies?

Mr. WILEY. They are delicacies, to be sure.

Mr. HENRY. In the matter of salad oils, I do not object to a refined cotton-seed oil for salad oil, but I do object to a grocer selling me cotton-seed oil put up with an Italian or French label and called olive oil.

Mr. WRIGHT. At an olive-oil price?

Mr. HENRY. At an olive-oil price. I object to that. I think we have a right to be protected, if possible, from such an imposition.

Mr. BURLESON. The same objection would obtain in regard to the sale of shoddy as pure woolen goods, and there is more money involved in that industry than in the purchase of such things as canned strawberries.

The CHAIRMAN. My point is this: If it is taken up by our State Department with foreign Governments, and if our Department asks foreign Governments, in view of the fact that they require a Government certificate from us on nearly all our exports, that they shall furnish their certificate in return on things that are sent into this country, that we may be able to accomplish something along that line. Why is not that a correct position to take?

Mr. WILEY. It may be that the method I propose is not the best way at all, but it is certainly one way; and I am sure that I could get at the very gist of this matter in the way which I propose, because other people have done it successfully in this way.

The CHAIRMAN. Now, is there not a good deal of strength in the point made by Mr. Brooks that your man who went over there and did it successfully did it in a secret way, and if a Government agent went over there they would say to him, "This is none of your business?" I am sure if a man came into my factory and said he was the agent of the French Government and asked me a lot of questions about my business that I would say to him, "That is none of your business."

Mr. WILEY. Suppose you were selling some product to France, and a man should come into your establishment and say, "I want to see how this is; I want to see how your goods are put up, and that they are just what they purport to be. The French Government requires this inspection, and unless I see that everything is all right and make a certificate to that effect you will not be able to sell your product in France."

The CHAIRMAN. I would say, "No; I will take the chances;" and if the French Government refused my goods, then I would ask my Government to inspect my goods; that is what I would do. I would not submit my business affairs to a Frenchman who came over here.

Mr. WRIGHT. It seems to me that people who were selling what they purported to sell would welcome an agent's investigating the purity of their goods or the correctness of their labels, as such an inspection, with a certificate as to the correctness of their labels and so on, would prevent others from using their trade-mark, would prevent an illegitimate dealer from selling goods on the reputation of the established firm. I think the legitimate dealers would be glad to give

all evidence possible in order to keep out their dishonest competitors; that would help the sale of their high-grade wines, it seems to me.

Mr. WILEY. I would suggest this: That if you can suggest a better plan for preventing these frauds, I will be glad to adopt it. I have thought about this, and this is the best plan I can think of; if you have a better plan I would like to see it tried. I believe I can work out this plan as we have suggested it pretty thoroughly.

Mr. GRAFF. What would be the salary of these men?

Mr. WILEY. I do not know. There is the man we had there I think we could get for about $3,000, and you could not get a better man, in my opinion, than that one.

The CHAIRMAN. Is he a Frenchman?

Mr. WILEY. He was born there, but he is an American citizen now, and has been for twenty-five years.

Mr. HAUGEN. Is he a chemist?

Mr. WILEY. He is a practical wine maker; he has had a vineyard in this country ever since he has been here. His business is wine making. If I could get such a man as Henry Lackman, of San Francisco, of course I would do it. I do not suppose that we could get him, and, if we succeeded in getting him of course, he would not go into it for the money, but simply for the love he has for the work and the interest he takes in it. He knows the wine business from beginning to end, and knows everything in connection with it. Of course, I am not thinking of anyone in particular, but only suggesting the character of the men that could do this work. You would want high-toned men, high-grade men.

I would say that of the $50,000 which the Secretary has recommended for this purpose, I roughly propose to expend about $10,000 in getting evidence in order that we would be able to exclude a few of these misbranded wines, and if we succeeded in doing that I think that would soon settle the matter; and the rest of the $50,000 would be used to do the work I speak of in the various ports.

The CHAIRMAN. Give us the details of that $40,000, please.

Mr. WILEY. I estimated that about $10,000 of it would be used in the port of New York, and about $5,000 in Philadelphia, Boston, San Francisco——

The CHAIRMAN. $10,000 in New York?

Mr. WILEY. Yes, it will take at least that there.

The CHAIRMAN. $5,000 where?

Mr. WILEY. In Philadelphia; $5,000 in Boston, $5,000 in New Orleans, and $5,000, or maybe a little more, in California, because that port has got to do the work of that whole coast; we have to do all that work in San Francisco. And then I want one station in the central part of the country for the internal ports, either at Chicago or St. Louis—probably Chicago.

The CHAIRMAN. $5,000 for Chicago?

Mr. WILEY. Yes. The rest of it would be for general expenses in our own Bureau.

The CHAIRMAN. That would be $35,000?

Mr. WILEY. And $10,000 for work in Europe; we will want $5,000 here at home. That is a rough estimate.

Mr. BURLESON. All that, with the exception of the $9,000, is to prevent adulterations?

Mr. WILEY. Yes.

Mr. BURLESON. And this $9,000 is to prevent false labeling?

Mr. WILEY. False labeling and false branding.

Mr. BROOKS. That to be used in foreign countries?

Mr. WILEY. In foreign countries; that is so we can have something on which we can execute this law.

Mr. BROOKS. I would like to ask one more question on that.

Mr. WILEY. Certainly.

Mr. BROOKS. You said the Italian Government does maintain such an inspection for itself in other countries. Does any other government do that officially?

Mr. WILEY. I do not know of any other.

The CHAIRMAN. Let me ask there, does the Italian Government retain that man specifically for this purpose, and for this purpose alone?

Mr. WILEY. No.

The CHAIRMAN. Is he not an Italian merchant?

Mr. WILEY. No, he is a chemist; he is employed by the Italian Government to look particularly after all the imports from Italy into this country, and also the exports into their country; he does both. That is, he is a general commercial agent. And the embassies here have attachés to look after matters for their government here. Some of them visit me almost every day. The chancellor of the French embassy saw me to-day and had a talk with me about the execution of that law.

The CHAIRMAN. They will be apt to correct that promptly, because they are not going to run the risk of having their goods seized and returned.

Mr. WILEY. One thing encouraging is that the merchants abroad have begun to unite to help the law, and also the people abroad, as they are convinced that we mean business, and they seem to be meeting this law in the proper spirit; no one has exhibited any ugly spirit, and no suits have been threatened.

Mr. BURLESON. They can not afford to meet it otherwise, because it would discredit them.

Mr. WILEY. Yes, they do not want to get into court.

The CHAIRMAN. As a matter of fact, has any one gone into court with a case?

Mr. WILEY. No, nor even suggested such a thing.

The CHAIRMAN. You can see how quickly this law is going to enforce itself.

Mr. WILEY. Yes, but that does not mean that we do not need the money.

The CHAIRMAN. Oh, no.

Mr. WILEY. But I do believe that if you give us the power we ask for, to make the inspection more general, that before the end of the year there will hardly be an adulterated invoice of food product come into this country.

The CHAIRMAN. If we give you the $40,000, will you promise to ask for a decreased appropriation next year?

Mr. WILEY. I do not know that we can promise that; but I will make this promise. I will not ask for any more than I can use for the benefit of the people.

The CHAIRMAN. What else have you?

Mr. WILEY. Did you want something in regard to the work we have done in regard to table sirup?

The CHAIRMAN. Yes, we will be glad to have you tell us about that.

Mr. WILEY. In regard to this work I am sorry to say I can not report such successful results.

The CHAIRMAN. You have been at it practically only a few months.

Mr. WILEY. This past year; but I will tell you one thing that hurts us most of all in regard to that, and that is the fact that when we made these estimates last year we based them on the price of materials at that time, and when we came to buy we found that the prices of materials were from 25 to 35 per cent higher than we had estimated them.

The CHAIRMAN. What do you mean by materials?

Mr. WILEY. The materials to put up our experiment factory at Waycross. We built a factory there to show the economies we proposed to introduce in sirup making.

The CHAIRMAN. You mean the materials of construction?

Mr. WILEY. Yes; materials of construction. These are the things we have accomplished. We have accomplished a great deal, but it has not been as successful as I had hoped it would be, because for two months we have not had a dollar for our own use, and the experiments we were doing had to be stopped. We built first a model factory, the plans of which were drawn by the best mechanical skill by Doctor Spencer, the most competent sugar expert of this country. We erected a six-roller mill instead of a three-roller mill, which had been used before. We have increased by actual measurement the extraction from 60 per cent under the old style to about 76 per cent.

The CHAIRMAN. Is that by increased pressure?

Mr. WILEY. By double milling. Any of you who have stood by a sorghum mill know how the bagasse comes out. It comes out like the stalk itself. This bagasse was taken at random [indicating samples to the committee]. This is the condition to which the stalk is crushed by our method. It is an absolute success, and it has worked without a hitch. Instead of getting that mill for $2,500, as we thought we would be able to do, we had to pay $3,500 for it before it was finished.

The CHAIRMAN. That mill would not be within the reach of the ordinary cane grower, then, would it?

Mr. WILEY. Yes.

The CHAIRMAN. How much cane would you have to grow to make that profitable?

Mr. WILEY. That mill will grind three tons of cane an hour—72 tons for twenty-four hours.

The CHAIRMAN. How many acres would a man have to plant?

Mr. WILEY. A single individual?

The CHAIRMAN. Each man does not use his own thrashing machine in the country?

Mr. WILEY. And this mill will grind about 250 acres of cane in a season of three months.

The CHAIRMAN. How many sugar-cane growers are there of that size?

Mr. WILEY. Not one.

The CHAIRMAN. Not one, and the small mill is rapidly disappearing from that country and mills of this kind are taking their places.

Mr. WILEY. This will do for a neighborhood. Some of the canes we have ground there were sent 40 miles.

The CHAIRMAN. Just on the same principle that the beet sugar mills are doing their business?

Mr. WILEY. Only in a smaller way. Sirup making does not propose such an extensive operation as the beet-sugar operations.

Mr. HENRY. A year ago you or the Secretary of Agriculture or somebody else sent me a package——

The CHAIRMAN. That was Mr. Brantley from Georgia.

Mr. HENRY. That may have been very fine sirup when it was put up, but I took it home and put it a way, and when I opened it it had soured.

Mr. WILEY. That is one of the points we have been working on.

Mr. HENRY. You are remedying that.

Mr. WILEY. Yes; that is one of the points we had in view, and we have entirely overcome that trouble—that is settled; last year we settled that. I have two barrels of sirup which were kept through the hot summer here in an open shed without a sign of fermentation, and that sirup is as sweet to-day as the day it was put up. So I say we will have no further trouble on that score if the people will follow our prescription.

The CHAIRMAN. What preservatives do you use?

Mr. WILEY. None; we put up the sirup sterilized and keep it tight, that is all. We first treat the barrels with steam until they are hot and we let the sirup run out of the kettle while it is hot into the barrels, and then we drive the bung in while it is hot, and that will keep forever as far as souring is concerned; a germ can not get into that.

Mr. CHAIRMAN. In other words, this work will have to be carried on at central stations?

Mr. WILEY. Yes.

Another point in connection with this is that this material (bagasse) makes a sufficient fuel to do nearly all the cooking. That was not done before.

The CHAIRMAN. It is done in sugar making?

Mr. WILEY. Yes; it is done in sugar making, but that was never done in sirup making.

The CHAIRMAN. Is it not true that formerly this was done by horse-power?

Mr. WILEY. Yes; altogether; and we now feed the fire with this stuff [bagasse], that burns like tinder; we put that in the furnace just as it comes from the mill.

Mr. LEVER. Does this have any value for feed?

Mr. WILEY. No; it is not valuable for feed; it is not digestible. What little sugar was left in here [indicating bagasse] is fermented.

The CHAIRMAN. What is the need of putting up such a big mill to make these experiments?

Mr. WILEY. It was necessary to have the double mill, because we can not get anything as dry as that by running it through one mill. This mill is a tandem; the stalk passes through the first three rolls and then through the second three rolls, and it is necessary that it should go through that many rolls.

Mr. SCOTT. You said that you had met with some failures in this matter. In what particular did you fail?

Mr. WILEY. Because we ran out of money.

Mr. SCOTT. I do not mean that. In what particular were they not successful?

Mr. WRIGHT. You have established two or three points, according to what you have said——

Mr. SCOTT. Yes; and what other points were there in which you did not succeed?

Mr. WILEY. Let me tell you first what we were successful in, and then I will tell you what we were not successful in.

Mr. SCOTT. Very well.

Mr. WILEY. The next thing was to utilize the waste steam. In other words, we did not allow a particle of steam to escape; it was all utilized in the evaporation. We borrowed all that from the big industry and applied it in our mill. The only question was whether or not it could be utilized in a small mill, because so far as a large mill is concerned that has long since been worked out—that was worked out years ago. In these three things we have been entirely successful. We have a splendid extraction, we have burned the bagasse, and we have used the waste steam.

The CHAIRMAN. And you have stopped the souring of the sirup?

Mr. WILEY. We have also stopped the sirup's souring, yes. One thing we were to work especially this year was to make a lighter-colored sirup, so as to make it more attractive in the market, and to develop fully methods of preventing granulation. We did that partially last year, but not with entire success. The sirup maker and dealer must have sirup in the first place that will not sour; in the next place it must not granulate. It must not turn into sugar. The sugar cane in Georgia is very rich in sugar; it is richer than the cane that grows in Louisiana. In the next place it must be bright and not too deeply colored.

The CHAIRMAN. It is on dry land?

Mr. WILEY. Yes; it is on high land.

Mr. BURLESON. What character of cane is it? Is it sorghum?

Mr. WILEY. No; it is sugar cane.

Mr. BURLESON. Uplands sugar cane?

Mr. WILEY. Real sugar cane.

Mr. BURLESON. Uplands sugar cane?

Mr. WILEY. It grows on the uplands, but it is the same sugar cane that grows on the lowlands.

The CHAIRMAN. Naturally it contains more sugar than that grown on the lowlands?

Mr. WILEY. Yes; sometimes. This industry was confronted by these three troubles—failure to extract cane; second, waste of fuel; and third, the souring of the sirup and the granulation of the sirup. Those are the problems we have worked out. I will say that in this particular respect there are some changes that must be made in order to perfect the mechanism, but that is a matter simply of mechanical detail. What we want now is to complete the work this year. I will promise not to ask for any more money for this purpose after this year, because I will be able to finish everything up, and then I believe we can sell the plant for a good price after we finish up, as we have done before under similar circumstances. It has so commended itself to the people there that I believe we can sell the plant for something like its real value.

The CHAIRMAN. You have given an ocular demonstration to the people?

Mr. WILEY. Yes, sir. One thing we could not do this year was to ask the people to come and see for themselves. In the first place, when you go to build anything under the Government you have a thousand things to deal with. If you want to buy anything you have to advertise if it is going to cost you over $50. Then, contractors do not finish on time, and we had put no penalty in because this was new work and we could not exact a penalty for not finishing on time. We expected to get started on the 1st day of October, and the first wheel was not turned until the 16th of November, which put us too far into the season altogether for the successful termination of the work. Now, we want to do this next year and get everything in proper trim; we want to invite the people there who are interested; and they all want to come, and we want to show them just how this is done, and in one more year I am confident, from what we have accomplished, that everything will be completed.

Now, there is one thing I have forgotten to say, that the important thing is the way in which the cane is grown, especially as to the quality, as to what the fertilizers are that will influence it favorably, and so on. We are determining those things by experiments, and they are not very expensive. They will take, perhaps, a thousand dollars. The great expense has been buying this outfit. We had $15,000——

Mr. WRIGHT. Last year?

Mr. WILEY. Yes.

Mr. LAMB. That is what we appropriated last year.

Mr. WILEY. Yes; and that has been all spent in this work; we have not been recreant to our trust.

The CHAIRMAN. Do not put in any deficiency bill now; we will make this sum immediately available.

Mr. WILEY. Can you get it in shape for our spring work?

The CHAIRMAN. Yes.

Mr. WILEY. The estimate has gone to the appropriation committee for the spring work.

The CHAIRMAN. You have not incurred any indebtedness?

Mr. WILEY. Not a dollar; no. Mr. Youmans, however, who is greatly interested in the work, has paid some bills, probably $1,000, which might properly have been charged to our fund.

The CHAIRMAN. We made it immediately available last year and it was passed by the 3d of March, and I think you will have this bill before then.

Mr. WILEY. It would be too late then. The 3d of March is too late for our agricultural work, I fear.

The CHAIRMAN. Why?

Mr. WILEY. Everything, you see, will be planted. I mean for our fertilizing experiments.

The CHAIRMAN. You say you only want a thousand dollars?

Mr. WILEY. Yes; only about a thousand dollars altogether for that.

The CHAIRMAN. I guess you can do that some way.

Mr. WILEY. I can do what I did in Waycross. I can advance my own money. We had to have little things there at once, and the only way to get them was to go out and buy those things and then send in the bills afterwards. It is necessary to do that sometimes in order to

get what you want. There is no other way to get them. There was no disbursing officer down there, and I could not hire a man even and pay him off Saturday night.

The CHAIRMAN. If that is the field of Congress, if we do not give you enough money——

Mr. WILEY. I am not complaining of that. I am only illustrating how it is done. I have often done that when I have done work for the Government outside.

Mr. SCOTT. Did you say you had solved the problem of granulation?

Mr. WILEY. That is partially solved. We want to solve it without adding anything to the sirup. We are working on the line of slow boiling, so as to have the heat applied for a long time.

Mr. HAUGEN. How much did this outfit cost you?

Mr. WILEY. The plant cost between $10,000 and $11,000, and the $5,000 we have used for ordinary expenses of running.

The CHAIRMAN. It seems to me that that plant cost you a good deal of money.

Mr. WILEY. If you could see it and see the character of the work, I do not think you would think so. There is nothing cheap about it.

Mr. HAUGEN. How much did you say it would produce?

Mr. WILEY. About 3 tons an hour; about 66 gallons an hour, or about 2 barrels.

Mr. SCOTT. How much did you turn out this year?

Mr. WILEY. We did not turn out any ourselves, because our funds would not allow it. We let the people, under the contract with them, operate it for themselves. They paid all the expenses of the operation and we let them use the building under our supervision. I do not know how much they made.

The CHAIRMAN. You would not buy any cane yourself?

Mr. WILEY. Oh, no; we only conducted the experimental work. The amount asked for, I think, is a proper amount to give so as to complete this work.

The other increase is, Mr. Chairman, I believe, altogether in the proposed transfer of the funds for the investigation of road materials to the Bureau of Chemistry instead of appropriating it to the road office, and having it transferred by the act of the Secretary. We feel it will be best in the way of administration to have the money appropriated directly to the Bureau of Chemistry. It is a little awkward now, although no friction has arisen between Mr. Dodge and myself; but still it is a little awkward to use his money, and so the Secretary has put in $15,000, which is $5,000 more than Mr. Dodge gave us. When you consider the character of this work, and the fundamental principles underlying it in road construction, I think you will agree that it is a wise expenditure; because what is the use of building roads with materials that will not last? The object of our investigation is to determine beforehand the character of the materials used for building roads. We can tell you whether the material you are going to put on your road will last or not, whether it will break up or blow away in dust, and so there will be no excuse for building a road with poor material. That is the character of this investigation. We do that for all parts of the United States. Wherever a road is building, anybody that wants to do so can have the material that it is proposed to be used on the road examined in our bureau.

Mr. SCOTT. Last year did you do anything in addition to what this $10,000 enabled you to do?

Mr. WILEY. Yes; we supplied a good deal in addition to the $10,000 from our general fund.

The CHAIRMAN. Is it a separate laboratory?

Mr. WILEY. Yes. It is one laboratory in the Bureau of Chemistry, one of our laboratories. They all have different lines of work, but they all use the general stores under a common direction.

Mr. HENRY. The materials are sent from all over the country?

Mr. WILEY. Yes; costing us nothing.

Mr. HENRY. How large a quantity of stone do you require?

Mr. WILEY. About 25 pounds, or the same weight of clay or any other material.

Mr. HENRY. Have you analyzed trap rock?

Mr. WILEY. Yes, sir; we are preparing a bulletin on that now.

Mr. HENRY. There is quite a difference in that——

Mr. WILEY. A most wonderful difference in their character.

The CHAIRMAN. How long have you been going on with this?

Mr. WILEY. We are beginning on our third year.

The CHAIRMAN. Are you not beginning to come to the end of your work on that?

Mr. WILEY. No; we are just beginning.

The CHAIRMAN. I mean in regard to road material.

Mr. WILEY. No; as long as roads are built you will need these investigations.

The CHAIRMAN. I do not suppose you could tell us whether Mr. Dodge would agree to have this amount deducted?

Mr. WILEY. I do not think he would object if he gets all he asks for.

The CHAIRMAN. If he gets that of course he will not object.

Mr. WILEY. We do not want to detract anything from his work; we do not want that injured in any way, but we would like to have this made independent. I recommended it last year, but the Secretary did not see fit to urge it, but this year he has thought it wise to do so.

Mr. SCOTT. If it is a mere transfer of funds I do not see why there should be any objection to changing it.

Mr. WILEY. Up to this time it has been a transfer of funds.

Mr. LAMB. What suggestions do you make as to road materials in sandy and wet countries? Take the Atlantic coast from here down to Florida.

Mr. WILEY. I will tell you what we are doing in that respect, Mr. Lamb. We are studying the properties of clay which we can mix with sand and make a road of, and we have made some interesting discoveries. We believe we can treat an ordinary clay by a certain degree of heat and make a cement with sand. If that can be done it will be the solution of the road problem in that kind of country.

Mr. RODEY. Have you had any materials sent you from the West?

Mr. WILEY. Yes, from all over the country.

Mr. BURLESON. Will it hold water?

Mr. WILEY. It will turn water.

Mr. BURLESON. If so, why not line these irrigation ditches with it?

Mr. WILEY. I do not know how it would be in a running stream, but we can destroy its plastic properties.

Mr. RODEY. We have any number of roads in the West that have been traveled for 250 years and they are fine roads to-day. That road material is a perfect road material, and if we could treat clay so as to make it the same as that it would be a good thing to do. Those roads are as perfect now as they ever were.

The CHAIRMAN. The soil itself?

Mr. RODEY. Yes.

Mr. WILEY. It is a sort of natural cement. During this past week I had a letter from the editor of the New York Herald asking me this question—and I hope the fact he assumes will come true. He said, "If you had a million dollars, write me what you would do with it for the advance of science." I have completed a reply and among other things I said something about the principles of physics and chemistry in the construction of roads so that our roads will be lasting and serviceable; for I believe if this country had the system of England or France that the agricultural wealth of the country would be doubled thereby, and I believe that to-day.

Mr. LAMB. When we get the population we will have the roads.

Mr. WILEY. Yes; but if we have the good roads the population will come.

The CHAIRMAN. Has France pursued any idea of this kind?

Mr. WILEY. We borrowed our idea from France. They have a separate department of roads and bridges in France, and the idea of investigating road material started right there. That is where we got our start. We have copied in this.

The CHAIRMAN. Cæsar started them, did he not?

Mr. WILEY. He started roads. I do not think he started the methods of examining road materials.

The CHAIRMAN. He built roads.

Mr. WILEY. Yes, he built roads. There are some along the Mediterranean now that he built. I have traveled along one of those, I know.

Mr. RODEY. In my country there seems to be a sort of natural cement that caps the whole drainage of the country within thirty feet of the surface, that makes a sort of natural floor, and in some places the river has cut down to it for many miles and no water goes below that. That makes artesian water.

Mr. WILEY. Here are some pamphlets which I will pass around. This will show you about our experiments last year on sugar cane and sirup. Here is the result of our investigations in regard to insecticides. Here is what we have done in regard to olive oil.

The CHAIRMAN. Does that all come to you?

Mr. WILEY. Not the use of insecticides, but the chemical principles of them—the composition. Here is olive oil and its substitutes, and some research work from a practical nature on the influence of environment on the chemical composition of crops. That is, what are the effects, not so much upon the yield as upon the actual constitution of bodies; and this is the fourth year on the sugar beet, which is a typical plant. These represent to you the work which has been actually published since I was up here before. We have four or five additional bulletins in the press at the present time.

Mr. RODEY. Do these go out in the regular issue of farmers' bulletins?

Mr. WILEY. No; these do not go out as farmers' bulletins; they

are technical bulletins, and do not go out to the farmers, except this one in regard to the sugar cane. We have had an issue of 15,000 of them.

Mr. SCOTT. Is this road material bulletin of practical value to a man who is not skilled in chemistry?

Mr. WILEY. No; it is more for the engineer and builder. It is valuable in this respect. Anyone can read this and see what is necessary, but it would not teach him how to test. It would show him what is necessary in road materials and what characteristics they should have.

Now, I have not begun to go over the whole line of our work, but I have dwelt merely upon that which is new and that for which we have asked for increases. Of course you always talk very nicely to me when I come up here, but when I go out you cut my estimates down nearly every year. I do not want you to do that again. I saw with approval that you voted $250,000 for the extermination of the boll weevil, and it is right for you to appropriate money for the cure of diseases of cattle and other things which you have appropriated for; but now I want to ask you to do something for man; I only ask $50,000 for the great human race, and do not cut that down.

Mr. SCOTT. You have been doing something for man in the past year, I think, and we would like to hear about these experiments in the matter of food preservatives.

Mr. WILEY. That is an old story, Mr. Chairman, but if you would like a few words about that I will be glad to go into it.

The CHAIRMAN. Yes; we would like to hear it.

Mr. WILEY. Last year we spent seven months feeding borax to a set of willing victims, and I can tell you now some of the things we have discovered.

The CHAIRMAN. Some of the results?

Mr. WILEY. Yes; I can tell you some of the results, although I have promised the Secretary of Agriculture that I shall not divulge the results of our experiments in advance of the publication of those results, which will shortly take place.

The CHAIRMAN. Then, if you do not wish this to go into the record it will not be reported.

Mr. WILEY. I think it had better not go into the record.

(Doctor Wiley explained to the committee some of the results of the experiments referred to.)

Mr. WILEY (continuing). Another thing to note is that the cost of supplies is very much greater than in preceding years. Take platinum, which is one of the most indispensable things in our work. Ten years ago it cost 37 cents a gram; to-day it is 77 cents a gram.

The CHAIRMAN. Is it in a trust?

Mr. WILEY. No. The platinum really is a trust, because it all comes from the Ural Mountains, in Russia; but the expansion of chemical work and the use of platinum in the arts has brought the price up.

Mr. LAMB. We have none here, have we?

Mr. WILEY. Of course we have a very good supply, but it is wearing out.

Mr. LAMB. I mean none is discovered here?

Mr. WILEY. No, only a very little, not enough to amount to anything. It all comes from the Ural Mountains. Since we started this

kitchen the gas and electric-light bills amount to $90 a month. A part of our experiments have to go on at night. For instance, the drying of the feces and the urine necessitate the burning of gas all night, and this has added to our expense. While we have been as economical as we could be, we do need a little more money for the ordinary work than we have had before, on account of these expenses and higher prices. I believe I have gone over almost everything. There are lines of work I have not mentioned, but they are old and well established.

The CHAIRMAN. Are any of them finished?

Mr. WILEY. No, and they never will be finished, Mr. Chairman. Now, do not let us be deluded. You are going to have me with you right along, like the poor. We do finish certain lines of work——

The CHAIRMAN. For instance, your boracic acid.

Mr. WILEY. Yes, that is done and the experiments with salicylic acid will be done this year; and also the experiments with sulphites. We hope we will not have to take that up again; that it will be done so well that the people will accept it as final. If it is reviewed and it is found that we have made an error——

Mr. BROOKS. Have any such laboratory experiments been made elsewhere?

Mr. WILEY. No, not to such an extent. I do not claim that ours have been better made than any others; we do not claim any superior excellence. We try to do good honest work, but do not claim it to be done better than anywhere else in the world. We know that there are others doing better work along some lines; others who have better opportunities for it; people who give themselves up more to one line of work.

Mr. LAMB. Whom do you mean—French chemists?

Mr. WILEY. Both at home and abroad. Take Professor Atwater. His work in nutrition has been better than anything we could do along that line; that is, he has worked along a specialty in respiration calorimeters. We could not do that work; we do not have the outfit. Take the work of Professor Chittenden——

Mr. LAMB. That is outside of your line.

Mr. WILEY. Professor Chittenden's work has been largely on the same physiological problems that we have worked on.

Mr. RICHARDSON. Whereabouts does he do his work?

Mr. WILEY. At Yale University. He is the professor of physiologic chemistry at Yale University. You would expect men working on special lines to do more than we can, because we are working on broad lines. Take a man who is director of chemistry anywhere and he has to take up a variety of problems, and he can not claim to be an expert in all those lines. It would be folly for me to claim that I am an expert on all these lines. A man in such a position might have a general knowledge, but he would not have the knowledge along a special line that a man would who was engaged in that particular work. We could not get along unless we had men who devote all their time to special lines.

This work spreads out, and the work in agricultural chemistry, as I have told this committee before—and it is true to-day as it was then—is the basic work of all agriculture; all agriculture rests upon it. There is scarcely an agricultural problem you can bring up anywhere that does not touch agricultural chemistry somewhere or other. Take

such men as Liebig, Humphry Davy, Bonssingault, Maercker, Lowes, and Gilbert, in Europe, and Johnson, Storer, and Hilgard in this country. They laid this foundation broad and deep, the foundation of agricultural chemistry; their work is spreading all the time into every variety of agricultural research. Therefore we want to claim from you some consideration for our line of work. We do it for less money, and yet it is work that stands nearer the very base of agriculture than any other. If we thought we were not getting help in other parts of the world we would be willing to abandon it, it is of such magnitude. If there were not all over the world many others who are going ahead on these lines and helping us in our lines of work we would be overwhelmed.

We recognize this work everywhere as being of the most important character. We recognize the value of the work that is going on in our universities and our schools and colleges and agricultural experiment stations. We are only doing a little branch of it here. And yet people are looking to us for help, and we want to be able to help them by taking up those lines of research which others may not be able to undertake; and we do this work with a due knowledge of our inferiority in many instances to others who are pursuing this plan, others who perhaps have superior opportunities, and many who have superior ability. But they help us and we try to help them. We help the men in the agricultural stations, and they write to us for this, that, and the other, and we write to them for their help. We have a sympathetic feeling, and we have their support in what we are doing. They believe in what we are doing and think we are trying to do it right, and on just and right principles, and therefore they support us and believe in us, not only in this country but other countries.

I have been in the Department of Agriculture twenty years, and I have seen it grow. I know what the opinion of the people of the world was about the Agricultural Department—about its scientific work—twenty years ago. Then there were two or three men only in the Department who had any world reputation at all. The late Professor Riley, the eminent entomologist, was one of those; and Professor Vasey, whose specialty was botany, and my predecessor, Doctor Collier, the Chief of the Division of Chemistry. Those were some of the few men in the Department who were then known throughout the world. And now where do we stand all over the world? Our men are recognized and their work is recognized everywhere and quoted in all the scientific journals of the world.

Mr. BURLESON. But you can not kill the boll weevil.

Mr. LAMB. Can you come to Richmond and give us a lecture on this?

Mr. WILEY. I think I can do my most effective work in lecturing right here to this committee.

Mr. HAUGEN. You spoke about road materials a while ago. Have you an estimate about the cost of building roads?

Mr. WILEY. No; that is Mr. Dodge's work solely; I do not know anything about that work. I submit herewith a statement covering the whole conduct of the food inspection from the time of its inception on July 1, 1903, until January 14, 1904, inclusive. This gives the total number of invoices inspected; the total number found contrary to the law, with the kinds of each; the total of that number admitted with a caution on the ground of being first offense; total number admitted when the labels were changed to harmonize with the law;

the total number required to be reshipped beyond the jurisdiction of the United States, and the number condemned but not yet disposed of, awaiting the arrival of additional evidence.

*Statement of imported food samples received by the Bureau of Chemistry, and results of inspection reported up to January 14, 1904.*

| Found contrary to law. | Wine. | Meat. | Olive oil. | Miscellaneous. | Total. |
|---|---|---|---|---|---|
| Admitted with a caution on the ground of being first offense | 17 | 1 | 5 | 14 | 37 |
| Admitted after the labels were changed to harmonize with the law | | 2 | 5 | 3 | 10 |
| Required to be reshipped beyond the jurisdiction of the United States | 29 | 2 | 14 | 2 | 47 |
| Condemned but not yet disposed of | 7 | | 3 | | 10 |
| Total | 53 | 5 | 27 | 19 | 104 |

Total number of samples analyzed, 1,186.

The committee then at 4.45 p. m. adjourned.

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WASHINGTON, D. C., *January 12, 1904—11 a. m.*

## ENTOMOLOGICAL INVESTIGATIONS.

### STATEMENT OF MR. L. O. HOWARD, CHIEF ENTOMOLOGIST, DIVISION OF ENTOMOLOGY, DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Gentlemen, Doctor Howard is before us this morning, from the Division of Entomology, Department of Agriculture.

Now, Doctor, the first thing that presents itself to the committee is the proposed change of your division into a bureau. What, in your judgment, is the need of that? What do you expect to accomplish by it, other than you are accomplishing now?

Mr. HOWARD. As a matter of fact, Mr. Chairman and gentlemen, we could do as much work under the division organization as I imagine we could under a bureau organization. And to confess the honest truth about the thing, the bureau has an advantage over the division in that it allows higher salaries to the principal officers—that is it, honestly. The divisional organization with the same amount of money could accomplish just about as much.

Mr. BURLESON. But it gives the head of a bureau more dignity and importance?

Mr. HOWARD. Yes; it puts him on a par with men who are already holding scientific positions under the Government in branches which are of no greater importance.

Mr. BURLESON. I mean in scientific work?

Mr. HOWARD. Yes. I mean in scientific work also. For example, you made, two years ago, the Division of Chemistry into a bureau. That division, at that time, carried no larger appropriation than the Division of Entomology does at present, and it seems to me that if you did it with one branch of the service on that plane, it ought properly to be done with another.

The CHAIRMAN. It has come about exactly as it was predicted on

the floor of the House at the time. There was a good deal of objection to it, and it went out on a point of order in the House, and was put back in the Senate; and it was predicted then that if one should be made a bureau the others would be eventually, and it was simply a raise of all salaries. Without proposing any increase of salaries, that objection, you see, was well taken, for it has come to that.

Mr. HOWARD. Exactly. Allow me to suggest that there are only two other branches of scientific work in the Department which have a claim to bureau organization, and those are Biology and Entomology. The others have already been made into bureaus. I think it would make a better feeling in the staff of workers also. They would feel that they were on a better plane; that the service was a more dignified one, and I think possibly it would allow for a better organization. Men in charge of certain specific branches of the work could be made chiefs of sections.

Mr. ADAMS. It would attract a better grade of talent?

Mr. HOWARD. Yes, sir.

Mr. BURLESON. It would be a recognition of the merits of the work already done?

Mr. HOWARD. Certainly; it would be taken that way. If the committee thought fit to recommend it, the only changes in the statutory roll would be——

The CHAIRMAN. What is the salary of Doctor Galloway now?

Mr. HOWARD. $4,000. The only changes that would bring about would be an increase in the salary of the chief of Bureau and of the first assistant——

Mr. BURLESON. Involving about how much a year, Doctor.

Mr. HOWARD. Involving $1,500.

The CHAIRMAN. An increase of $1,400?

Mr. HOWARD. Yes.

The CHAIRMAN. What did you get formerly, Doctor?

Mr. HOWARD. $2,750; that would be $750 increase; in all $1,450.

The CHAIRMAN. Now passing on to the general clause, the committee will notice there is quite a change. All that in italics is new—no, I will not say it is new, it is apparently a rearrangement of the clause. They are carrying out the idea of sections. Here is the way the paragraph reads:

General Expenses, Bureau of Entomology: Promotion of economic entomology; investigating the history and habits of insects injurious and beneficial to agriculture, horticulture, and arboriculture; ascertaining the best means of destroying those found to be injurious, including an investigation into the ravages of insects affecting field crops; (a) southern section—cotton, tobacco, sugar-cane; (b) northern section—cereals and forage plants; investigations of the insects affecting orchard fruits; (a) northern section—deciduous orchard fruits; (b) southern section—citrus and other tropical fruits; investigations of the insects affecting small fruit and truck crops; forest and forest products and stored products; investigations of insects in relation to diseases of man and other animals, and as animal parasites; miscellaneous insect investigations, including the introduction of beneficial insects, quarantine work, and the study of fungus and other diseases of insects; for the expenses of insect laboratory, collections, and experimental garden; investigations in apiculture and in silk culture; investigations of insecticides and insecticide machinery; * * *

Mr. SCOTT. Is all that new, or simply a rearrangement?

The CHAIRMAN. That has been going on all the time.

Mr. HOWARD. It is a systemization of the work, and the arranging of it in such a way as to indicate our purpose of employing good men and putting them in charge of each of these branches of the work.

The CHAIRMAN. Does this change involve a general increase—are you going to get the Secretary to raise all these salaries under a lump sum?

Mr. HOWARD. No. I want him to employ a number of new men, if this plan is adopted; and it will be necessary to pay fairly good salaries in order to attract the best men. We want to get the best men that can be obtained for the investigation work of the Department.

The CHAIRMAN. You are asking an increase in a lump sum of $25,000, are you not?

Mr. HOWARD. Yes, sir, $25,000.

The CHAIRMAN. $25,950 or $26,000, practically?

Mr. HOWARD. Yes, sir.

The CHAIRMAN. At the end of the paragraph you say: "Of which amount not to exceed $15,000 may be expended for silk investigations and $5,000 for apicultural investigations." Now, go on in your own way, Doctor, and tell us what you propose to do with this increase, and the pressing need of the increase.

Mr. HOWARD. One of the principal things which I hope to do is to get started a thoroughly systematic investigation of the subject of insects injurious to forest trees. We have begun that to some extent, at the request of the various forestry people in the lumbering sections of the country, but we have not had sufficient means. I would like to keep my present man, Doctor Hopkins, who is one of the most efficient men in his line anywhere, at the head of the work, and employ three or four assistants. The scheme that has been outlined is substantially this—I will read from a little memorandum which I have had prepared, and which I have here with me:

*Section of forest insect investigation.*

The extent of depredations of insects on the principal kinds of forest trees in different sections of the country, and the earnest demand for information on the causes and remedies, has rendered it necessary to employ a specialist to take charge of this line of investigation and to organize and equip a section of the Division for this work.

The problems which demanded immediate attention and are now the subject of special investigations are:

1. Bark-beetle depredations on the spruce forests of the northeastern States, involving a great annual loss of the best matured timber.

2. The pine-destroying beetle of the Black Hills which is threatening the total destruction of the pine timber of the Black Hills Forest Reserve, and the mining and other interests of the State of South Dakota which are peculiarly dependent upon this timber.

3. Bark-beetle ravages on the limited supply of matured pine timber in Arizona, New Mexico, and Colorado.

4. Destruction by insects in the forests of spruce, hemlock, and fir in western Washington and Oregon; and the redwoods, Monterey cypress, pine, and tan-bark oak in California.

5. A threatened outbreak in the southern States of the destructive pine-bark beetle, which in 1891–1893 threatened the total destruction of the pine and spruce forests and shade trees of West Virginia and adjacent States, thus demonstrating its ability to devastate the pine forests of the South.

6. A serious trouble affecting the cypress industry of the southern States caused by insects.

7. Destruction of chestnut timber in the Appalachian region, and a widespread trouble affecting the hickories in the entire eastern United States, due to insect ravages.

8. Losses to importers of mahogany logs, caused by insects introduced with the logs, and from injuries to the lumber by native insects.

9. Ravages by insects on hard-wood lumber, stave bolts, seasoned handles, and tan bark, causing great losses to the manufacturers of forest products.

ORGANIZATION AND EQUIPMENT.

It has been necessary to rent a special building for the accommodation of the working force, which consists of a specialist on forest insects, in charge; 3 field and office assistants, 1 stenographer, and 1 artist.

PLAN OF WORK.

The entomologist in charge and the 3 assistants engage in active field work during the spring, summer, and fall months, and devote the winter months, in the office and laboratories, to working up notes for permanent record and publication.

Two field stations have been established and equipped for the northwestern and southeastern problems, and it is planned to establish two more, one in the southwest, for study and experiments relating to the special trouble affecting the pines of that region; the other in the northeast, to make a detailed study of the insect enemies of the spruce.

The organization and equipment of this work has been a heavy draft on the available funds of the division, in addition to those advanced by the Bureau of Forestry in cooperative work; therefore, for its proper support in the future it would require an annual expenditure of at least $20,000.

Mr. HOWARD (resuming). We wish, for example, to have 5 investigators in this line, who will be paid $6,000 for the whole 5. We will need a stenographer and 2 clerks also. We want to establish 4 field stations, each with an assistant in charge. And we want traveling expenses for the service. We want additional equipment of the office, laboratory, and field stations. We think $20,000 could be expended on this branch of the service economically.

The CHAIRMAN. For the investigation of forests?

Mr. HOWARD. Forest insects. We have been doing a certain amount of work already, but we have had to ask for the cooperation of the Bureau of Forestry.

Mr. SCOTT. Have you accomplished anything?

Mr. HOWARD. We have accomplished a great deal, sir. Allow me to refer you to a few extracts from this memorandum, which I will read:

RESULTS.

While this special work has been in operation less than two years, some phenomenal results have been attained, especially in demonstrating that millions of dollars of the annual losses can be prevented by inexpensive adjustments in ordinary lumbering and business methods and forest management based on the knowledge of the habits of the insects and the unfavorable conditions of their life and destructive work. This has been shown in recent published reports on results and progress of the work, and the recommendations are being adopted in the practical lumbering operations of the spruce forests of Maine to control the ravages of the spruce bark beetle; in the Black Hills Forest Reserve in controlling the pine-destroying beetle; in the management of a private estate in New Mexico to control insect enemies of the pine; in the cypress lumber operations in the South to prevent damage to girdled trees by insects; in the mahogany industry to prevent losses by insects from introduced and native species; on Belle Isle Park, Detroit, in the control of the hickory bark beetle; in the tan bark industry to avoid the destruction of bark by insects; in the care of handles and seasoned wood products to prevent damage by the powder post beetle; in working plans for farmers' wood lots, large private estates, and Government reserves.

Large private interests in the South, West, and Northeast have been cooperating in the most liberal manner in the execution of expensive experiments to determine important facts relating to practical methods of preventing losses. Indeed, it is realized that the field in this new line of work by the Department is an important and comprehensive one which is most promising in practical results toward the protection and perpetuation of our forest reserves.

The principal cost of this work is the salaries of experts to conduct the investigations; their expenses in active field work; facilities for working up results; and classification and care of the collections in the office and laboratories.

The present members of the working force have demonstrated their ability to

economize and make the best possible use of the limited funds which have been available. Some of them are working for from one-third to one-half less salary than they were getting elsewhere in order that they might pursue the lines of work in which they are deeply interested.

There is urgent need for pushing the more important investigations now under way in different sections of the country, and the amount which we desire to expend for this purpose during the fiscal year 1903–4, is $20,000, which may be itemized as follows:

| | |
|---|---|
| Salaries for five investigators | $6,000 |
| Salaries for stenographer, artist, and clerks, together with janitor service, etc. | 3,000 |
| Expenses for four field stations with an assistant at each in charge | 5,000 |
| Expenses of specialist in charge of the work | 2,000 |
| Special investigations and experiments | 3,000 |
| Additional equipment of office, laboratory, and field stations | 1,000 |
| Total | 20,000 |

The CHAIRMAN. What is that you read about the hickory-bark beetle?

Mr. HOWARD. The hickory bark is one of the most useful barks in the country. This beetle has been destroying the trees, and by the employment of men in my branch of the service we have been able to stop it.

The CHAIRMAN. By the destruction of the trees?

Mr. HOWARD. Not at all; by the destruction only of a certain portion of the infested trees, which is done at a particular time of the year. If the thing is done at any other time, it has no effect whatever in controlling the spread; but if it is done at a certain time, it succeeds in settling the old trouble.

The CHAIRMAN. What is the operation? Mr. Hopkins came up to our country and looked at our hickory trees. In our neighborhood we lost thousands and thousands of them.

Mr. HOWARD. Doctor Hopkins presented a report on the subject?

The CHAIRMAN. I remember at the time that he said he did not know how to stop it.

Mr. HOWARD. Since that time he has been working on the bark beetle, and I will send you a copy of his report. He made a report, I think, to some relative of yours, a Mr. Wadsworth up there, I think—Mr. Austin Wadsworth.

The CHAIRMAN. Yes; he said some insect was practically girdling the inner bark, but at that time he did not know how to stop it.

Mr. HOWARD. Now, people who are manufacturing handles and hickory implements of all sorts—plow handles and hoe handles, frequently have their establishments invaded by a little beetle which reduces the wood to powder. Some investigations have been carried on to show how to get rid of that.

The CHAIRMAN. I saw a statement somewhere that if you bored into a tree and filled the hole with sulphur and plugged the hole, the sulphur, through the circulation of the tree, would destroy the insects.

Mr. HOWARD. No; that is a quack remedy.

The CHAIRMAN. There are two big hickories near my house. I saw the first symptoms, and I heard of that remedy and did that with them, and they have never been attacked since.

Mr. HOWARD. It must have been a mere coincidence, for it would have no effect whatever upon the insect. That is as old as the beginning of the last century. Back in 1808 that remedy was proposed. It is all the time cropping up, although repeatedly shown to be false.

Here within the last five years a company was formed and incorporated under the laws of New Jersey to manufacture a remedy for insects on trees, and they had a certain substance which they put into the bark. They sold the State rights in New Jersey for about $50,000, and the rights in Connecticut for a large sum of money. They went into Mr. Henry's region up there; and their agents went around and for $50 treated the trees of wealthy citizens there, and when people afterwards looked into the matter, and pulled out the plugs and analyzed the contents, they found it was simply sulphur treated with charcoal to change the color and make it look like something mysterious. But it has no effect whatever on the insects that eat the leaves.

The CHAIRMAN. Could anything be taken up in the circulation of the tree, as in the circulation of the body?

Mr. HOWARD. I think so.

Mr. LAMB. They did not fool anybody except in New England?

Mr. HOWARD. They did in New England and New Jersey. Down South, I think, they would have feared the superior intelligence of the Southern people.

The recommendations of Doctor Hopkins and his assistant have been adopted in the Black Hills region in the Northwest, and the people there are enthusiastic in their statements to us as to the value of their recommendations. It saves not only in the actual losses of timber itself, but it means a great deal to them otherwise up there, because they use the timber in mining and building houses in that particular region, and so it means a great deal to have good reliable methods of treatment.

Mr. SCOTT. Have you accomplished anything in the way of controlling that pine beetle, or is that what you are speaking of?

Mr. HOWARD. Yes, sir.

The CHAIRMAN. Can you arrive at anything that will be practical from a commercial point of view?

Mr. HOWARD. Oh, decidedly so. They vary the time of cutting the timber. Just some slight variation in the lumbering process will handle the whole thing. In the case of many of these insects, they prefer trees that are in an injured condition, and therefore oftentimes by girdling a very few trees you can attack all the bark beetles, which will go into those dying trees in preference to the healthy trees. Then at the proper time, after the insects are concentrated on the girdled trees, we cut them down.

Mr. ADAMS. That is a fact, that they will desert the healthy trees and concentrate on the diseased trees?

Mr. HOWARD. Yes, sir. They will concentrate on the diseased trees. That is the habit of nearly all insects of that class. They have that decided preference.

Now that is one thing we hope to do. We hope also, with your permission, to devote more attention than heretofore to the subject of bee culture.

Mr. BOWIE. Before you go from the tree insects to bees, I want to ask you one question. How many acres of trees would it be necessary to girdle in order to accomplish that result?

Mr. HOWARD. Two or three trees to an acre.

Mr. BOWIE. So that there would be comparatively little loss?

Mr. HOWARD. Comparatively no loss.

The CHAIRMAN. Is that the hickory beetle?

Mr. HOWARD. No; the pine and spruce beetles.

Mr. ADAMS. Is that true of the insects that affect the cypress swamps?

Mr. HOWARD. I do not know anything about cypress.

Mr. SCOTT. I have seen in the spruce forests of Colorado a great many trees with some sort of moss hanging from them, looking a great deal like the Spanish moss hanging from the trees in the southern latitudes; and the trees were all dead or dying. What was the nature of that disease?

Mr. HOWARD. I am not a botanist, but probably the trouble was caused by a parasite that attacks trees that are already in an enfeebled condition.

Mr. BURLESON. The moss is a parasite, just as the mistletoe is, and will kill a tree. They attack a perfectly healthy tree in the South, they do, and kill it.

Mr. HENRY. Doctor, I want to ask you a question in regard to the elm tree. Have you made any progress in finding a check to the parasite that infests the elm tree?

Mr. HOWARD. No, sir; that elm-tree beetle seems to be one of those creatures which has no animal enemy. Even birds will not eat it.

Mr. HENRY. The beetle was not very destructive last year. I saw very few indications of it about the country last year.

Mr. HOWARD. You had a very rainy spring, did you not, Mr. Henry?

Mr. HENRY. Yes, a rainy June; and I attribute it to that.

Mr. HOWARD. Yes.

Mr. HENRY. There was considerable sprinkling of the trees early in the season in cities and towns. But even in the forests I did not see the beetle, or in the open land. So you attribute that, do you, to the wet June?

Mr. HOWARD. Yes, sir; entirely.

Mr. HENRY. What will be the effect of that off year, if you can call it so, upon another year?

Mr. HOWARD. There won't be so many to begin with, next year. But if it is a dry June, they will probably increase very rapidly. There is nothing to be done for that insect except spraying the trees.

Mr. HENRY. That is being done in the cities and towns. It was done last spring, but evidently it was unnecessary.

Mr. HOWARD. Every city or town should have a city forester, who should be equipped with a good spraying apparatus. The city of Washington ought to have one. We are suffering very much here, not only in the streets, but in the reservations and parks.

Mr. LAMB. Why do not the Commissioners do it?

Mr. HOWARD. They say they have not enough money granted them from Congress. They receive about $20,000 for shade trees, and spend it all in setting out new trees. They make almost no attempt in getting rid of the insects. Sometimes there will be an outbreak of some insect in the midsummer that leaves hardly a leaf on the trees. There are usually two visitations of these insects in the summer. The first is in the early summer, and the other one in the late summer. The one in the early summer is the one that ought to be fought. But at the time it appears the old appropriation of the Commissioners is exhausted, and the new one is not available until after the 1st of July. Then, when the second visitation comes, they make a half-hearted attempt to attack it. They send out squads of men and carts, and cut

off branches and put the caterpillar webs in the carts, and the men stop to smoke a pipe, and then go on to the next tree, and in the meantime the caterpillars crawl off the carts and get onto the trees again, and then the men burn the lopped-off branches. The people in charge of the public parks, under the superintendence of the officer in charge of public buildings and grounds, have no control over the shade trees of the streets, and the parking commission, which has control over these, has no control over the reservations. While a little spraying is done for the elm-leaf beetle, as soon as the spraying is over the insects from the interlocking elms across the pavement, 15 feet away, follow right across and begin over again.

Mr. HENRY. Then that is labor lost.

Mr. HOWARD. Yes, sir.

The CHAIRMAN. How old is the study of entomology?

Mr. HOWARD. The real scientific study of entomology began with Linnæus, about the year 1745. But the real economic entomology began in this country with Thaddeus William Harris, of Massachusetts, in 1830.

The CHAIRMAN. Are we subject to more parasite insects and tree-destroying insects in this country now than formerly?

Mr. HOWARD. I think not, sir.

The CHAIRMAN. How do these forest trees grow that are subject to these insects?

Mr. HOWARD. I do not know that they do, but it may be. We have not any record of them for years—away back.

Mr. HENRY. Right there, what has been known of the elm-tree beetle until within the last twenty years?

Mr. HOWARD. It is an imported insect. It is a city insect, brought to us from Europe.

Mr. HENRY. Like the San Jose scale?

Mr. HOWARD. Yes; that was brought from China.

Mr. LAMB. When our settlers came here, had not the old forest trees died out, and the new ones were here when the settlers came?

Mr. HOWARD. Possibly.

Mr. BURLESON. Doctor, have you any knowledge as to whether our forests are more subject to destructive insects than the forests of Europe are?

Mr. HOWARD. No, sir; they are not.

Mr. BOWIE. Are they better cared for, or not?

Mr. HOWARD. They are better cared for in Europe than they are here. The subject of entomology is made a serious study in schools in Europe. They are ahead of us in that direction, but only in that. In the whole subject of economic entomology we are ahead of them.

The CHAIRMAN. Now you want $20,000 for your forestry entomology and $5,000 for your apiculture?

Mr. HOWARD. We would use more than $5,000 in apiculture.

The CHAIRMAN. You have been doing something?

Mr. HOWARD. We have been doing very little. We have been paying $1,400 for one of the best bee experts in the country. He has been largely engaged in answering letters of inquiry. He has published a number of bulletins on scientific bee keeping, and he has been making experiments on bee forage—as to different plants used as forage for bee keeping.

Mr. ADAMS. What is the most serious problem? What do you hope to do?

Mr. HOWARD. The most serious thing is the disease of bees, which wipes out colonies of bees. Particularly in your State, sir; it has destroyed many colonies in Wisconsin.

Mr. BURLESON. Is that a breeding insect?

Mr. HOWARD. No, sir; it is a disease which they have not determined the nature of as yet.

The CHAIRMAN. Is it a fungus growth?

Mr. HOWARD. No, sir; I think it is a bacteriological disease, which kills the larvæ in the hive.

Mr. BOWIE. What do you expect to do with that?

Mr. HOWARD. We hope to find some way of destroying it.

Mr. BOWIE. Have you done anything in that regard yet?

Mr. HOWARD. We have not yet been able to; no.

Mr. BOWIE. What appropriation have you had available for that purpose in the past?

Mr. HOWARD. Nothing, except to pay this man's salary—$1,400.

Mr. BOWIE. You ask for $5,000?

The CHAIRMAN. You know all these bureaus carry lump sums to carry on their general work, and I supposed the Secretary would direct the work in the most necessary lines, and in apiculture I remember we added the words that you should look into the question of apiculture.

Mr. HOWARD. Yes; you put it in as a phrase in the bill, to conduct investigations in apiculture. With your permission I will read a little of the memorandum I have here.

*Apiculture, fiscal year 1904–5.*

SALARIES.

| | |
|---|---|
| Apicultural investigator in charge of work | $2,250 |
| Assistant investigator | 1,200 |
| Assistant, or clerk | 900 |
| Clerk | 720 |
| Total | 5,070 |

EXPENSES.

| | |
|---|---|
| For the purchase and fitting up of a model apiary of 50 to 60 colonies of bees to be used in experimental work, with small laboratory, workshop, and implements, at Arlington Experimental Farm | 600 |
| For the introduction, testing, and dissemination of seeds, cuttings, roots, etc., of new and promising honey-producing plants | 1,000 |
| For the investigation of certain contagious bee diseases, particularly the foul brood or black brood, now devastating apiaries in the State of New York | 300 |
| For an investigation of the bees of the Far East, particularly the large races known as the Giant Bees of India (*Apis dorsata* and *zonata*), found in East India and the Philippine Islands; also incidentally to investigating the possibilities in apiculture in the Philippines, and the possible benefits from the introduction of modern methods there | 1,800 |
| For the importation and testing in various portions of this country of breeding queens of the Caucasian, Cyprian, Dalmatian, Italian, and Carniolan races | 400 |
| For a test of the employment of artificial heat in the wintering and rapid breeding of bees | 200 |
| For the purpose of constructing and testing hives and accessories adapted to migratory or pastoral bee keeping | 100 |
| For supplies, chemicals, necessary labor, and incidentals | 130 |
| For traveling expenses in connection with the above investigations | 400 |
| Total | 4,930 |
| Total appropriation for apiculture | 10,000 |

Of the force indicated above the assistants could devote considerable time to office work, and all of the time of the clerk would be occupied in this manner.

The office work, in addition to the experimental work which has been enumerated above, which it is proposed should be accomplished, is:

First. To collect data regarding apiculture in the United States: (*a*) As to principal honey-producing plants of the various regions; (*b*) as to losses of bees by disease, and in wintering; (*c*) as to races now kept; (*d*) as to proportion of frame and box hives now in use.

Second. On the basis of these data it is proposed to map on outline maps of the United States the areas of the principal honey-producing plants, and to determine where and what new plants could be disseminated for the purpose of increasing bee pasturage.

Third. The publication of a bulletin on pasturage for bees, the manner of increasing it, with cultural and other notes on new honey-producing plants; a bulletin treating of migratory or pastoral bee keeping; and a bulletin on the best methods of rearing queen bees.

Fourth. The beginning of a card index of apiarian literature.

Fifth. The beginning of careful studies to complete a knowledge of the life histories of various insect enemies of bees.

Sixth. The rearing and distribution for the testing and introduction of fresh blood into different parts of the country of 300 queen bees of improved races and crosses.

### DEMAND FOR WORK OF THIS NATURE.

Apiarian societies, including the National Bee Keepers' Association of the United States, have repeatedly passed resolutions favoring such work as is here indicated. Committees have been appointed, both to urge legislation and executive action in favor of it, and if their influence and activity have been slight, it has been chiefly caused by a lack of knowledge of how to proceed. The Department has frequently been appealed to by letter and by numerously signed petitions to undertake nearly all of the investigations here enumerated. The apiarian journals of the country have for many years been unanimous in urging the extension of the investigations of the Department. All bulletins of apiculture thus far issued have been very highly commended by the bee keepers of the United States as being worthy of rank with the most useful work done by the United States Department of Agriculture. They are in constant demand. Many thousands of copies of Farmers' Bulletin No. 59, "Bee Keeping," have been called for. Three editions, including a Congressional edition of 20,000 copies, and several reprints of the third edition of the larger bulletin entitled "The Honey Bee: A Manual of Instruction in Apiculture," have been eagerly sought for by individuals. Frequent suggestions have also come to the Department that bulletins on special topics relating to the industry would be equally acceptable.

### ESTIMATED VALUE OF WORK ALREADY DONE.

It is extremely difficult to arrive at a definite money value of the work already done by the Department of Agriculture for the advancement of this industry, especially the indirect value.

The introduction and extension of bee keeping favors the production of larger and better fruit and seed crops through the more perfect pollination of fruit blossoms and seed blossoms. Information on this subject has been widely disseminated by the Department, and the views of fruit and seed growers have been greatly modified thereby, so that the great value of bees to the orchardist and seed grower has come to be generally recognized. Individual bee keepers also often express in letters addressed to the Department the direct value—even to the extent of many hundreds of dollars, to them, of the methods advised by the Department publications on apiculture, and of the new races and crosses of bees introduced by the Department.

With the increase in apiarian products the demand has steadily kept pace. Vast quantities, as compared with those actually used, could and would be profitably employed, were the public to understand more fully the wholesomeness of honey as an article of diet, and the practical applications which honey and wax find in the arts, in manufacture, and medicine; also the introduction of better methods, and the resultant larger yields from the individual apiaries, would tend to place the price of the products at a figure more within the reach of the masses of the people. So many uses have been found for wax in recent years that the article has become scarce and prices have been advanced considerably. With the introduction of more productive races of bees, and through the introduction of honey-yielding plants into new regions where they would fill in gaps in the honey yields, it is safe to say the value of apiarian products might be doubled within a decade.

It would be a modest claim to assert that 5 per cent of the annual return derived in this country from apiarian products is to be attributed to the promulgation by the United States Department of Agriculture of improved methods in the care of bees and the introduction of more productive races of bees than were formerly raised. The sum named by the Census Office, nearly $7,000,000, as the valuation of apiarian products for the year 1900 is assuredly lower than would be the case were all reports obtainable. On this basis, however, the work of the Department in the development of bee culture may be credited with $350,000 annually.

Mr. BURLESON. How do you propose to expend this additional $5,000; how much of it will go to salaries?

Mr. HOWARD. I should like to raise that man's salary to $2,000, and let him have an assistant at $1,800, and keep the other money for laboratory expenses and supplies, and things of that kind.

Mr. BOWIE. It is an addition, then, of nearly $3,600?

Mr. HOWARD. Yes, sir; for that particular branch of the work. However, we can do a great deal if we have the funds.

The CHAIRMAN. Now, you have $15,000 for expenditure in silk investigations?

Mr. HOWARD. Yes, sir; that is a question in which the Secretary of Agriculture is very much interested. I felt, myself, last year very doubtful as to the ultimate success of any investigations or experiments in the way of introducing silk culture in the United States, but I feel more hopeful this year. We sent out last year mulberry cuttings, and distributed eggs to those who had mulberry trees already growing, and at the end of the season we published manuals of information and instructions, and purchased at the European market rates the cocoons that were raised. We have imported two experienced cocoon breeders, and the cocoon crop is about completed now.

The CHAIRMAN. Last year that appropriation was a separate item?

Mr. HOWARD. No; that was the year before last. Last year it was a general Department appropriation.

Mr. HENRY. Why do you ask an increase of $5,000?

Mr. HOWARD. We want to send out more eggs and more mulberry cuttings. The demand for these is very great indeed. We were able to send out only a small number of eggs.

Mr. BOWIE. How much of the extra $5,000 will go to salaries, and how much to eggs and the extension of the work?

Mr. HOWARD. I have not estimated it in detail, but I should think we would be obliged to retain a considerable sum for the employment of reelers.

The CHAIRMAN. How much was done under the previous investigations on this subject, twenty or thirty years ago? Have you not all that data, so that you do not have to go over it again?

Mr. HOWARD. Yes, we have that data, but it is very largely a question of labor now, and the conditions, according to the Secretary's idea, have changed. It is certain that commercial reeling establishments can not be established in this country unless there is a guaranteed supply of cocoons. That is a sure thing. We want to educate and get as many people in the country as possible interested and acquainted with the methods of raising the silkworm. We want to get enough mulberry trees started in order to guarantee a supply of cocoons.

Mr. SCOTT. If it is true that a reeling establishment will not be established unless a supply of cocoons is assured, is it not also true that a supply of cocoons will not be assured without the reeling establishment?

Mr. BURLESON. That is a point I was going to ask you about. Is it not more a question of the market of cocoons, rather than of labor?

Mr. HOWARD. It is both. We find things absolutely at a standstill, and therefore we are doing this work. We are creating in this interim a sort of artificial market.

Mr. SCOTT. What do you propose to do with the skeined silk?

Mr. HOWARD. Sell it in the open market.

The CHAIRMAN. How much have you of it?

Mr. HOWARD. About 500 pounds.

The CHAIRMAN. What is that worth?

Mr. HOWARD. From $3.50 to $4 a pound.

Mr. BROOKS. At the European market rate is there any profit?

Mr. HOWARD. It is not a profitable industry; it is a household industry.

Mr. BOWIE. A sort of pin-money affair.

Mr. HOWARD. Yes; like the chickens and the beehives.

Mr. BOWIE. A side issue, as it were.

Mr. HOWARD. Yes, sir.

Mr. BOWIE. Nobody could concentrate their time on it?

Mr. HOWARD. Not on silkworms.

Mr. BOWIE. Where do you get your inquiries from?

Mr. HOWARD. From all over the country, but mostly from the South.

The CHAIRMAN. Where can you raise the silkworm?

Mr. HOWARD. They can be raised wherever they will grow. In western New York, for instance; that would be an excellent place to raise silkworms. As I said before, the only way to keep people interested and get this guaranteed supply of cocoons is to get up this artificial market here, and after a few years after it is shown that the country is raising cocoons to a certain amount and of a certain grade—because they do not raise good cocoons when they first start—then you may reasonably expect a reeling establishment to be put in operation.

Mr. SCOTT. It is your experience that the same people come back several years in succession asking for eggs?

Mr. HOWARD. Some of them are discouraged by the low price, and do not come back at all. That means that they had extravagant ideas to start with.

Mr. SCOTT. I know of a number of cases in which families have sent here for eggs and gone into the business with a great deal of enthusiasm, and got all over their enthusiasm at the end of the first year, and never repeated the operation. I wondered if the applications that came to you were not every year from a new set of people, who are attracted by the glowing prospectuses they may have seen, but who, after a season of experience, find that the business was either not profitable or not pleasant to carry on, and so abandoned it, and that the next year it would be a new lot of families who would engage in it.

Mr. HOWARD. I understand your idea. There is a great deal of that fluctuation, and a great many people who get discouraged and drop it.

Mr. HENRY. I might say in reply to Mr. Scott's suggestion that the growing and production of silk is no new proposal in this country. It is nearly a hundred years since we began to produce silk in this country, and I know of families that followed it for a generation; and to-day you can go to the Connecticut Valley and find elderly ladies

who have as practical a knowledge of the handling and growth and reeling of silk as the Agricultural Department has—with all due deference to the Department's trained men. And it was only abandoned because it did not pay for the labor bestowed upon it. That was the reason for the abandonment of the silk growth in New England. Labor was more profitable in other directions. The mulberry tree can be found scattered all over the Connecticut Valley. I have trees on my farm. In fact, there was an old cocoonery on it that I pulled down only a few years ago.

Mr. SCOTT. My observation has been that it has been carried on spasmodically, and, just as you state, it is due to the fact that it is not a profitable way to employ labor.

Mr. HENRY. The silk manufacturers in this country originated in American-grown silk, and all those manufacturers, like Chainey Brothers, who have millions of capital invested in the business, first bought their silk from local producers, in small quantities.

Mr. SCOTT. After once gaining a foothold, it has declined until it now amounts to little.

Mr. HOWARD. That discourages me more than anything else.

Mr. SCOTT. The Secretary stated last year that he thinks there are sections in the South, remote sections, where it will be advantageous to the people, and where the labor problem is somewhat different.

Mr. BOWIE. Somewhat different.

Mr. ADAMS. This silk production is undoubtedly profitable, to a certain degree, in foreign countries. Why is that?

Mr. HOWARD. It is not more profitable there than it is here, but the people there are satisfied with less money. It is the well-to-do people who give this thing up, after trying it the first year. The very poor people, to whom $10 is a big thing, are the ones that keep it up. Those are the ones the Secretary tries to help.

Mr. ADAMS. I confess I am dubious about the merits of a kind of business on the farm which will not pay to carry on on an extensive scale. I can not understand how a business can be profitable in a small way that will not be profitable in a large way.

Mr. HOWARD. If you raise silkworms on a large scale, they are pretty sure to become diseased and die, but if you raise them in a small way, as is the experience all over Europe, better results will be obtained. In Europe the very large cocooneries die off. The silk business is a household industry there.

Mr. BOWIE. Is that the experience in other countries?

Mr. HOWARD. Yes; it is the same way.

Mr. BOWIE. Can not you urge your scientific experts to find a remedy for the disease?

Mr. HOWARD. They have found it for certain diseases. The first thing that Pasteur did that gave him a great reputation was to find a remedy for one of the silkworm diseases. The situation in regard to this thing is encouraging. Only recently a Syrian, an importer of certain grades of silk in New York City, came to me and told me that he could get, in the vicinity of New York, no less than 5,000 Syrians, experienced persons, who would be willing to work at 25 cents a day in this business.

The CHAIRMAN. Syrians?

Mr. HOWARD. Yes, sir; he said he could get them, and he says he

is strongly tempted to start a commercial silk reel as soon as a supply of cocoons can be had.

The CHAIRMAN. Do you suppose the labor unions would allow it?

Mr. HOWARD. I do not know. There would be no competition. It would be the sole industry of the kind in the country.

The CHAIRMAN. How long would they stay at 25 cents a day? It would not take them ten days to find out that they could get more wages at something else.

Mr. HOWARD. At all events, the man says he is prepared, as soon as we can get commercial cocoons; and he says the people are here now, in the vicinity of New York city.

The CHAIRMAN. And willing to work at 25 cents a day?

Mr. HOWARD. Yes, sir.

Mr. BOWIE. Why?

Mr. HOWARD. Probably because they can not get any other work.

Mr. ADAMS. Probably they do not know enough to go on a farm.

Mr. BURLESON. Maybe they are not willing to undertake hard labor?

The CHAIRMAN. They are willing, if paid for it.

Mr. HOWARD. There is a firm of Italian bankers in San Francisco known as Barbaro & Rossi, who have started a colony known as the Asti Colony; and they also say they are willing to start an establishment.

Mr. BOWIE. Do you know how much silk we import into this country?

Mr. HOWARD. I had the figures, but I can not just tell you now.

Mr. BOWIE. Can you give me an idea?

Mr. HOWARD. My impression is that it is three or four hundred million dollars.

The CHAIRMAN. Manufactured silk?

Mr. HOWARD. No; raw silk.

Mr. ADAMS. I think, Doctor, you are mistaken.

Mr. HOWARD. That was merely my impression, sir.

Mr. ADAMS. Our total imports are nearly eight or nine hundred millions.

Mr. HOWARD. The silk manufacturers import all their raw silk.

Mr. BURLESON. Have you made a calculation of what a girl or woman can make, per day or month, growing silk in the cocooneries?

Mr. HOWARD. If she is expert and has plenty of eggs she can make in six weeks about $45 or $50.

Mr. BOWIE. And that does not take all her time?

Mr. HOWARD. Toward the end of the life of the worm it takes all her time, but it is only six weeks in a year.

Mr. BOWIE. I got the impression from you that it was a sort of side line, or side issue.

Mr. HOWARD. Members of the family do it.

Mr. GRAFF. How many employees have you in the silk work?

Mr. HOWARD. We have at the present one silk-cultural adviser, Miss Skerry, who has studied in the laboratories of Europe, at $1,800 a year. Then, we have three persons engaged in reeling at the Department. Now, two of them get $20 a month each, and one gets $50. We have had, this summer, two expert French women, whose expenses we paid, and who are paid $50 a month each.

Mr. GRAFF. How many employees does that make, in the aggregate?

Mr. HOWARD. We have only three permanent employees; the others are all temporary.

Mr. GRAFF. One was paid $1,800 a year, and the other two—one is paid $1,000, and one of them, I think, is paid $840, or something like that. Were these civil-service appointees?

Mr. HOWARD. Yes; one of them was a civil-service appointee. There was a civil-service examination for the $1,000 position.

The CHAIRMAN. A clerk?

Mr. HOWARD. No. He thoroughly understands the care of the silkworm.

Mr. BOWIE. How does the Civil Service Commission get up the series of questions?

Mr. HOWARD. They applied to me for the questions. These ladies served about three weeks for nothing, and now we are paying them $20 a month.

Mr. SCOTT. Is that the standard wage? If they would work the year round, would they get only that price?

Mr. HOWARD. No; not unless the business was commercially started.

Mr. SCOTT. I presume the work over here is handicapped considerably by its having to be done on a small scale, so that they can not earn as much as they would in a factory.

Mr. HOWARD. I do not think they would earn more than $15 or $20 a month in a factory. I do not think any reeling establishment would pay more than that. We are paying liberal wages.

Mr. SCOTT. Do you know what fraction of a pound one of these girls could reel in a day?

Mr. HOWARD. I am sorry I do not remember exactly. I can not tell you that.

Mr. GRAFF. What is the purpose of the reeling?

Mr. HOWARD. To show that it can be practically manufactured.

Mr. GRAFF. What do you do with it after it is reeled?

Mr. HOWARD. It is sold to manufacturers.

Mr. GRAFF. Do you purchase silk or cocoons from the people in the country?

Mr. HOWARD. From persons who have raised our eggs. They sell them to us; we reel it and sell the silk.

Mr. GRAFF. Has any private industry attempted to take hold of this work.

Mr. HOWARD. Not as yet.

Mr. BOWIE. Doctor, do you recommend really the extra $5,000? Do you think it is very important?

Mr. HOWARD. No; not very important. It does not occur to me that the whole thing is of supreme importance. But I think, as we are trying to get the thing started as rapidly as possible, we can do it much more rapidly with $15,000 than with $10,000.

Mr. BOWIE. You could get rid of it quicker, and see what was going to happen?

Mr. HOWARD. Yes, sir.

Mr. ADAMS. Back of this is a theory. Here is an article imported into this country every year to the extent of many millions of dollars, and this country, in climate and soil and so on, is adapted to its production and industrial conditions——

Mr. BOWIE. And we ought to make an effort to meet those conditions and find them out.

Mr. HOWARD. True.

The CHAIRMAN. Does that include all your subjects of increase, Doctor?

Mr. HOWARD. No, sir; I wanted to indicate what would be the expenditure of a particular typical one of these sections into which we propose to classify the work of the division, and so I have had drawn up here a memorandum on the investigations of the insects affecting the deciduous fruit trees and insects destructive of bush trees and nursery stock—a very important subject; and those of you who have any interest at all in it know that it suffers to the extent of many millions of dollars a year.

The CHAIRMAN. These investigations have been going on for years?

Mr. HOWARD. Yes; but having arranged this thing, and having put it under some competent person, and allowing that man and his assistant to pay their entire attention to that subject, we can get better results than we have had in the past, where my own attention has been diverted over the whole field; and my first and second assistants also are men who cover large fields. If we can put one of them on one distinct field and give him an assistant we think the work can go on better.

Mr. SCOTT. Why can not you give a man an assistant under the division arrangement as well as under the bureau plan?

Mr. HOWARD. I started in by saying that it could be done under the division plan.

The CHAIRMAN. Read the statement, please, as to how you propose to expend this money.

Mr. HOWARD. The man whom I told to draw up a statement as to what he would do if the money were appropriated and put in his hands has drawn this up, for laboratory equipment:

*Estimated expenses fiscal year 1904–5, investigation deciduous fruit tree insects, including insects destructive to bush fruits and deciduous nursery stock.*

LABORATORY EQUIPMENT.

| | |
|---|---|
| Microscope, dissecting microscrope, photographic apparatus and supplies, insect cases, glass work, breeding cases, and miscellaneous supplies | $850 |

EXPERIMENTS AND LABORATORY INVESTIGATIONS.

| | |
|---|---|
| Lime, sulphur, and salt experiments | 300 |
| Experiments with carbon bisulphid against peach tree borer | 200 |
| Experiments with plum curculio | 300 |
| Experiments with woolly aphis of apple on nursery stock and orchard trees | 300 |
| Experiments with fruit tree bark beetle | 200 |
| Experiments in fumigation of nursery stock | 150 |
| Experiments with black peach aphis on nursery stock | 200 |
| Miscellaneous insects | 400 |
| Spraying machinery and insecticides | 300 |
| Labor | 300 |
| Experimental orchards, Arlington and flats | 200 |
| Traveling expenses | 1,500 |
| Salaries | 3,800 |
| Total | 9,000 |

Mr. HOWARD (resuming). Nine thousand dollars, then, as you will see, could be definitely assigned to these investigations.

The CHAIRMAN. That would be an increase?

Mr. HOWARD. It would be spending more money on that line of work than before.

Mr. BOWIE. What would be the actual increase?

Mr. HOWARD. About half of that.

Mr. BOWIE. That is about $4,500, approximately?

Mr. HOWARD. Yes.

The CHAIRMAN. Have you got a statement like that for everything?

Mr. HOWARD. No, sir; we have not.

Mr. BROOKS. I want to ask you about entomology in connection with forestry. You propose to increase that work?

Mr. HOWARD. Very much.

Mr. BROOKS. And in what sections of the country?

Mr. HOWARD. Wherever there is a call for it. Two field sections have already been established. One in the Northwest and one in the Southeast; and two more seem to be urgently desired, one in the Southwest and the other in the Northeast.

Mr. BROOKS. I think you said we were behind the European governments in our treatment of forest entomology?

Mr. HOWARD. Yes, sir.

Mr. BROOKS. Has there been a call from the Rocky Mountain region for work in that direction?

Mr. HOWARD. In the Black Hills, yes; and one over in the Yellowstone Park.

Mr. BROOKS. Is it not true of the Rocky Mountain forest region that the destructive insects are increasing very rapidly now?

Mr. HOWARD. I have heard so.

Mr. BROOKS. In the last two years there have been very serious depredations there, threatening the existence of the forests.

Mr. HOWARD. Some of the agents of the Bureau of Forestry have told me so.

Mr. BROOKS. The fact will come out when Mr. Gifford Pinchot comes before us.

The CHAIRMAN. The fact will come out.

Mr. BROOKS. I am not speaking of Colorado alone.

Mr. BURLESON. Is not that attributed to the destruction of birds in this country?

Mr. BROOKS. I do not know, but it is a very serious question in regard to the water supply. Some cities in my section have attempted locally to deal with it, and the caterpillars would get into the water supply and appear in the bath tubs. I simply call attention to that.

Mr. HOWARD. You say the caterpillars defoliate the trees?

Mr. BROOKS. Yes; the deciduous trees, particularly. I have seen the whole side of a mountain, probably 10,000 acres, burned as though a fire had gone through it; and at the same time the city water supply would be very much damaged by the excreting of the insects, and the bodies themselves. The quaking aspen is very much attacked. There is one place where Mr. Pinchot wants to establish a forest reserve. There are trees there 4 feet through and 150 feet high that have stood there from the beginning of time, and they are being gradually cut down by the borers there.

The CHAIRMAN. Is it extermination and death?

Mr. BROOKS. Yes. That is, down along the New Mexico line.

Mr. SCOTT. In northeastern or northwestern New Mexico?

Mr. BROOKS. In northwestern New Mexico and southwestern Colorado.

The CHAIRMAN. Doctor, is there anything further you want to say to us, particularly?

Mr. HOWARD. Nothing, sir, except to answer questions.

The CHAIRMAN. Well, then, the committee will now adjourn until 2 o'clock this afternoon. I am very much obliged to you, Doctor Howard.

Thereupon, at 12.03 o'clock p. m., the committee took a recess.

AFTER RECESS.

## STATEMENT OF C. HART MERRIAM, BIOLOGIST AND CHIEF OF THE BIOLOGICAL SURVEY, DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Gentlemen, we have Doctor Merriam, Chief of the Biological Survey of the Department of Agriculture, before us this afternoon. Now, Doctor, we notice that on page 20 of the estimates the Secretary recommends, as he did in the case of the Entomological Division, that your division be transferred into a bureau. What benefit do you expect to be derived from that, outside of increase of salary?

Mr. MERRIAM. The bureau organization would put us in a better position with respect to the other branches of the Department, and with respect to the outside world, in a more dignified position. Doctor Howard and I suffer now from being below the rank of men who have heretofore been coordinate with us in their work. I am speaking of the work of which we have charge, and not as respect to ourselves as individuals; but the work is recognized generally as of a much higher grade when it has been elevated to bureau rank, as in the case of the Bureau of Plant Industry, Bureau of Chemistry, Bureau of Soils, Bureau of Forestry, and so on, which were divisions coordinate with ours a few years ago.

The CHAIRMAN. Do you think your work will be done in a better way than it is now, as a matter of fact?

Mr. MERRIAM. It will not be done any better; we hope to do more of it. It would place us on a better footing in the Department and outside of the Department if we have equal rank with other lines of investigation to be carried on.

Mr. SCOTT. In just what way does it put you on a better footing—in what practical way—looking toward the better prosecution of your work?

Mr. MERRIAM. In our field work and in all the lines of work that we are carrying on. We are now considered as merely a subordinate division. The work has not the rank that commends itself to the people with whom we come in contact in the office and in the field with the work that is recognized by the Government itself as of greater rank.

Mr. SCOTT. When your men go out into the field to do this work, do the people with whom they come in contact there inquire, first of all, whether they are working under a bureau or under a division?

Mr. MERRIAM. Certainly not.

Mr. SCOTT. Then I hardly understand what you mean by saying that your work will have a higher rank and a better standing with the people with whom you come in contact out in the field.

Mr. MERRIAM. We come in contact with several classes of people in the field, as we do here in Washington. Occasionally we come in contact with other classes, for instance, when we are investigating the prairie-dog scourge. When we are in contact with the leading horticulturists and agriculturists in different parts of the country, they often express surprise at the difference in rank between our work and other work in the branches of the Department with which they are familiar.

Mr. SCOTT. In what way is that difference in rank made manifest?

Mr. MERRIAM. Simply, the question is often asked us, how it is that we are not a bureau; that we are a division and have not the same rank as other work which was formerly coordinate with ours.

Mr. GRAFF. Is not the chief difficulty in this case that it is a little embarrassing for you to present this subject yourself?

Mr. MERRIAM. I do not think it is embarrassing, but it is a difficult thing; it is one of those things that you can feel more easily than you can express in words.

Mr. SCOTT. You understand, of course, I am asking these questions for the purpose of eliciting information, not to imply any criticism whatever. The advance of this work from a division organization to a bureau organization involves a considerable expense, and I think the committee would like to know—I certainly would like to know—as clearly as you can state it, exactly how much work or better work the Government would get by reason of this advanced organization, and why? That is the purport of all my questions.

Mr. BOWIE. It is now a division?

Mr. MERRIAM. Yes. All but two of the divisions of the Department have been raised to bureau rank. The Division of Entomology and the Division of Biological Survey are the only two which have remained at the old grade.

The CHAIRMAN. Was "Statistics" made a bureau last year?

Mr. MERRIAM. Yes, sir.

The CHAIRMAN. It never should have been.

Mr. BOWIE. Is it not the real fact that the people in your division rather feel it is discrimination against them that ought to be corrected?

Mr. MERRIAM. Certainly; we all feel that; there is no question about that.

Mr. GRAFF. What additional expense is involved?

Mr. MERRIAM. $1,400, or a little over.

Mr. GRAFF. How would it increase your salary?

Mr. MERRIAM. From $2,750 to $3,500 if the salaries' recommendation is carried out.

Mr. GRAFF. Where will the balance of the $1,400 be?

Mr. MERRIAM. In the first assistant, who has always been held down to $1,800. It has been very embarrassing, as we have had assistants at $2,400 and $2,500—assistants paid about $2,500, which was my salary. The assistant chief is acting while I am in the field, which is half of every year. A large part of my time is always spent in field work.

Mr. BOWIE. Is that a good man?

Mr. MERRIAM. An excellent man.

Mr. BOWIE. And entitled to an increase of $700 a year?

Mr. MERRIAM. I think he ought to have had $2,500 years ago. It was a shame to keep a man of his grade and ability at so low a salary.

Mr. BOWIE. Has he charge of the office, you say, half of the time?

Mr. MERRIAM. He has all the time. He has absolute charge of the office. This year for several months when I was in the field——

Mr. BOWIE. Does he ever do field work?

Mr. MERRIAM. He has done field work for a number of years; he has had charge of parties in New Mexico, Nevada, California, Arizona, etc.

Mr. BOWIE. You get expenses in addition to salary when on field work?

Mr. MERRIAM. In field work we get traveling expenses. We do not get per diem, we get actual expenses.

Mr. HAUGEN. Are you allowed subsistence, then, besides railroad expenses?

Mr. MERRIAM. Yes, in the field.

Mr. HAUGEN. But no fixed price?

Mr. MERRIAM. No. It varies from 10 cents a day up to about 50 cents; sometimes 60, in the field—in regular field work.

Mr. BOWIE. Ten cents a day, up to 50 or 60; what do you mean by that?

Mr. MERRIAM. Subsistence while actually in the field—field work. Our field expenses for subsistence have ranged from 10 cents a day up to 50 and 60; I think 60 cents is about the highest.

Mr. BOWIE. Does that include your board?

Mr. MERRIAM. That is board.

Mr. BOWIE. I was wondering how you got it.

Mr. MERRIAM. Camp fare is not Delmonico.

Mr. GRAFF. I want to ask one question, Mr. Chairman. Your division is not in a bureau?

Mr. MERRIAM. No; it is a division, and it has no near relations with any existing bureau.

Mr. GRAFF. For how long?

Mr. MERRIAM. Always.

Mr. GRAFF. Is that usually the case, that a division is not a part of some bureau?

Mr. MERRIAM. That grade of divisions. The history of the divisions in the Department of Agriculture on different lines of inquiry is that they were created, established there by the Secretary or by Congress—usually by Congress—as divisions, and during the past few years they have been taken up one at a time and given bureau rank.

Mr. HENRY. The Department itself was once a bureau.

Mr. MERRIAM. Yes.

Mr. HENRY. And a part of the Department of the Interior?

Mr. MERRIAM. Yes, sir.

The CHAIRMAN. Doctor, coming down to your increase, last year you had $51,850; you had $50,000 in round figures for the lump appropriations——

Mr. MERRIAM. $33,000 for the lump sum.

The CHAIRMAN. $34,000 for your lump sum, and increased to $50,000.

Mr. MERRIAM. Yes; a part of that is for a special purpose.

The CHAIRMAN. The committee would like to know what is the need of this increase, and what you propose to do with it.

Mr. MERRIAM. The need of it is along the three different lines of inquiry that the Biological Survey has always carried on, or, rather, has carried on within the last few years. For the last sixteen or

eighteen years, ever since we have been in the Department, we have carried on two lines of work: The Biological Survey proper—studying and mapping the geographical distribution of animals and plants, and the natural life belts, the agricultural belts, of the country; and, second, an investigation of the food habits of birds and mammals with reference to horticulture and agriculture generally. Those have been two separate divisions. To those have been added, a few years ago, by the Lacey Act, a third—investigation in relation to the introduction and importation of game animals and nongame animals and birds into this country, and supervision of interstate traffic in game; and, more recently still, another which comes under the same division—the charge of all matters relating to Alaska game, and the granting of permits for taking game out of Alaska. So that for two or three years we have had three divisions under the Biological Survey. The Biological Survey, from the Economic Ornithology and Game Preservation divisions, issue permits for the introduction of all birds and animals brought into this country from abroad. Two hundred and fifty-four thousand birds were introduced into this country last year.

The CHAIRMAN. Live birds?

Mr. MERRIAM. Live birds.

The CHAIRMAN. What were they, principally—canaries?

Mr. MERRIAM. The vast majority of them were canaries. Other birds are brought in from all over the world, and we have inspectors at the different ports. At New York the great bulk of inspections are made; others at Philadelphia, New Orleans, San Francisco, and Honolulu. We do a great deal of inspection at Honolulu (perhaps more than anywhere except New York) to keep out birds, mammals, and reptiles which the natives of the Hawaiian Islands regard of the greatest possible injury to them should they come to be introduced. They have suffered severely from the introduction of species which have been naturalized there—the mongoose, the fruit-eating bats, and birds which are destructive; and they are afraid of the introduction of certain reptiles; so they secured a certain enactment against the introduction of any reptile without inspection.

The CHAIRMAN. You mean the local powers?

Mr. MERRIAM. The local legislature. An order was issued by the Secretary of Agriculture on the subject under the general law, which is in effect there; and we have an inspector there who examines all shipments; and we allow nothing to come into this country from the Philippines on account of the diseases there.

The CHAIRMAN. What reptiles?

Mr. MERRIAM. They are afraid of poisonous reptiles, poisonous snakes, and poisonous lizards, and they seem to be afraid of some reptiles, the reason for which was not quite clear to me.

The CHAIRMAN. What are the grounds for that fear?

Mr. MERRIAM. I do not know.

Mr. SCOTT. Who are likely to import poisonous reptiles here?

Mr. MERRIAM. A great many people. Some people import them just as curiosities and freaks, and others import them because they think they will destroy some of our insect pests. Snakes have been introduced to kill rats, just as the mongoose is introduced to kill rats. We have never had any money to pay for the inspections of importations, so that the importer pays for every inspection of his own goods.

This is a hardship on the importer, which he objects to very strongly, but thus far there has been no way out of it.

The CHAIRMAN. You say that is a hardship on the importer; what is the object of most of the importation of animals—menagerie purposes?

Mr. MERRIAM. In a small percentage of cases they are for menageries.

The CHAIRMAN. In other words, there is a very small percentage for the commercial good of the country?

Mr. MERRIAM. Most of them are for private preserves, game preserves, which are becoming very numerous all over the country, and others are unusual pets; but most of them are imported through dealers. And dealers complain. The dealers in merchandise of various kinds have Government examination by custom officials without cost to them, but here we discriminate against them in the matter of live animals and birds, and make them pay for the inspection of their own goods, which is $5 an inspection. That could be put under the existing law—the same fee to the inspectors. It does not amount to much after all. In New York City this year there were only 125 inspections, which would be only $625.

The CHAIRMAN. What becomes of that money?

Mr. MERRIAM. The inspectors keep it. It is paid to the inspectors. They are not employed by the Government at all. They simply agree to go on call to inspect any incoming cargo, and they are notified by the collector of customs and also by the importers; and they have to leave their business—they are all business men—and go down and examine these things at once. We have to have three in New York, three alternates, because it has happened that one has been sick when a large importation came in; so to obviate such an embarrassment we have had three. In one case Doctor Palmer had to go from here to New York to examine a large shipment.

The CHAIRMAN. A large shipment of what?

Mr. MERRIAM. Of birds. Some very large consignments came there at once.

Then, in the way of field work we need more money under all three of the lines. In the work of the geographical distribution and mapping the life zones and crop zones in detail, we are able to work only a comparatively small part of each year. Each field party has a small allotment, and when that is used up, has to come back. It would be much more economical if they could stay out the full season without having to come back to Washington as soon as their allotments are expended.

The CHAIRMAN. What beneficial results to the agricultural interests of the country have you obtained from this work of mapping the crop and animal zones?

Mr. MERRIAM. We show the areas where certain crops can be raised and where they can not.

The CHAIRMAN. Have not people very generally found out where they can raise things and where they can not?

Mr. MERRIAM. Those that have found out have found out by an expensive method, by spending hundreds and thousands of dollars, where a few dollars——. This is one of the maps [showing and distributing them to the members]. Those maps show, in a general way, on a very small scale what we are doing in mapping the areas that are fit for cultivation of certain crops

The CHAIRMAN. Are you not practically doing this work in some other way?

Mr. MERRIAM. Not at all. It would do no good to see that grapes and oranges and raisin grapes would do on a particular kind of soil, if you found that soil in Maine, New Hampshire, or Connecticut. You have to know what belt that soil recrosses in order to know the variable areas. So, on the other hand, with hardy cereals and hardy apples, if you found soils like that on which they grow through the Southern States, it would be impossible, obviously impossible, to grow those crops there, because they are in a different life zone entirely—in a belt in which they could not possibly thrive.

The CHAIRMAN. What is your method of determining that?

Mr. MERRIAM. We determine the climatic belts which control the distribution of animal life and the growth of plants. We actually map the real distribution of animals and plants as they occur in nature, in a wild state, and then coordinate those areas with the climatic factors which govern them. We have found out that the northern limit of species of southern origin is determined by the activity of heat for the season of growth and introduction. We have determined that the southern limit of southern species is determined by the hottest part of the summer; and I have maps here showing the actual temperature, and showing the extent of areas determined in that way, with the boundaries of the life zone as we have mapped them, from actual distribution of species in the field.

Mr. SCOTT. What do these maps indicate?

Mr. MERRIAM. They indicate the boundaries of the principal transcontinental belts that are fitted for large association of species that are not fit to thrive in other areas. They are based on the study of wild animals and plants in the field coordinate with temperature data, and are the natural agricultural belts. We are carrying this on in very much more detail than you see in these small-scale maps here.

Mr. LAMB. Have you one defining the cotton belt?

Mr. MERRIAM. No; I have not, here. The cotton belt is a subdivision of this austral riparian belt.

Mr. SCOTT. Do you publish a bulletin to go with this map?

Mr. MERRIAM. Yes; giving a list of the different varieties of apples, peaches, grapes, plums, cherries, and cereals of different kinds that thrive in each of these areas. That is our principal and most important work for agriculture. It means a great deal in a region which is developing fast agriculturally, like many parts of the far West, where it saves a man an absolute loss—as has occurred over and over again, year by year—in futile experimentation, to try to make things grow in areas where nature is not fitted for them, and where they can not be a commercial success.

Mr. GRAFF. Do you mean that the result of these investigations has been obtained principally by the habitat of the various animals and birds?

Mr. MERRIAM. Certainly. Those are the main factors we have used; and these same areas have been found, as Doctor Howard has shown, to coincide with the areas over which noxious insects extend. When we have an outbreak of some noxious insect it is in a natural home area, and in extending its range it will not pass the boundaries of its natural zone. So we can lay out beforehand the area where it will occur next year or the year after next, or the same year, in its exten-

sion, and where it can be combated or avoided by notifying the farmers in advance. Similarly with yellow fever. Investigations have recently shown that the yellow fever is strictly confined—the breeding of the yellow-fever mosquito—to the austral riparian region here, this lower transcontinental belt, to humid parts of that region; and yellow fever does not occur outside of that, and that is a matter of enormous practical importance to the people of the United States. It is so in the spread of many diseases of cattle, that they are limited by these definite regions.

Mr. GRAFF. How do you ascertain about what particular grains or fruits grow in certain localities by the location of these wild animals and birds?

Mr. MERRIAM. We find the area where a particular crop does best, and then we find additional areas where it does well, and that shows us at once, by platting them on our map, in what part of a zone or area this crop flourishes best commercially; and we know then that it is adapted to that zone, where conditions of equal humidity occur, and favorable soils, that it can be grown in that zone. We find sometimes, that in certain kinds of crops which have a wide latitude, they do fairly well in two zones; like the sugar beet, which does well in the transition belt—the belt colored blue on this map. That is its natural and best home, and it also thrives in the adjacent belt of upper Sonora. It does best in the boundary between the two.

Mr. SCOTT. These conclusions of yours have been reached by an examination of the growing crops?

Mr. MERRIAM. Of the growing crops.

Mr. SCOTT. And by weather conditions too?

Mr. MERRIAM. Yes; by study of climatic data of the temperatures and humidity and of the actual crops which are a success in definite places—a commercial success. We do not mean the things that have to be nursed and cuddled, but the things that do best in the open.

Mr. GRAFF. Mr. Scott remarked just now, asking if animal life had anything to do with it; I understood you to say it did a little while ago.

Mr. MERRIAM. It does; certainly. Animal life and plant life coincide in their distribution. Where you find a certain species of animals you find certain species of plants, right across the country. You find certain trees and shrubs in each of these belts that do not occur in other belts, in association with certain birds and reptiles. Where they recur, we know the crops that do best in the area will do quite well in other areas where soil conditions are suitable. So, in mapping these animal life areas we are mapping the agricultural belts, and we make a study of the crops throughout the belts, and publish lists of those that are adapted to each area and each subdivision of an area.

Mr. ADAMS. Is not this one-hundredth meridian here a pretty arbitrary line on your map?

Mr. MERRIAM. That is a transition between the arid and humid. It is a somewhat irregular line, but it is a well-known line of division.

Mr. HENRY. Your investigations are originally with animal and vegetable life?

Mr. MERRIAM. Yes; we study both together.

Mr. HENRY. To what extent, if at all, does the work of your division conflict with or supplement the Bureau of Soils and the Bureau of Plant Industries.

Mr. MERRIAM. It has nothing to do with the work of plant industries except so far as that in importing crops from foreign countries they try to ascertain in which of these regions we have mapped the introduced crop will thrive best. In the Division of Soils they determine what particular soil is adapted to a particular crop, and the recurrence of that soil within the climatic belts fitted for it give the limitations of utility in that direction. As I stated a few moments ago, it would not do any good to find a soil in Texas that was there adapted to any particular crop, and a repetition of the soil in North Dakota. It would not give the same crop in North Dakota as in Texas, because they are in different climatic belts—in different life zones. So the knowledge of soils is subordinate to a knowledge of climatic belts. It is one of the many minor subjects that have no particular bearing on one another, although they all fit in together to the advantage of the farmer eventually.

Mr. HENRY. I gather from some of the remarks of the gentlemen preceding you that these investigations were similar to those they were carrying on. I noticed in the Bureau of Soils that the determination of the place where tobacco would grow was similar to what you are talking about.

Mr. MERRIAM. They can utilize our climatic maps, and by study of soils in one of the zones as shown on these maps, you arrive at once at the areas where tobacco or any other crop would be likely to do well.

Mr. SCOTT. To what extent have you carried the mapping of these belts?

Mr. MERRIAM. We have worked in every State and Territory of the United States, and also we have done some work in Mexico and in Canada, and we are working down in more detail in the Western States. We are going over ground that we went over in a preliminary way, in order to enable us to publish this small map, with much more care, and are actually defining on a large scale map—for instance, in California—on the land-office map, in which the sections are shown, the actual boundaries of the life zones as they exist; that that map is of practical use to a farmer, wherever his farm is situated. He can look on the map and see what he can hope to raise successfully, and what he can not, as soon as he locates his place.

Mr. SCOTT. What is the purpose of your extending this work into Canada and Mexico?

Mr. MERRIAM. To find out where the centers of these areas come from, and to find in Mexico particularly crops and natural products that are useful in those areas that could be equally useful, the extension of those areas in our country in the case of many fiber plants of Mexico which will do in Sonorian areas in Mexico and southern California. In Canada we have a double purpose. We are doing a great deal of work in Alaska, and have been for some years—are there every year; and we are trying to carry the belts we take up in Alaska, east of the coast ranges, down into Canada, and coordinate and continue them with the belts that are known there, to see if really any of the lands in Alaska come particularly under the head of agricultural lands; whether actually fit for agricultural pursuits, and that range along the east of the coast ranges to the Mackenzie Basin. We have one man up there.

Mr. SCOTT. Will you expect to extend these inquiries to South America and Europe after you have finished Mexico and Canada?

Mr. MERRIAM. We will not, at all. We are not doing detailed work there, as we do in the United States. We are getting the general facts that are necessary to us in our work here, but we are not doing the detail work in those countries like we do in our country.

Mr. SCOTT. Will you ever finish the work in our own country?

Mr. MERRIAM. Yes; we will finish it, but it will be a slow process with our present force. It is very difficult, indeed, to get men of sufficient training to carry on this kind of work, because they must be zoologists and botanists, and accomplished ones, and they must know practically every mammal and bird, tree and shrub, that we find from Alaska to Mexico. It is a big field and involves the knowledge of thousands of species—and not every man has that knowledge. We have all the men in the world who have it, and they are men we have trained ourselves. So the work can not be done with very great rapidity, but it will be economy to keep the good men in the field as long each year as the season will admit.

Mr. SCOTT. How many men do you keep in the field each year?

Mr. MERRIAM. We have a varying number. We generally have four or five parties, and we are doing the economic work similarly. We have men in the field studying the food habits of birds and mammals of economic importance. For instance, our economic ornithologist has spent a large part of two years now in California in studying the food of birds of the fruit districts of California, where the fruit industries are of enormous importance, and where insect devastations are of great importance, and where it was believed a few years ago that a number of species of birds were doing great damage.

We have shown that in nearly every instance—not in every instance, but in nearly every instance—that the bird was of great benefit to the orchardist, and we have demonstrated that to their satisfaction; that they recognize it as a fact and protect birds that a few years ago they were killing. We find some birds are destructive for a very brief period—for a few weeks or a month—while during the rest of the year they are very beneficial, and if we can suggest means of warding them off during this brief period when they are injurious; then their services are of enormous benefit to the fruit men; and that is what we are doing.

We are also called upon to expend a great deal of money, which amounts to more than the increase in our appropriation has amounted to, in carrying on the work imposed upon us by the "Lacey Act" and the bill proposing game laws for Alaska. This matter has taken Doctor Palmer, of the Biological Survey, who receives the highest salary—has taken his entire time and that of two assistants and a stenographer, and to that must be added traveling expenses and various incidental expenses. They have taken that out of the Biological Survey appropriation without any special appropriation for it.

Last year we had an item of $1,000 for fencing and transporting and caring for elk and other animals in forest reservations.

The CHAIRMAN. They had an idea in the Senate, in the conference committee, that these elk were to be in captivity for a few months, and then would be turned loose. We were told that they were a gift to the Government, and the Government would take care of them a few months, and then they would be turned loose.

Mr. MERRIAM. That latter statement is incorrect. As a matter of fact——

The CHAIRMAN. Tell us the history of that.

Mr. MERRIAM. The Miller & Lux cattle concern, one of the largest cattle concerns in the West—in California—have a herd of elk on their lands in the lower San Joaquin Valley. This elk is a very important animal for the reason that its species differ from the elk of the northwest coast and the elk of the Rocky Mountains. It is unlike every other elk, and all there are of them in the world are on this range in the lower San Joaquin Valley. They are in great danger of extermination. They were given to the Government by Miller & Lux, provided we would take care of them and transport them to some forest preserve, and we have undertaken to do this. This has involved great expense, because a thousand dollars will not pay for the fencing that is necessary to put up. We had a man in California last summer making a special examination of forest reserves with reference to this, apart from the attention I was able to give personally to the same matter, and we have selected a locality on the Keweah River, and we have a man there now laying out the fence, and we want to fence as much as we can with the small amount of money we have. It is sufficient for this herd of about 100 elk—about 120, altogether—as nearly as we are informed by Miller & Lux.

Mr. SCOTT. How many acres will you have to inclose for the care of these elk?

Mr. MERRIAM. I do not know, I can not answer that.

The CHAIRMAN. What do you think of the Government going into a thing like this; is it not an extraordinary movement on the part of the Department?

Mr. MERRIAM. It is in line of what has been proposed in the way of game preservation; it is in line with what has been done in Yellowstone Park in the care of buffalo.

The CHAIRMAN. But we do not fence and take care of any game.

Mr. MERRIAM. We are doing that in the Yellowstone Park.

The CHAIRMAN. That is a public park. Let us turn these elk right in there.

Mr. MERRIAM. So is this park also a public park, but the land we have selected is in the National Sequoia Park, in California, on the Keweah River. We do not propose to purchase any land, but to fence a part of that, so that they can not get out.

Mr. SCOTT. How far do they have to be transported?

Mr. MERRIAM. About 100 miles.

Mr. SCOTT. How are they caught and handled?

Mr. MERRIAM. Miller & Lux agree to put up wings, and corral and hold them for us; and then we have to take them on a car to a place called Exeter, and then carry them in wagons about 30 miles.

The CHAIRMAN. In wagons?

Mr. MERRIAM. In wagons. We have to crate them and put them in wagons, and carry them about 30 miles to the boundary of the national park.

The CHAIRMAN. What good is going to accrue from it?

Mr. MERRIAM. We are going to preserve a species of big game from extinction, and which is now destined to speedy extermination. They are on a cattle range, with no protection at all except such as Miller & Lux give them through their cowboys.

Mr. RODEY. Where did Miller & Lux get those elk?

Mr. MERRIAM. They were always there; they have lived there from

time immemorial. This species is the San Joaquim Valley elk. It has been exterminated, except in a small area south of Tulare Lake.

Mr. BOWIE. What is the advantage of these elk? For game?

Mr. MERRIAM. No special advantage. The elk is supposed to be the noblest game animal we have; and we, as a nation, are concerned in preventing the extinction of our game animals as long as we can. That is what every civilized nation has tried to do.

Mr. BOWIE. Do you think the society of Elks will object to the extinction?

The CHAIRMAN. If they can not take care of themselves, you will admit they are of no good to anybody.

Mr. MERRIAM. When fenced in. They would not stay there at all if left there now. They would return. The valley is all under cultivation, or under cattle range, and is fenced land.

The CHAIRMAN. What would become of them if they were simply turned loose?

Mr. MERRIAM. They would return to the valley that we took them out of.

The CHAIRMAN. What harm would that do?

Mr. MERRIAM. They would be killed. Their tusks are worth from $10 to $30 apiece there—are in much demand by the society of Elks. It is only because they are so isolated in this range country that they have not been exterminated before this.

Mr. SCOTT. How long will they have to be kept under fence to have them become acclimatized to their new habitat?

Mr. MERRIAM. We have taken pains to select a place which is almost climatically the same. There is no snow in the lower part of the range, and it is where they can go up on a still higher ground in the mountains in the summer, where the conditions are, as near as possible to get, to those they live under now.

The CHAIRMAN. How many acres do you propose to fence in?

Mr. MERRIAM. I do not know; we have not measured it up in that way. We have selected a strip along the river, and have a man in there now measuring it and laying out the line of the fence we will have to build.

The CHAIRMAN. Will the river follow the fence on one side?

Mr. MERRIAM. No. It will in part, but in part it will not. But we want to use in part some natural cliffs in the lower part of the Keweah canyon—extend up into the canyon far enough so that we can utilize this line of cliffs, and not be obliged to build any fence on that part. We can not build the fence for less than $2,000, and that money ought to be immediately available. Miller & Lux are very much displeased that we have not already taken the herd off their hands.

The CHAIRMAN. Why do they want to get rid of them?

Mr. MERRIAM. Because they consume a great deal of alfalfa and a great deal of grain. They have had various offers from other parties to take these elk, but they do not want to put them where they will be exterminated, and they think the Government ought to take them and put them in one of its reserves. After the cost of the fence, the cost of maintaining will be very little, indeed.

Mr. BOWIE. Do they multiply very rapidly?

Mr. MERRIAM. They have been holding their own apparently for some years.

Mr. BROOKS. What about these societies?

Mr. MERRIAM. The Elk society has wanted to transplant them to some nucleus near Salt Lake City.

Mr. BROOKS. That is for purposes of propagation?

Mr. MERRIAM. I do not know, but it would undoubtedly result in the extinction of the species in a short time. The Yosemite commissioners have taken some move toward getting them into the Yosemite Park. It is where the snowfall is heavy, and these elk, not being mountain animals, would undoubtedly die in a short time.

Mr. SCOTT. Is it expected they will have to be fenced in all the time, for all future generations, or will they after a while become attached to their new habitat and stay there without a fence?

Mr. MERRIAM. The probabilities are, where they find good feed—you will have to see that they are fed a little in the severest part of the winter—they will stay there after they get well acclimated. And the place we have selected in California is the most favorable one in California, so far as the ease of protection or care is concerned. It is in a forest reserve, where there are several competent rangers who are interested in the idea of having them there.

The CHAIRMAN. The idea of the Government taking this herd, and taking care of them in perpetuity——

Mr. MERRIAM. In a forest reserve, the same as is now done with the buffalo in Yosemite.

Mr. CHAIRMAN. You do not have a fence down there?

Mr. MERRIAM. Yes; they are fenced and fed.

A MEMBER. The elk in the Yellowstone Park are not shut up while they are in the park; there is nothing to prevent their getting out of the park into the forest reserve?

Mr. MERRIAM. The region they are in now is their natural home.

Mr. BURLESON. After they are fenced in, what does the Department propose to do with them, then?

Mr. MERRIAM. Simply, you will have them there indefinitely. They will probably require some little feed in winter.

Mr. BURLESON. Some one will have to be there all the time to look after them?

Mr. MERRIAM. It would be better; but it is not essential that some one be there. It would be better to have some one keep track of them, especially for the first year or two, to see that the fence was not broken down by falling trees, and so on, and to see that they were fed in case feed were needed.

Mr. RODEY. Is there no way of getting citizens who raise elk and buffalo, and all that sort of thing, interested, so as to relieve the Government from having to take care of them in the future?

Mr. MERRIAM. A number of citizens have tried, more or less successfully, to breed buffalo and elk. Austin Corbin has both, and William C. Whitney, of New York, has both; and there are to-day a number of private preserves in which both buffalo and elk are kept.

Mr. RODEY. Could you not get some of these elk and put in there?

Mr. MERRIAM. The trouble is that the climate is unfit for this species, which is almost a subtropical animal. It lives in the Tulare plain.

Mr. RODEY. How would the Gila Forest Reserve in New Mexico do?

Mr. MERRIAM. It would do equally as well, possibly, as the one we have selected.

Mr. RODEY. There is a tremendous forest reserve there, as big as a

whole State, and a whole lot of rangers taking care of it; and I do not think they have much to do.

The CHAIRMAN. That was just the idea, Mr. Rodey, when we consented to this appropriation in the Senate; that they would be taken care of temporarily, for a month or two, until they could be turned loose on a Government range. We would not have consented to it under any other conditions.

Mr. RODEY. The various rangers there now would look after them. We use it for pasturing largely, but there is room for elk there.

The CHAIRMAN. The very same thing was said in the conference with the Senate committee. There are rangers on all these forest reservations, and if turned over to the Department of Agriculture this year, then the rangers will be under the Secretary of Agriculture and can take entire charge of this work.

Mr. BOWIE. Do you state that it will cost a thousand dollars every year to keep up these elk?

Mr. MERRIAM. No, indeed; that was not put in with exclusive reference to these elk, but possibly taking care of other animals which might come into the possession of the Government and which it was desirable to protect from extermination. Two thousand dollars will cover the cost of fencing, as nearly as we are able to estimate it now, and the cost of feed would be very little, indeed; and if the forest reserves are transferred to the Department of Agriculture and their rangers authorized to take care of these animals, it could be done without the additional expense of getting anyone to look after them.

Mr. SCOTT. What part of this appropriation have you used?

Mr. MERRIAM. None at all, because we have not bought any fence yet; but the Biological Survey has a man now who is laying out the line of the fence.

The CHAIRMAN. Why did you make that expenditure until you knew whether Congress would make you the appropriation?

Mr. MERRIAM. Because Miller & Lux asked us to take those elk, if we are to take them; and we did not want to have them exterminated; and we want to know exactly what it will cost to put up that fence.

Mr. BOWIE. How many acres of ground is it going to cover?

Mr. MERRIAM. I do not know how many acres, the equivalent of about a mile on a side.

Mr. BOWIE. Six hundred and forty-eight?

Mr. MERRIAM. That would be the minimum that we could possibly expect to use.

Mr. BURLESON. What kind of a fence do you expect to put up?

The CHAIRMAN. A Page fence?

Mr. MERRIAM. A mesh-wire fence about 6½ feet high; not so expensive a fence as the Page fence. We find that we can get a cattle fence, with meshes about 14 inches long and 6 inches or 4 inches between the meshes, that will last a number of years; a fence that the cattlemen are using. We can get that at half of the price that we can a Page fence, and we are going to ask bids from a number of firms for fencing as soon as we have the lines measured. The forest wardens could take all the care of the elk after they are transferred, as long as it is necessary to employ anyone to do it, if they are authorized by the Secretary of the Interior; or if the forest reserves are transferred to the Agricultural Department.

The CHAIRMAN. It is a good illustration of where Congress was

misled by somebody. It was a distinct understanding that those elk would be turned loose on the public domain. It is another example of starting in and not knowing where it is going to end. In this case it is absolutely provoking, and Mr. Henry will bear me out when I say that we would not have agreed to it in conference except for the distinct and positive statement that that was all there was to it. These elk were given, and it seemed impolite not to accept them, and all that; but to go there and transport them, and take care of them forever, is not right. Turn them loose on a Government reservation and let them go, if they can not take care of themselves. They will take care of themselves all right if we can give them an area large enough to afford them food. If they can not do that they are of no use to us from a practical point of view.

Mr. SCOTT. I understand you to say, then, that the $1,000 appropriated last year was intended simply to pay the cost of transportation?

The CHAIRMAN. That was what I understood.

Mr. HENRY. That was the representation at the conference.

Mr. SCOTT. They did not say anything about building the fence?

Mr. MERRIAM. Yes; that is in the bill; that is the way it reads in the last bill.

The CHAIRMAN. Yes; for the winter months, until they could be transported. I think Mr. Henry will bear me out. He was in the conference.

Mr. BURLESON. What was done with the thousand dollars that was appropriated last year?

Mr. MERRIAM. Not a cent of it has been used.

Mr. SCOTT. Are you paying the man that is making this survey out of that fund?

Mr. MERRIAM. Not at all. We are paying him out of the Biological Survey appropriation, so that this fund could be used entirely for fencing, if a large enough area can be fenced to really afford them the necessary food.

Mr. SCOTT. As I understand you, then, the only expense involved in this matter will be the expense of transportation and the cost of a fence, with what little feed may be needed from year to year.

Mr. MERRIAM. Yes; that is the only expense.

The CHAIRMAN. Then there is the maintenance of your fence hereafter.

Mr. MERRIAM. That is, of course, a very small matter. If the forest rangers will look after that it is a trivial matter. I do not suppose it will be over $10 a year.

The CHAIRMAN. The posts only last a certain number of years, anyway, and then you will have to have new posts?

Mr. MERRIAM. That country is a dry country, and posts last a long time—blue oak or cedar—either.

The CHAIRMAN. They do not last forever?

Mr. MERRIAM. They do not last forever, exactly.

Mr. BROOKS. If the Department of Agriculture takes over the Department of Forestry will they not be charged with the duty of game wardenship?

Mr. MERRIAM. In part; in places.

Mr. BROOKS. The trouble is the forest ranger has not the power of arrest.

Mr. MERRIAM. Yes, he lacks the power.

Mr. BROOKS. If the forest ranger remains where he is, and is given the power to arrest the trespasser, does not that solve the problem? The only authority he needs in addition to what he has now is authority to arrest for depredation. He is charged with the duty now in general of being the game warden, but there is not coupled with that the right to arrest?

Mr. MERRIAM. You are right there.

Mr. SCOTT. What are the value of his services if he can not arrest?

Mr. BROOKS. A good deal.

Mr. SCOTT. I think in some places he would have to go 200 miles to get a warrant.

Mr. BROOKS. That is why he ought to have the right to arrest a trespasser in the act.

Mr. RODEY. It will be too bad if you let the only species of elk there is die out. They ought to be taken care of.

Mr. MERRIAM. It is a noble game animal, and it would not be creditable to us to let it become extinct, especially when the owners of them have made a present of them to the Government, and will be to the expense of corralling the elk and loading them for us. Mr. Chairman, I want it distinctly understood that this matter of the elk is nothing that the Biological Survey took the initiative in. It was something thrown on us, and we felt that these animals ought to be preserved from extinction and that here was an opportunity to do it at really very small expense, so long as the land was kept by the Government as a permanent national park, anyway.

The CHAIRMAN. Have you seen these elk yourself?

Mr. MERRIAM. Yes.

The CHAIRMAN. Are they naturally a very wild animal?

Mr. MERRIAM. They are rather a timid animal, but they are not so wild as elk are usually where they never see persons. They see the cowboys going back and forth on horseback, and if they do not come too near they are not disturbed by them.

Mr. HENRY. How large are they?

Mr. MERRIAM. They are a small elk; smaller than the big elk of the Rocky Mountains.

The CHAIRMAN. They are no longer useful as a food supply?

Mr. MERRIAM. No.

The CHAIRMAN. Were they ever numerous enough for food supply?

Mr. MERRIAM. Yes; thousands and thousands of them have been killed for food by the early settlers and miners of California. They used to swarm in the Sacramento and San Joaquin valleys.

The CHAIRMAN. You admit it would not be possible to establish these in the food supply?

Mr. MERRIAM. Not food enough for any consequence, because there is not land enough available for them to multiply on. The land is used for other purposes—the land they used to range over—until the range is contracted more every year.

Mr. RODEY. Why is it not possible to range buffalo as it is cattle?

Mr. MERRIAM. There is no land available for that purpose.

The CHAIRMAN. Cattle are taking the place of buffalo.

Mr. RODEY. I did not know but that buffalo was just as good meat as cattle.

The CHAIRMAN. There is not the same amount of good beef in a buffalo; there is very little good beef in a buffalo.

Mr. MERRIAM. In carrying out the requirements of the game law for Alaska we have difficulties because we have no money to be used for that purpose, no wardens, and we are obliged to give permits. A number of foreigners come over here each year to hunt big game in Alaska, because big game is so accessible there and so easily killed. A number of sportsmen go from the United States; and the men who are out there, the natives, and people who are there temporarily—it is hard to speak of most of them as inhabitants, as very few are real inhabitants, but men who are there from one to two or three years as miners—want to kill what game they need for their own use; and the enforcement of this law, even in a limited way—in a specified way—is a very difficult matter; and there is a great deal of local feeling against letting sportsmen from the United States and from abroad go there and kill game.

Mr. SCOTT. You will know in a few weeks how much the fence will cost?

Mr. MERRIAM. Yes; but we have made preliminary estimates, and we do not think we can put up that fence for less than $2,000. That is the real difficulty. We have not money enough to buy the fencing and put up the posts. It is expensive to put up the posts, even when we are allowed to cut them on Government land.

The CHAIRMAN. Go on, Doctor, in your own way.

Mr. MERRIAM. That is all with respect to this; and this, of course, is no part of the regular work of the Biological Survey. It is something put on top of us that we have had to try to look out for.

In the work in economic ornithology we are carrying on investigations of food habits of birds with respect to their value to the people and publishing the results in little special bulletins—as in our bulletins, with which you are familiar—on the hawks, and owls, and blackbirds, woodpeckers, and so on. We take up a crop at a time and point out what species are of value to the farm or to the forest and what species are injurious. And this is work that is of immediate practical interest to all agriculturists and all interested in forestry, and can not be done any too early, because in certain areas birds of enormous importance have been destroyed, just as many important mammals have been destroyed. Big epidemics of injurious insects would not have occurred in many cases if it had not been for the destruction of their natural enemies.

The destruction of the large hawks and owls, the coyotes and rattlesnakes, has enabled the prairie dogs to increase disproportionately and inordinately and to spread over a much larger area than it originally inhabited, and become much more abundant on parts of that area than formerly. We take up questions that seem particularly important wherever they arise, and send men into the field. We also cooperate with the States in helping them to enforce the game laws under the Lacey Act, in preventing interstate traffic in game. We found the largest source of supply of cage birds in the United States was in Louisiana, and by enforcing the Lacey Act, preventing interstate traffic, we have checked that traffic immensely. In Kansas the quail was trapped for propagating purposes in immense numbers, until they were nearly exterminated in southern Kansas, and by cooperating with local authorities we have largely stopped them; and Kansas has passed very stringent laws in some of its counties. About twenty of

of its counties have absolutely prohibited the killing of quail, as well as the shipment.

Mr. LAMB. How about it in Virginia?

Mr. MERRIAM. I can not give you an authoritative answer myself. I would have to ask Doctor Palmer; but there is difficulty there in allowing game to be sold in the District. I think the Virginia game can be sold here in the District; and I think that prevents the enforcement in the usual way.

In brief, Mr. Chairman, the demands under the Lacey Act, which were never independently provided for, have used a great deal of our fund.

The CHAIRMAN. Did we not increase that? Did we not give you a $10,000 increase one year?

Mr. MERRIAM. You gave last year a $5,000 increase, and the expenditures last year under the Lacey Act alone have amounted to probably between $7,000 and $8,000 already, so that the increase did not provide even for the expenses under that one division; and we have employed no warden and we have paid no inspector. It has been office work and what field work we have been obliged to do in sending men to different places.

Mr. HENRY. Was not the increase of $10,000 to provide for all the extra cost?

Mr. MERRIAM. Yes; an increase of $10,000 as the work stands now, but all of the work is growing all along the line. We ask an increase of $12,000 to cover everything. If we are granted bureau organization, we are to organize with three divisions of coordinate rank—the three divisions we already have—and allot the appropriation in a more definite and specific way. The increase of $12,000 asked for was to be appropriated among the three divisions, which would be an average of $4,000 increase apiece, to meet the increasing demands. We are already spending vastly more than that on this game-preserve division, because we either have to do that or let the work drop.

Mr. SCOTT. In what way did the Lacey Act involve additional office expense?

Mr. MERRIAM. It was put on the Department of Agriculture, and the Secretary turned it over to the Biological Survey—the administration of all matters respecting game in the public domain; the interstate commerce in game; the inspection of birds and animals coming into this country, whether game animals or not; the importation of eggs and the game law of Alaska—put that work on the Biological Survey, and neither of those bills are accompanied by any appropriation, so that, in order to obey the law, we were obliged to carry on the office work in our office, and that has gradually taken more and more of the force, until the man who had been my best man, my right-hand man for years, has, for the last two years, given practically all of his time to it; has taken two other good assistants and a stenographer, and still can not keep up with the work.

Mr. SCOTT. What I failed to understand was how it could be that a man in an office here in Washington could enforce game laws in Alaska.

Mr. MERRIAM. We do it by the way the law is phrased. We have charge of granting permits for killing game, and the way we enforce the law is by looking out for the shipments, and by preventing the landing of game at the ports of entry. The customs inspectors at Seattle and

at San Francisco examine all game. We have arranged so that the game trophies must be sent to those ports, and must be so packed that they can be examined, and through cooperation with the Treasury officials we know what game is landed there. They can not kill any game without a permit, and we furnished last year 105 permits—not last year, but since the game law of Alaska went into effect. That is, we have issued 105 permits altogether. Last year we issued 11 to foreigners and about 94 to citizens of the United States and Alaska, mainly out there in Alaska, to the men who live there.

Mr. SCOTT. Can no one kill that game lawfully without a permit from your office?

Mr. MERRIAM. He can not bring it out, if he does. You or I could not go up there and kill a moose or a sheep—a mountain sheep—and bring it out of that country without a permit. Nobody can.

Mr. SCOTT. Does everybody who applies for a permit receive it?

Mr. MERRIAM. That depends on who he is, and what we know about his record and about him. If he is a taxidermist who is after trophies to sell, we will not grant him a permit; but if he is a respectable man we will give him a permit to bring out what the law allows, except in regard to the Kenai Peninsula. That peninsula is so accessible that a man can in twenty-four hours get into the finest hunting country, where the largest moose in the world are to-day, and where he will see 500 sheep in a day.

The attractions of that country—the moose, and the sheep, and the great big brown bears, and the caribou—are such that we have had to restrict and cut off hunting in that particular place. We tell them that they can kill anything that the law allows in other parts of Alaska, but that they can not kill in the Kenai Peninsula. The caribou are so easily gotten at that they are almost exterminated already.

The CHAIRMAN. Is there anything further that you want to speak to us about?

Mr. MERRIAM. Not unless there are some further questions that some member wishes to ask.

The CHAIRMAN. Are there any further questions?

(There was no response.)

Thereupon, at 3.40 o'clock p. m., the committee adjourned.

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JANUARY 13, 1904—10.30 O'CLOCK A. M.

Hon. James W. Wadsworth in the chair.

## STATEMENT OF GEORGE WILLIAM HILL, EDITOR AND CHIEF OF THE DIVISION OF PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Mr. Hill, we have asked you to appear before us in regard to certain changes. The committee will turn to page 21 of the estimate. A change in your estimate is "one editor, who shall be assistant chief of division, $2,500."

Mr. HILL. Yes, sir.

The CHAIRMAN. That is absolutely new. Kindly tell the committee, in your own way, what the necessity for that is?

Mr. HILL. It is a plea for help on the part of myself, Mr. Wads-

worth. The increase in editorial work between last year and the year before was 30 per cent, and you will notice that I relieved the editorial force of one man at $1,400. It was too loaded with the cheaper class of men, and I did not have enough of the best. Now, I want to make it a little stronger in the upper story.

The CHAIRMAN. Does the increase of salary always make things stronger?

Mr. HILL. It does if you get the right men.

The CHAIRMAN. We do not always get the right men.

Mr. HILL. I will get the right men.

The CHAIRMAN. How has your editorial increased 30 per cent?

Mr. HILL. It has increased by 6,000 printed pages of editorial matter, and I want to say in calling for extra help I take this into account, that I have not had time to do two hours' editorial work during business hours the last three years. Every single bit of editorial work I have had to do I have had to do at home and after hours; and the increase is something I can not control.

The CHAIRMAN. What is causing the increase?

Mr. HILL. The increase in the development of the Department; the growth of the other bureaus and divisions. All this work finds its ultimate expression in publication. We issued the year before last, for instance, 750 publications; last year we issued 938 publications.

The CHAIRMAN. You only have to do with bulletins?

Mr. HILL. All bulletins and books. The Yearbook is edited by us, you know—everything that is issued by the Department, the Department order; it is issued by the Department itself.

The CHAIRMAN. You do not have the soil publications?

Mr. HILL. Yes.

The CHAIRMAN. Do you publish this report of the operations of the Bureau of Soils?

Mr. HILL. It all passes through our hands.

The CHAIRMAN. Did you edit that [indicating]?

Mr. HILL. Yes, sir.

The CHAIRMAN. Do you have anything to do with the maps?

Mr. HILL. I have a good deal to do with them—do my best to suppress the number of illustrations and number of maps.

Mr. SCOTT. Can you give the committee the cost of this bulletin and accompanying maps [indicating soil bulletin and maps]?

Mr HILL. I think they will cost about $37,000 or $38,000 for the complete report—two volumes we call it.

Mr. SCOTT. Is that cost paid——

Mr. HILL. That is paid by special appropriation of the Printing Committee. Congress appropriates for the printing of our Department, aside from the sum that is disbursed through myself, the $300,000 for the Yearbook, and so many thousand dollars for the Bureau of Animal Industry reports, etc., and it amounts to over $400,000 a year that is expended by the Public Printer under the order of Congress for publications of our Department irrespective of what is done over my signature.

The CHAIRMAN. That is practically a half million dollars spent in dissemination of the knowledge gathered by the Department of Agriculture.

Mr. HILL. Yes, sir; outside of the $300,000 for the Yearbook.

The CHAIRMAN. In addition to the other expenses of the Department?

Mr. HILL. In addition to the expenses of my Division. For instance——

The CHAIRMAN. And in excess of anything that appears on the Agricultural appropriation bill?

Mr. HILL. Yes, sir; the entire editing has involved so much extra work on the part of all of us it is getting to be more than we can stand, almost.

Mr. BOWIE. How much time do you have to give at night to the editorial work?

Mr. HILL. It will run from November until April, which is our busiest time, four or five nights in a week, and from one to three hours an evening, for my share. My helpers have to do a good share of all extra work.

Mr. GRAFF. You do not mean to be understood, Mr. Hill, that you write, for instance, all of these bulletins and all of the articles that appear in the——

Mr. HILL. That I write them?

Mr. GRAFF. Write them, or that your Bureau writes them?

Mr. HILL. Oh, no, sir. The manuscript comes to us in all its native purity and strength, and we have to edit it. The first duty I have is to read it for the Secretary, to see that there is nothing there, for instance, that might conflict with his policy, nothing that he might prefer not to give to the public just yet. He may think they are premature; that these gentlemen are claiming too much. He expects me to call his attention to everything in the manuscript of the bulletin that is proper for him to see before it is printed; and then we do the usual editing, such as is done in every magazine.

Mr. ADAMS. You do the same work as the editorial manager of a newspaper?

Mr. HILL. As the managing editor of a newspaper.

Mr. GRAFF. You act under the direction of the Secretary of Agriculture?

Mr. HILL. Yes, sir; he is our umpire. For instance, an author and I come together about a difference of opinion as to what is permitted; it is the Secretary of Agriculture——

Mr. GRAFF. Your duties are not confined to the writing of original matter.

Mr. HILL. No, sir; we have done a little occasional writing of original matter, but not usually. It is the supervision of the printing or the administration of the fund.

Mr. HAUGEN. How many thousand pages do you edit?

Mr. HILL. Last year we edited 23,000, and it is running bigger than that this year.

Mr. SCOTT. I would like to inquire what your practice is when proofs come back from the Printing Office, in regard to the report. I am told at the Government Printing Office that one of the largest items of expense over there arises from the changes in manuscript that are made——

Mr. HILL. Do they make that complaint of us now?

Mr. SCOTT (continuing). That are made in the proofs sent out. I wondered if you had got things fixed in your Department so as to eliminate that.

Mr. HILL. We have eliminated it very largely. It was a very serious expense when I first took hold of the editorial work. I have known

a case where the original composition was $200, and the corrections cost over $200; and the Secretary issued an order of the most positive character that no alterations must be permitted in proofs except such as were intended to correct errors made in the proof or where entirely new matter was added, which, of course, makes no additional expense. The addition of a paragraph is no further expense than the original composition would be. Sometimes new matter comes up during the course of—we do our very best to limit that, and two or three times when it has been excessive we have altered the requisition so that the amount of the correction was charged to the fund of the sinner—of the offender.

Mr. SCOTT. How did it happen that the sin was committed? Was it due to carelessness in the preparation of the copy?

Mr. HILL. Probably it was partly that. The tendency used to be a great many years ago, when I took hold over there—they used to get in the habit of editing things in the proof themselves, going over it, and they would put things in in very unprepared condition, and then go over it and make great changes in the galley proof. Now, it is more or less the tendency of every man in going over his matter to change and rewrite and fix up, and we have to check that all the time. We find everybody has that tendency.

Mr. GRAFF. By checking them you make them more careful in the preparation of their original matter?

Mr. HILL. Exactly. Of course, the editing saves a good deal of it. I take this ground, that if either my man or I can not understand it, it will not be better understood by the people outside, and consequently it has to be rewritten in the manuscript in such a way as to reach our modest understanding.

Mr. BURLESON. Is that one of the tasks imposed on you, to understand all of the things these scientific gentlemen write over there?

Mr. HILL. Yes; except science. If Doctor Wiley says $CO_2$ killed a cat, I do not know whether it does or not; that is his lookout, and the Secretary will not be held responsible.

Mr. GRAFF. I would like to ask you a question, Mr. Hill, about the farmers' bulletins.

The CHAIRMAN. Suppose we take that up after we get through with the salary list; that will be more appropriate. You submit for a chief clerk at $1,800?

Mr. HILL. Yes; and I promote the best man I have got to a $2,500 job.

The CHAIRMAN. Is that your editor, at $2,000?

Mr. HILL. He is getting $2,000 now.

The CHAIRMAN. He is on the statutory roll?

Mr. HILL. He is on the statutory roll, and he has been getting that salary for several years.

Mr. SCOTT. Who is that man?

Mr. HILL. Mr. Arnold—my first assistant.

The CHAIRMAN. He appears now on the statutory rolls as an editor, at $2,000?

Mr. HILL. At $2,000; yes, sir.

Mr. GRAFF. What became of this $1,400 man that you say you eliminated?

Mr. HILL. I can spare the $1,400 man.

Mr. GRAFF. What becomes of him?

Mr. HILL. The money went back in the Treasury for a while.

Mr. GRAFF. Where is he?

Mr. HILL. He did not exist.

The CHAIRMAN. Never was created?

Mr. HILL. We had one for awhile, you know, and after while we got him into one of the $1,600 places and——

The CHAIRMAN. He did not leave the Department?

Mr. HILL. We promoted one of the $1,400 clerks and left a $1,400 place vacant. We had the distressing experience of seeing the money go back into the Treasury.

Mr. GRAFF. I understood from you, Mr. Hill, that the $1,400 man was unsatisfactory.

Mr. HILL. I mean if the matter was left as it is I would need to get in another man at $1,400, and that would not be satisfactory. I have got enough of that sort of help.

Mr. GRAFF. You had a $1,400 clerk and advanced him to $1,800?

Mr. HILL. To $1,600. I have certainly got one of them that is good, but I can not get as good a man for $1,400 as I can for a higher price, you know. He showed himself to be especially worthy, and he was promoted at the first opportunity we had to $1,600. I still have one at $1,400, and in the course of time he will grow to be a very good man.

Mr. SCOTT. As I understand it, the pressing necessity in your office now is high-grade help, and in order to get high-grade work you must pay a decent salary?

Mr. HILL. That is what I want. I want to keep and help the best men I have got, and to relieve them, and let us get more chance to do editorial work. I have 158 people in my division, and the purely administrative details of that are very exacting and constant.

Mr. BOWIE. Mr. Hill, let me ask you just one question there in reference to that clerk at $1,400 that you say, technically, was dropped. That was really a reduction, for the reason, was it not, that you, prior to that time, under the statutory roll, was entitled to two assistant editors at $1,600?

Mr. HILL. Yes.

Mr. BOWIE. And 2 at $1,400?

Mr. HILL. Yes.

Mr. BOWIE. You gave 1 of your $1,400 men $1,600 and left the $1,400 place vacant?

Mr. HILL. Yes, sir.

Mr. BOWIE. You were entitled previous to that to 2 at $1,600 and 2 at $1,400, and now you have 2 at $1,400 and 1 at $1,600?

Mr. HILL. Yes.

The CHAIRMAN. Who is acting as chief clerk now?

Mr. HILL. Practically myself and Mr. Arnold—principally myself. I take at least three hours which is devoted to the chief clerk's work by myself. With a force of 155 to 160 people that I have every year it means quite a lot of detail.

Mr. BURLESON. Would these same publications printed by private concerns cost as much as they cost the Government now?

Mr. HILL. I do not see how they could, sir. The Public Printer pays a third more wages, about, to what is paid generally, and he gets a short day. He pays about $4 a day on an average to men who in

the most of the country get $3, and then he pays thirty days a year for work that he does not get.

Mr. BURLESON. The additional expense goes to the labor, does it?

Mr. HILL. I think the great bulk of it does; yes, sir. Of course I do not know, but it is popularly supposed that the Government really makes contracts as cheaply and as favorably as with other people. I confess they do our work pretty cheap, considering the difference in wages. Our farmers' bulletins, with which you are familiar—some of you gentlemen—we print those at an average cost of a cent and a half apiece. We could not better that a great deal, I think.

Mr. BURLESON. The reason I ask the question is because you said the Yearbook cost $300,000.

Mr. HILL. That is the amount that Congress sets aside for it, but I do not suppose the Public Printer spends all of it for the Yearbook. One Yearbook will not cost as much as another, and a great deal will depend on the amount of illustrations (colored illustrations), but the edition, you remember, is half a million; 60 cents a volume.

The CHAIRMAN. How much has your work increased this last fiscal year?

Mr. HILL. This present year over last?

The CHAIRMAN. Yes.

Mr. HILL. It has increased steadily, Mr. Chairman.

The CHAIRMAN. How can it, under the orders of last year?

Mr. HILL. There is more activity. We are certainly issuing more publications even than last year.

The CHAIRMAN. Last year your estimate was $29,000, and we gave you $29,320.

Mr. HILL. For statutory salaries, and the present arrangement asked for $1,200 more.

The CHAIRMAN. An increase of $2,820?

Mr. HILL. $2,820.

The CHAIRMAN. That is a big increase; that is about a 10 per cent increase on your statutory roll.

I notice you ask for 2 copyists at $840?

Mr. HILL. I have dropped them entirely in this present estimate. I have 2 copyists at $840, but I leave them out. I am trying to strengthen it up above a little, and spare what I can below.

The CHAIRMAN. You ask for an increase of salary for assistant in charge of the document section, and you ask for a second assistant in the document section at $1,400?

Mr. HILL. That document section has come to be a tremendous piece of work.

Mr. LAMB. I want you to explain that, please, sir.

Mr. HILL. In that document section we have over 120 people engaged, and during the past three weeks, for instance, many of those people have worked every night to 5 o'clock and 5.30. We were unable to get out the mail without it. We have sent out in a single day, of farmers' bulletins alone, 1,000 orders, which means a transcription of name and address twice over; and that is apart from the general miscellaneous mail.

The CHAIRMAN. We relieved you from addressing these franks this last year.

Mr. HILL. From addressing these Congressional franks, Mr. Chair-

man, and that was a very big job; but we have got to address all our own franks. We have 1,000,000 addresses in that room a month, I think, without a doubt.

The CHAIRMAN. Is not this assistant in the document section one of the hardest worked men you have got?

Mr. HILL. It is very hard, indeed. His Congressional mail alone, which he attends to himself, for me, is a big job during the session.

The CHAIRMAN. I have come in contact with him; that is the reason I ask you the question.

Mr. HILL. I want to give him an assistant at $1,400 that will relieve him of some of the minor details of that office. I want to say another thing, Mr. Chairman —to take this opportunity of saying it—it is a very difficult thing to get hold of a man who will run an office of 120 people. He has 105 ladies in that department.

The CHAIRMAN. What?

Mr. HILL. About 105 ladies in his section; and I assure you they require constant, judicious, and careful handling. He has got to be a sensible man and have a great deal of tact and judgment.

Mr. LAMB. He has that.

Mr. HILL. He has got that; but it takes time. Our force is a very good force; I am not saying anything against them. We have a little "deadwood," but there is getting less and less of "deadwood" every year. But you can not handle 90 or 100 women with just the brusqueness with which you can handle a force of 90 or 100 men.

Mr. HENRY. Will that remark apply to the other divisions and bureaus of the Agricultural Department?

Mr. HILL. I think so—in regard to the "deadwood," I think so; but I think there is a marked improvement year by year.

The CHAIRMAN. You have a greater percentage of women than any of the others, with the exception of the Statistical Division.

Mr. HILL. I beat them all. They are cheap help; a great majority of them get but $50 a month.

Mr. GRAFF. You could not get men to do this work?

Mr. HILL. I do not think so; not perhaps as accurately.

Mr. HENRY. What salary do you pay them?

Mr. HILL. We pay them $50; I think they will average $50 for the bulk of them.

The CHAIRMAN. Do not some of them work at $30 when starting in?

Mr. HILL. When starting in, some of them get $30.

Mr. HENRY. Where is the periodical list of documents compiled?

Mr. HILL. I do that in my office.

Mr. HENRY. Complaints have been made to me by a number of the members of the House that they are annoyed by early publication; for instance, of the horse book; it was announced through your catalogue several weeks before it reached the House folding room. I had 20 applications filed upon my desk, and they all involved a reply to explain why I could not send them.

Mr. HILL. I think I can explain that.

Mr. HAUGEN. I had 157 requests before it was issued, before we had a single copy; it got into the newspapers about six or eight weeks ahead of time. How did it get into the newspapers?

Mr. HILL. They were watching for it.

Mr. HENRY. They obtained it from your catalogue?

Mr. HILL. My catalogue did not come out until we got a copy. We get the first copy before it gets into the catalogue.

The chairman read as follows:

No. 471.] UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF PUBLICATIONS,
WASHINGTON, D. C., *September 19, 1903.*

THE HORSE BOOK.

The Special Report on Diseases of the Horse has been revised under a joint resolution of the Fifty-seventh Congress, is now in press, and will soon be issued. This report was prepared under the direction of the Bureau of Animal Industry of the United States Department of Agriculture, and was first issued in 1890, and the limited edition that the Department was able to publish was soon exhausted. The demand was then turned on Congress, and that body has from time to time ordered reprints for distribution by its own members, exclusively, until the number already issued has reached nearly half a million copies.

The resolution under which the present revision was made provides for the printing and binding, in cloth, of 200,000 copies, the same to be first revised and brought up to date under the supervision of the Secretary of Agriculture; 128,000 copies for the use of the House of Representatives; 64,000 copies for the use of the Senate; and 8,000 copies for the use of the Department of Agriculture. The allotment to the Department is so small that it will have none for general distribution, and those who may desire copies of the report should apply to members of the last Congress (the 57th), to whom all copies of the Congressional allotment will be delivered.

New members of the present Congress will not be entitled to a quota.

The report has been carefully revised, either by the authors of the several articles or by veterinarians of wide reputation. An entirely new article on The Examination of a Horse, by Dr. Leonard Pearson, State veterinarian of Pennsylvania, is included; also a chapter on shoeing, written by J. W. Adams, professor of surgery and lecturer on shoeing, veterinary department, University of Pennsylvania.

The report also contains the following articles: Methods of Administering Medicines, Diseases of the Digestive Organs, and Wounds and their Treatment, by Ch. B. Michener, V. S.; Diseases of the Urinary Organs, Diseases of the Generative Organs, Diseases of the Eye, and Diseases of the Skin, by James Law, F. R. C. V. S.; Diseases of the Respiratory Organs, by W. H. Harbaugh, V. S.; Diseases of the Nervous System and Diseases of the Heart, Blood Vessels, and Lymphatics, by M. R. Trumbower, V. S.; Lameness, by A. Liautard, M. D., V. S.; Diseases of the Fetlock, Ankle, and Foot, by A. A. Holcomb, D. V. S.; General Diseases, by Rush Shippen Huidekoper, M. D., Vet.; and Surra, by Ch. Wardell Stiles, Ph. D.

It is illustrated by 41 plates and 18 text figures.

Mr. HILL. That was information that was given to us from the House folding room.

The CHAIRMAN. It was issued from your Division of Publications.

Mr. ADAMS. And states that it will soon be issued.

Mr. HILL. Will be issued in the future.

The CHAIRMAN. What was the necessity for issuing that?

Mr. HILL. To answer our innumerable correspondence that came to us through the newspaper reports to the effect that the new edition of the horse book would be issued and would soon appear.

Mr. HENRY. I dislike very much to criticise the work of your division, but it does seem to me that this announcement might have been delayed approximately to the time the publication reaches the House folding room and save all of this annoyance.

Mr. SCOTT. Sometimes the newspapers will not only announce the fact of the publication about to issue but they give a lot of detailed information as to what is in the book.

Mr. BOWIE. I suppose that can not be prevented.

Mr. BURLESON. And they also urge that everyone who wishes to read this book will immediately write their Congressman for it.

The CHAIRMAN. The article states what the report contains, and also that it is to be illustrated with plates, and carefully revised, etc.

Mr. HILL. I would like permission to look at it. [Takes paper.] This is not a monthly list. This is a press report. We sent that to the papers to correct some of the most extraordinary misstatements which were causing us an enormous amount of correspondence, and we concluded it would be better to send out this; but we at that time anticipated, and had every reason to anticipate, that the book would be out in about three weeks, and were getting such an enormous number of applications and letters based upon this information, some of the most ridiculous character, that we thought we had better send out a slip giving the exact facts. If we had had an idea that the Horse Book would not have been out in three weeks we would not have done it. It saved us an immense amount of correspondence.

The CHAIRMAN. Why would not a copy to the effect that they had been provided for answer?

Mr. HILL. The sequel proves that that would have been better, but we had every reason to believe they would be out. The fact was, at that time, it was not expected the new members would have any, because it was expected to be out before the next Congress met.

Mr. BOWIE. How many of these announcements of the publication do you send out?

Mr. HILL. We aim to send out the announcement of our new publication when the last page proof goes back to the printer, and we have reason to suppose that in the course of ten days or a fortnight that they will be ready.

Mr. BURLESON. How many did you send out?

Mr. HILL. Every newspaper on our list. Every newspaper that asks to be put on our list, we put on our list.

Mr. SCOTT. Do you send to private individuals who ask to be put on your list?

Mr. HILL. No, sir; we send them a monthly list, giving the details of the publications issued—a monthly publication—and we send that to everybody that asks for them. We send out 120,000 of those every month, and the demand is increasing constantly.

Mr. ADAMS. Is there to be another edition of the Cattle Book?

Mr. HILL. Yes, sir; it is under revision now.

Mr. ADAMS. When will that be published?

Mr. HILL. It will not reach my hands for a long time yet.

The CHAIRMAN. Your general answer to these questions concerning increases of salary, then, and increases of force on the statutory roll, is increase of work?

Mr. HILL. It is increase of work, Mr. Chairman, and—I will be perfectly frank—an earnest desire on my part to relieve myself, and to relieve my assistant, of a lot of extra work that we have been very cheerfully performing. I do not expect to get rid of it all, but I would like to get rid of the constant night work that I have for five or six months of the year.

Mr. HASKINS. Is it not true that the Department is increasing in all its branches every year as the country increases in size?

Mr. HILL. Exactly; and perhaps a little faster, because we have not caught up to the country yet. There are 6,000,000 farmers in the United States, but I do not believe we reach a million of them.

The CHAIRMAN. You reach all that want to be reached?

Mr. ADAMS. The trouble is that the fellows we want to reach are the fellows who do not want it.

Mr. GRAFF. I believe this division is one of the most important divisions, because this is the medium through which the people are to get the benefit of the information, if they get it at all.

Mr. SCOTT. You said a moment ago that a large number of the employees on your roll are kept during most of the session of Congress until 5 or 5.30 o'clock.

Mr. HILL. That would be an exaggeration—not during the most of the session of Congress, but frequently during the session we have to keep them late.

Mr. SCOTT. When that is the case what arrangement do you make for extra pay?

Mr. HILL. None. The law prohibits it; the law says the Secretary may exact extra hours, but he can not compensate with extra pay. It is only the laborers that get extra pay.

I want to say, Mr. Chairman, it is a little overlooked that our people have been giving the extra work that they have. Lots of our people give more than the half hour amounts to.

The CHAIRMAN. Would that be an average for a year—a half hour a day?

Mr. HILL. It would come, every year, very near it. If you remember, we give the half holiday on Saturdays very cheerfully and ungrudgingly to the Government service. We exact that from our employees.

Mr. ADAMS. We figure the Government would gain fifteen to sixteen days' actual work.

Mr. HILL. I think that is it. I have figured that out. The most responsible men I have put in from twenty to thirty days of extra work—the equivalent of twenty or thirty days of extra work.

Mr. ADAMS. Are you quite sure of that?

Mr. HILL. I know it, sir. You have not got a finer lot of men in the world than my force. Let me tell you this. I have had many of my men face a lot of work that I know would take a man four or five hours to do, at 4 o'clock in the afternoon, and I know they have brought it to me completed at 9 o'clock the next morning, many and many a time. As soon as they find out I want it, and I am going to be disappointed if I do not get it, I get it.

Mr. BOWIE. Those are the men you want to promote?

Mr. HILL. Yes, sir.

Mr. BOWIE. Is it not a fact that many of your men do not take a thirty-day leave?

Mr. HILL. I do not think that in the fourteen years I have been here that I can think of a half dozen cases where responsible men have taken thirty days of leave.

Mr. BOWIE. All of it, you mean?

Mr. HILL. All of it, I mean. I have been there fourteen years last July, and I do not think I have had thirty days in all that time.

The CHAIRMAN. Why do they not take their leave? The law says they can.

Mr. HILL. If the Secretary permits.

The CHAIRMAN. I thought it was obligatory.

Mr. HILL. No, sir; it is purely permissive.

The CHAIRMAN. Is the act in your Department exceptional?

Mr. HILL. No, sir. You will find the law says that where the Department shall be so and so, the head of the Department may, in his discretion, if the work of the Department permits, allow employes not to exceed thirty days' leave, during the year.

The CHAIRMAN. I have been here sixteen or eighteen years, and that is absolutely new to me. I though that obligatory.

Mr. HILL. It is with the Public Printer. It is made obligatory, but on the other hand they never ask a man——

The CHAIRMAN (reading). "One second assistant in document section." Do you think you need two assistants there?

Mr. HILL. Indeed, Mr. Chairman, I do. It is perfectly impossible for me or Mr. Arnold to be free when occasion requires Mr. Handy's absence. You must remember, Mr. Chairman, another thing, that that section is scattered all over an acre of ground.

The CHAIRMAN. You have a foreman in the document section at $1,400. You have one assistant in charge of the document section——

Mr. HILL. At present getting $1,800.

The CHAIRMAN. You want him increased to $2,000?

Mr. HILL. I would like to get him increased a couple of hundred dollars; he has never had an increase.

The CHAIRMAN. Who is the foreman?

Mr. HILL. A man named Hendricks; but he is not competent to take Mr. Handy's place in any way. It would be like appointing a sergeant to be captain; some of them are good sergeants, but not fit to be captains.

The CHAIRMAN. What is the character of the foreman's work?

Mr. HILL. He simply has charge of some 30 men who do what I call the heavy work—mailing of the Year Book and Horse Book, the mailing of the Soil Report; he superintends men who do practically manual labor. The civil service calls it "semi-clerical," because they have to know how to read and write.

The CHAIRMAN. If it is manual labor, you are giving him a pretty big salary.

Mr. HILL. He supervises 20 or 30 men, too. It is the supervision we pay for. The only fault I have to find with the old man is that he tries to do too much manual labor.

The CHAIRMAN. How long has he been there?

Mr. HILL. About eight, or nine, or ten years.

Mr. LAMB. What is his name?

Mr. HILL. Hendricks.

The CHAIRMAN. How old is he?

Mr. HILL. That is a delicate subject; but he was all through the war; he is an old soldier; I should judge he is a man in the late sixties.

The CHAIRMAN. Nearly 70 years old?

Mr. HILL. I should think so.

The CHAIRMAN. It is all owing to his age or decrepitude that you feel bound to ask for a second assistant for him?

Mr. HILL. No, sir; but he can not supervise outside of these men, and I want a second assistant. I want a man who has got education, a man who can write letters, a man who can dictate, a man who understands bookkeeping. The foreman understands nothing about bookkeeping. We keep accounts; we keep a ledger account with every Senator and Member of Congress; we keep card indexes, and things

of that sort. I have got to have a man with clerical experience and education as second assistant.

Mr. SCOTT. Did you say the foreman knows nothing about bookkeeping, and you must keep books; what have you been doing heretofore?

Mr. HILL. I have been keeping it with a part of the clerical force, but to our very great disadvantage. I have been helping Mr. Handy in a spasmodic way, sending somebody over there at times. I want somebody to be there permanently. You see our force is scattered; our document-section force is in three different buildings, a great many rooms, and Mr. Handy, with all his good qualities, is far from being ubiquitous. He is absent a great deal, from one place to another. He is very earnest, tries his very best, but I need to give him help; it has grown beyond us. The present force has not been increased in that section, Mr. Chairman, since the time when we issued 7,000,000 publications during the year, and we handled nearly 12,000,000 last year. We are accomplishing a great deal more for the reason that we are getting rid of the "dead wood," little by little. My force is getting more and more efficient as time goes on. We are accomplishing more and we are doing 25 per cent more work, without additional help, than we were doing four years ago. But it is——

The CHAIRMAN. Are you troubled much with what is generally called "dry rot," either on your lump sum or statutory roll?

Mr. HILL. There are a few ladies and gentlemen that I could spare, but they seem to have too much influence to be gotten rid of. I think we probably have as little "dry rot" as anywhere.

Mr. LEVER. Your force is under the civil service?

Mr. HILL. Yes.

The CHAIRMAN (resuming). What percentage of the whole—10 per cent?

Mr. HILL. No, sir; I should think it was less.

The CHAIRMAN. Five in 100?

Mr. HILL. I think possibly I might, out of my force of 150 or 160, if I had to do it, take out about 8 or 10 or 12 that I would be glad to see taken away.

The CHAIRMAN. Mostly on account of age, or on account of incompetency?

Mr. HILL. With some, natural meanness; some, just natural laziness; some, because they can not see why I am worrying about their doing work when they have got pull enough to keep them there without doing it.

The CHAIRMAN. Have you ever tried to get rid of them?

Mr. HILL. I furnish a semiannual report, in which I state that their absence would be better than their company. I try to persuade them to resign; sometimes I have made them unhappy enough so that they have resigned.

Mr. BOWIE. Have you any power to discharge them?

Mr. HILL. No; I have no punitive power whatever; that belongs to the chief clerk.

The CHAIRMAN. He makes the recommendation and it goes to the Secretary?

Mr. HILL. I make the recommendation.

Mr. BURLESON. The chief clerk of the Department of Agriculture?

Mr. HILL. Of the Department of Agriculture.

Mr. BURLESON. Who is the chief clerk?

Mr. HILL. Col. S. R. Burch.

A MEMBER. I thought Geddes was chief clerk?

Mr. HILL. He has not been for nearly six months.

The CHAIRMAN. If these 8 or 10 people that you think are incompetent for one reason or another were supplanted by 8 or 10 good people you would not ask any increase?

Mr. HILL. Well——

The CHAIRMAN. I do not mean increase in salary, but increase in your force.

Mr. HILL. Well, Mr. Chairman, I am asking for so little increase now for force; I would have to for what we have already been decreased; and I would have to ask, anyway, because the people I speak of are so insignificant as regards salary and position—"the deadwood"—it would not help me in the points we have been making. When it comes to the other $10,000 we are going to get to, that is mostly for material. There is very little of wages there, except for some additional photographic help.

The CHAIRMAN. I thought we "sat upon" photographic help, or photographs, last year?

Mr. HILL. We sat down on expensive illustrations, and that is what increases photographic work.

Mr. BURLESON. Before we pass from these 8 or 10 clerks, it strikes me that when it is brought to our attention that there are 8 or 10 men in any division who are not rendering proper service, who are inefficient and idle, and when the chief of the division says that he has tried to get rid of them and can not, on account of "pull," I think we ought to ask who they are. Send for the chief clerk, and ask him why he does not dispense with their services.

The CHAIRMAN. Did the committee understand you to say that you had recommended their discharge?

Mr. HILL. I have never formally recommended it; I have discussed the matter occasionally with the chief clerk, that such and such a one was a very "poor sister." In some cases I have discovered there are reasons; in one or two cases they may be eleemosynary; may be cases almost of charity. I can think of one case now that I think is largely due to long and faithful service of many years of a father who is now helpless. He served his country for many years in responsible positions at a good salary and he is now old, helpless, and I think the party who is trying to do this work is conscientious and does the best possible, but is not very fit for work.

Mr. HASKINS. You say the influence of Senators and Members of Congress keep them there?

Mr. HILL. As a rule; yes, sir. It is generally something of that sort; yes, sir. I think that the reduction which has gone on with us in that respect has been very satisfactory, and that has given us all hope. There has been a continual sloughing off of that kind of thing, and no additions to it.

Mr. BOWIE. You think the present Congress is improving in that respect?

Mr. HILL. Either in that respect or it is becoming to think it is a kind of hopeless matter to get people on now. We are hedged about with a great many regulations, you know, but I do not think they get after us as they used to do.

Mr. ADAMS. We can not. The civil-service business comes in.

Mr. HILL. It does; and it helps a good deal, but there has been a steady reduction in that direction for the last five years.

The CHAIRMAN. You have never really made a distinct recommendation for the discharge of these incompetent people?

Mr. HILL. I have in two cases, but they were both old soldiers, and the Secretary told me he would not discharge an old soldier; said he would punish them, suspend them, and try to make them see the errors of their ways, but he would not discharge an old soldier.

The CHAIRMAN. What was the punishment in that case?

Mr. HILL. One man was furloughed for a fortnight with loss of pay.

The CHAIRMAN. Do you know what those men are getting to-day?

Mr. HILL. One of them the Lord took to himself a few months ago.

Mr. BOWIE. Were they incompetent or did they commit breaches of discipline, of insubordination?

Mr. HILL. Incompetent and insubordinate, and occasionally very drunk. On anniversaries, for instance; and anniversaries of great battles were very much to be dreaded.

The CHAIRMAN. What salary does the man get who still holds his position there.

Mr. HILL. $60. I have asked to reduce him to $40. I have concluded that he wastes so much money that the less salary he has the better it is.

Mr. HAUGEN. It is possible for you to reduce their salaries?

Mr. HILL. I have no punitive power at all. I can not suspend him for two days. If he became particularly offensive I would ask him to leave the place, and refer it to the chief clerk to see what he would do.

Mr. LAMB. The Secretary suspends them when they fight?

Mr. HILL. When they fight; yes.

The CHAIRMAN. I think we will have to pass to your lump-sum appropriation. You ask for $15,000 for additional assistance—editorial, proof reading, inspecting, and other necessary help in the city of Washington or elsewhere, etc.—and an increase to $90,000 for labor and material required in the distribution of documents—both of those cover labor of certain kinds?

Mr. HILL. The additional assistance cover occasionally an additional emergency clerk, an additional artist, and occasionally when we have to purchase manuscript——

The CHAIRMAN. Who from?

Mr. HILL. We sometimes find a man who is possessed of a certain amount of very valuable information upon some line of work in which we are engaged, and we want to publish it, and we want to publish it as a publication of the Department.

The CHAIRMAN. Those are men who are not connected with the Government?

Mr. HILL. They are not connected with the Government. We could not do that if they were.

The CHAIRMAN. I think I have seen some of those that were furnished by the officials of the experimental stations.

Mr. HILL. They are, frequently, by some of the officials of the experimental stations. The matter was decided by the Comptroller that they were not employees of the Department, and could not be treated that way.

The CHAIRMAN. I remember seeing those publications.

Mr. HILL. Occasionally, for farmers' bulletins.

Mr. HENRY. Not very many of those, Mr. Hill?

Mr. HILL. Not very many.

The CHAIRMAN. Very few. I remember seeing one on irrigation expenses last year.

Mr. HILL. The foreman that is now an employee of our department; there was a time we got one from him, as a drainage expert. We got one from him; and occasionally we have a Yearbook article, and in addition to that we pay our artists—the bulk of our artists—from that fund; but it is not altogether a permanent force. We have left it in that lump sum because we have occasionally to put on a man for two or three weeks—sometimes for two or three months—and yet not permanently; and there are a few of them that have practically become permanent because they have grown up to our work. Then in our photographic work, in our efforts to reduce the more expensive illustrations and to avoid the expense of artists, we use photography more and more.

We have a very good equipment, and I find it absolutely necessary for me to have one or more assistants at work in that line. But I can get assistants at from $840 to $1,000 in that line, that would cost from $1,200 to $1,400 if I had to put artists on. It would cost at least $1,000 more in wages, for artists, than it would——

Mr. BOWIE. Do the plates cost any different?

Mr. HILL. That would be mechanical; but as to the artists themselves, you can get a man who will help in our photographic laboratory for $400 or $500 less than I can get a first-class artist——

Mr. BOWIE. I want to know what you save on the plates.

Mr. HILL. A great deal less on the plates. We are doing much more line engraving and half-tone, all of which is done with our photographic work, and we help a great deal on the map work, and save a great deal. Most of our illustrations are made by photography, where a few years ago we made them by hand.

Mr. BURLESON. Did you print that [showing map], issued by Biologist?

Mr. HILL. I think I did. That was prepared here; yes.

Mr. BURLESON. How much does that cost?

Mr. HILL. I could not tell you.

Mr. BURLESON. Approximately?

Mr. HILL. It is one of the most difficult things in the world. I would have to count the colors and know the exact size of the edition, which I can not remember.

Mr. BURLESON. It would cost $300 or $400?

Mr. HILL. I should think so, yes; in bulletin form I should say about $300—I should think that would be a safe estimate, but I would not like to be tied down to $50 one way or the other. That is for an issue for 3,500 or 4,000 copies.

Mr. GRAFF. Are these farmers' bulletins that are issued, all of them, extracted from the same matter that goes into the Yearbook?

Mr. HILL. By no means. That occasionally happens. We occasionally have a Yearbook article that is good material for a farmers' bulletin, and there is no use sending a man a whole Yearbook because he simply wants the one article, so we reissue it as a farmers' bulletin; but that has happened I, think, in only about half a dozen cases.

Mr. GRAFF. Are not these employees of the Department in any

capacity, in your department of investigation, bound to furnish articles when they are asked to do so in the line of their work without extra charge?

Mr. HILL. Certainly. Most of our farmers' bulletins are written by employees of the Department who get no extra remuneration. It is rare that we have an article in our Yearbook that is not written by one of our men. It has happened very seldom, and they get no extra remuneration.

Mr. BOWIE. I want to ask you one question. You stated once or twice this morning, and I have heard it frequently before, that the Department had many more requisitions for Yearbooks than it had?

Mr. HILL. Three times as many as we have.

Mr. BOWIE. Why can not that be corrected by increasing the Department quota threefold? What is the use of printing it without furnishing it to everybody that wants them? And just fill out those that ask for it in your list of correspondents—your regular list—and then stop.

Mr. HILL. We practically use that entirely as a sort of remuneration for correspondents and collaborators who work for the Department for nothing, and one of the few things we can do toward keeping them ready to help us, is to give them some of our publications, especially the Yearbooks.

Mr. LAMB. You do not send that Yearbook to anybody but these?

Mr. HILL. No, sir; that is one reason we got into trouble with Members of Congress, because we have to state to them that our quota is exhausted, and they can only get one by applying to your Senator or Representative.

The CHAIRMAN. You remember last year attention was called to what was considered a tendency to over illustrate? Some of the illustrations we considered rather ridiculous.

Mr. HILL. Yes, sir.

The CHAIRMAN. Has there been any determined effort to curb that tendency?

Mr. HILL. There has, most assuredly. I do not think you can show in twelve months a single example of serious overillustration, or one that would compare with three or four cases that were brought up here a year ago.

The CHAIRMAN. You can not show me another photograph of a hogpen, can you?

Mr. HILL. I think not.

The CHAIRMAN. That was one of the most ridiculous things I have ever seen, I think. One of these bulletins contained a photograph of a plank hogpen down in Georgia. A determined effort has been made, Mr. Hill?

Mr. HILL. A determined effort—most assuredly. If you were to consult with the authorities, and show sympathy, they would denounce me.

The CHAIRMAN. This volume here is pretty profusely illustrated [indicating].

Mr. HILL. What one is that?

The CHAIRMAN. Soils.

Mr. HILL. For a volume of that kind I think there were between 40 and 50, and there were 100 submitted.

Mr. SCOTT. Who determines what bulletins shall be issued and what shall not be issued?

Mr. HILL. Well, sir, that is mainly the head of the bureau. If he says that he has information that is worth printing and ought to go out, it is generally conceded to him that it is so.

Mr. SCOTT. Is there any place in the Department where the cost of each individual bulletin is figured and placed on record?

Mr. HILL. Yes, sir, and charged to each bureau.

Mr. SCOTT. Where is that?

Mr. HILL. My report will show you the exact amount chargeable to the printing fund of each bureau and division in the Department. I keep a ledger account with each one of them.

Mr. GRAFF. Do you mean the amount is deducted from the appropriation and set aside for that particular bureau?

Mr. HILL. We have no printing appropriation set aside for each bureau. It simply enables me to keep one man from "hogging" the whole thing. It keeps me posted as to how much each one is spending. Sometimes, of course, you will see that one is spending a great deal more than another, but there seems to be a good reason. It does not become a burning question only until the last three months of the fiscal year, when the fund begins to run low, and I have to concede to one man who has not had his share for the previous nine months, and, perhaps, to the exclusion of another man who has had more than his share.

Mr. GRAFF. Do the heads of the different bureaus show a disposition to be governed in the issuing of bulletins that——

Mr. HILL. I think so, sir. There is another thing. In most of the bureau appropriations there is a clause which permits them to pay for printing, and we get after them that way—"if you want this, you can have it by paying for it yourself, out of your own funds; you can not have it out of the general printing fund."

The CHAIRMAN. In view of the two orders requiring clerks to work a half hour additional every day, you will still recommend that $5,000, and eliminate the other portion of it—the $2,000 for labor?

Mr. HILL. Between $2,500 and $3,000 is for material. I have run short of material this year. I tell you frankly, Mr. Chairman, I hope to be able to use that for promotions of from $40 to $50 and from $50 to $60. I do not expect to add a single person to my force. They have handled the work so cheerfully and so well, and so cheerfully performed extra work, and all that kind of thing, I am inclined to think we will be able to pull through without increasing the force. There are women there who used to write 500 franks a day who have gotten so they write 700 or 800. I really find it is more economical to increase the efficiency of the force than it is to increase the number. There is another thing: I can not increase the number, because I have not room, and I must do my best to increase the efficiency of the force, and would like very much to have a couple thousand dollars leeway. If you will notice the total of my increase, Mr. Chairman, it is barely 5 per cent increase on this year.

The CHAIRMAN. What was the increase last year?

Mr. HILL. There was none, sir, except $500 on the total amount, except in the printing fund.

The CHAIRMAN. Was there not an increase in the lump sum?

Mr. HILL. No, sir; there was a little readjustment in the lump sum, but there was no increase in this year over last. There was an apparent increase because the material, labor, got 85 instead of 80, but you took it off of the farmers' bulletin and additional assistants, and, except the increase in my own salary of $500, there was no increase.

The CHAIRMAN. Yes; we only had $280,000 in 1904, Mr. Hill, was it not?

Mr. HILL. In 1903 the appropriations were just the same, Mr. Chairman, as for 1904.

The CHAIRMAN. You had $200,000 last year?

Mr. HILL. I had $200,000 last year, and I have got $200,000 this year.

The CHAIRMAN. Yes; that is right.

Mr. HILL. So it is an increase of 5 per cent in two years. And, as I say, the amount required for additional assistants, a good share of that will have to be to enable us to cheapen the illustration work, to meet the increase at the least expense possible, by enlarging our photographic facilities; and of the other five thousand, nearly three thousand has got to be allowed for labor.

The CHAIRMAN. That is the second five thousand.

Mr. HILL. I do not expect to add a single person to the force. I think possibly the additional hours may help us to get through, though I have never had any trouble about that. My people never fail to respond when I ask them to work for an hour later. They always do it without grumbling, and cheerfully; and it was a little convenience to us leaving it free in that way, because we worked them until 5 o'clock when there was an emergency, and let them get out at 4 o'clock when there was not an emergency.

The CHAIRMAN. A year ago we allowed you to purchase a wagon, horses, etc. Has that been a source of economy to you?

Mr. HILL. Yes, sir; in fact it has been more than a source of economy. We actually could not have done the work. We would have had to hire men.

The CHAIRMAN. You used to hire, but you have found it more economical to do it with your own horses.

Mr. HILL. A great deal. Of course, there is a great deal in the convenience. We have it there, and we keep it very busy.

The CHAIRMAN. Could you not have wagons by the month, by contract?

Mr. HILL. I never thought of that. I never tried that.

The CHAIRMAN. A great many people job their carriages by the month.

Mr. HILL. We have this team now in use constantly for over two years and it is the greatest kind of a convenience. You see the mail work has become something perfectly tremendous. I can load seventy-five or eighty bags on that wagon at one clip, and it is always there when the material is ready to go, and we get at it; and we do not have to wait for a man to come and call for it; and we have so little room that it is a matter of great importance to us. We have hardly room to turn around in when we get stuff together; it must go out.

The CHAIRMAN. How much are you paying the driver of that wagon?

Mr. HILL. I am paying him only $50; I think he is worth $60. The equipment is worth $1,300 or $1,400.

The CHAIRMAN. How much does it cost to maintain your horses?

Mr. HILL. That does not come out of my fund, and I do not know. I am hoping that nobody will bring up that question, because if they do they will make me pay for it.

The CHAIRMAN. I do not believe if you get the dollars and cents together you will find it is any economy.

Mr. HILL. Possibly not, sir.

The CHAIRMAN. In the first place, the average dray and livery stable man here does not pay $50 or $60 a month for his driver, to start with, and men who make a business of that thing feed 60 or 100 horses cheaper than 5 or 6?

Mr. HILL. We did not have any additional barn room. We found barn room for them by readjustment of the stable that was there.

The CHAIRMAN. But you had to buy horses?

Mr. HILL. We have bought the horses, and we have got to have a man as a driver who is a little better than the ordinary. He has got to handle the post-office people, and he has got to have a good deal of intelligence; then he has got to handle things for members of Congress. The members of Congress took 4,000,000 of farmers' bulletins last year; and I think we have got to have rather something better than an ordinary teamster.

The CHAIRMAN. It is a small detail. I wanted to know if it was a matter of economy; as a matter of fact I did not think you would find it economical.

Mr. HILL. It is really something on which I am not competent. I know so little about horseflesh—I never kept but one in my life—I think he had to be shod every two days; and I sold him.

The CHAIRMAN. As a matter of fact your rush does not come steadily, it is periodical during the year; and at times you are comparatively easy?

Mr. HILL. There are times when we are comparatively easy; but we have pretty good steady work all the time, now, but unfortunately the absence of a watchman or the departure of somebody else does not occur with special reference to our easy times, and we have a great deal of trouble in helping them out. A man turns up sick in the post-office and they send to me to know if I can not supply his place; a watchman fails to turn up and I have to help out.

The CHAIRMAN. Are there any further questions the committee wishes to ask of Mr. Hill? If not we will stand adjourned until 2 o'clock p. m.

Thereupon the committee adjourned until 2 o'clock p. m.

AFTER RECESS.

The committee met, Hon. James W. Wadsworth in the chair.

Mr. Frank L. Evans, chief and disbursing clerk, division of accounts and disbursements, Department of Agriculture, appeared before the committee.

## STATEMENT OF MR. FRANK L. EVANS.

The CHAIRMAN. Mr. Evans, the chief of the division of accounts of the Agricultural Department, is before us, gentlemen. You have what might be called the Secretary's roll, have you not, Mr. Evans?

Mr. EVANS. Yes, sir; I have some figures here.

The CHAIRMAN. Would you not be the proper person to consult in regard to that on the estimates for what is called the office of the Secretary.

Mr. EVANS. Yes, sir.

The CHAIRMAN. The chief clerk, the telegraph and telephone operators, and there is an increase asked for an assistant engineer, and other things asked for.

Mr. EVANS. Yes, sir.

The CHAIRMAN. Who would have specific charge of these people? You do, do you not?

Mr. EVANS. Not entirely; no.

The CHAIRMAN. Whom ought we to see about that roll?

Mr. EVANS. The chief clerk of the Department.

The CHAIRMAN. Then let us go to page 21, division of accounts and disbursements. The first change that I notice there is the increase of the salary of the chief of the division, $250, making it $3,000, instead of $2,750 which you get now.

Mr. EVANS. Yes, sir.

The CHAIRMAN. I suppose that you have a little delicacy about giving your reasons for your own increase, but you may state in your own way to the committee why you think that you ought to have an increase.

Mr. EVANS. That increase was based upon the work and the responsibility that I have as chief of the division, not as disbursing clerk. As chief of the division I have a great deal of work to do that other disbursing clerks, the disbursing clerks in other departments, have not. For instance, all the accounts of the Department are prepared in my office, audited, and paid there. In the other departments, as a general thing, the accounts are prepared in another division, and merely come to the disbursing clerk for payment. With me, from start to finish, it is all in my office.

The CHAIRMAN. And any appropriation for your Department passes through your office?

Mr. EVANS. Yes; I am the only disbursing clerk of the Department. I pay all the moneys for the different appropriations. All the requisitions for supplies are issued by me and over my signature. All letters of authorization for travel and otherwise are issued by me, and all requisitions for transportation and orders for transportation of Government property are issued over my signature. I prepare the schedules for annual supplies and all the legal work of the Department is done in my division and under my supervision and direction. All those things are really outside of my duty as disbursing clerk.

The CHAIRMAN. What increases have you had?

Mr. EVANS. I have had only one increase, which came the 1st of last July.

The CHAIRMAN. You had $2,500 before that?

Mr. EVANS. I had $2,500 for a good many years. And the appropriations for the last ten years have doubled, from about $2,600,000 to $5,200,000 for the present year.

The CHAIRMAN. It has more than doubled?

Mr. EVANS. More than doubled.

Mr. ADAMS. It is $6,000,000, is it not?

Mr. GRAFF. Do I understand this increase is for the present year?

Mr. EVANS. For the present year.

The CHAIRMAN. It is in effect now, since the 1st day of last July?

Mr. EVANS. Since the 1st day of last July.

Mr. GRAFF. That carries $3,000.

The CHAIRMAN. The estimate was submitted. Has the number of employees increased any—in your division?

Mr. EVANS. They have increased; yes, sir, somewhat. They have increased from 13 to 21, and several of those are detailed from other branches of the Department.

The CHAIRMAN. There is one assistant chief of the division; he is for the Weather Bureau?

Mr. EVANS. Yes. He is in charge of the present weather accounts division of the Weather Bureau.

The CHAIRMAN. That increase, you remember, gentlemen, was advocated by Professor Moore here the other day, so that we will not touch upon it with Mr. Evans.

Mr. SCOTT. You spoke just now of some of the clerks in your division being detailed from other divisions in the Department.

Mr. EVANS. From other branches; yes, sir.

Mr. SCOTT. How many are there, on the average?

Mr. EVANS. There are 5, I think, now.

Mr. SCOTT. Would that mean that some division has had more clerks than it needed.

Mr. EVANS. More than it needed, and they furnished these additional clerks in order to enable me to do this additional work.

Mr. SCOTT. As a matter of fact, then, a certain number of clerks ought to be cut out of some other division and put into yours? It is not good administration, is it, to give one division more clerks than it needs with the expectation that they will be detailed into some other division?

Mr. EVANS. No, sir; that would be the proper thing, to give them permanently to this division.

Mr. SCOTT. Is it not true that these clerks are doing the work of those separate divisions in your division?

Mr. EVANS. Yes, sir.

The CHAIRMAN. Working on the accounts of those bureaus?

Mr. EVANS. When detailed from a bureau that clerk has charge of the accounts of that bureau; for instance, the clerk from the Bureau of Plant Industry has the accounts of his division. The clerk detailed from the Bureau of Soils has charge of the accounts of that Bureau, and so forth, and practically they should be paid from the appropriations of those several Bureaus.

Mr. SCOTT. I understand, but you know that there has been a good deal of criticism about this practice that has prevailed in nearly all of the Departments of detailing clerks from one part of a Department to another, or even from one Department to another Department in some cases, and it seems to me that that is bad administration.

Mr. ADAMS. That is economy, sometimes. For instance, in our State government—and it can not be very different here—we have in our State capitol several hundred clerks, and there are times in the year when it is absolutely required to have the whole force in one department, and in another part of the year there is no work to do in that department, and they are sometimes transferred, and in a case of that kind it is an economical measure, and it might occur in these Departments here. I do not say that it does; I do not know.

Mr. EVANS. There was a question submitted to the Comptroller about a year ago, and he decided that it was proper for such details to be made, under the law.

The CHAIRMAN. You spoke of a supervising auditor. That is absolutely new?

Mr. EVANS. That is new; yes, sir.

The CHAIRMAN. That is the next item. Professor Moore, you know, spoke about that. This is an instance of one of those details, Mr. Scott. The chief of the division is paid by the Weather Bureau?

Mr. EVANS. No, sir; he is paid on my roll.

The CHAIRMAN. But he attends specifically to the Weather Bureau accounts?

Mr. EVANS. Yes, sir; all the time. He simply goes back and forth to report to me, and he is there to do that work.

The CHAIRMAN. Are his headquarters with you in your office?

Mr. EVANS. No, sir; his headquarters are in the Weather Bureau.

The CHAIRMAN. That is what I thought. I have always seen him there when I went there.

Mr. EVANS. His headquarters are at the Weather Bureau, but he is carried on my roll, and he is detailed there as a matter of convenience because the building being located at another part of the city it is more convenient.

The CHAIRMAN. I thought that this stood on all fours with the other details, but it seems that it does not. In a way he is one of Mr. Evans's subordinates, and yet in a way he is the subordinate of the Weather Bureau. He is a subordinate of both of you, in a way, is he not?

Mr. EVANS. Yes, sir; he is detailed there because the accounts of that office are there, and the clerk doing that work is there, and it is more convenient to send him there than to bring them to the Department.

Mr. SCOTT. There is no danger, I suppose, of his being carried on a salary in both of your offices, is there?

Mr. EVANS. No danger of that; no, sir.

Mr. SCOTT. What bureaus have details to your office? Name them specifically, these five clerks?

Mr. EVANS. The Bureau of Plant Industry, the Bureau of Animal Industry, the Bureau of Forestry, and the Division of Publications; and the other detail is only temporary—that is, for a short time, on account of additional work.

Mr. SCOTT. To meet an emergency at certain times of the month, on pay days, or something of that sort, in special times of emergency?

Mr. EVANS. Just to meet emergencies; yes, sir.

The CHAIRMAN. Now, you estimate for a supervising auditor, and that is an absolutely new place. What do you propose to do with the supervising auditor, and what is the necessity for that?

Mr. EVANS. To have the accounts, after they have passed the usual audit under my direction, to be supervised by another clerk who will be under the Secretary, to give them an administrative audit, as it were, so as to catch up anything that might escape the first audit, and to be an audit that is practically outside of my office, as it were. The clerk is located there, but the audit will be under the direction of the Secretary and under his supervision. It is an additional safeguard.

The CHAIRMAN. Is there any evidence of mistakes being made that suggests an additional supervision?

Mr. EVANS. No; nothing of that kind. They have a board now in the Treasury Department who have been making some investigations in regard to the methods of accounting, and so on, in the Treasury, by direction of the Secretary of the Treasury, and one of the things they propose to recommend, it seems, is that after the accounts have been audited and paid, and passed practically out of the hands of the disbursing officer, then there shall be a second audit under the direction of the head of the Department before the accounts go into the Treasury.

Mr. SCOTT. Is it not rather late to have that audit after the accounts have been paid?

Mr. EVANS. It would seem so, because the accounts go to the Treasury Department and are audited there, and any discrepancies would be caught there.

Mr. LEVER. This suggestion comes from the Secretary of the Treasury?

Mr. EVANS. Yes, sir. This is an audit by the Secretary of the Treasury, practically.

Mr. LEVER. And you want to be able to meet that suggestion?

Mr. EVANS. Yes; it is in anticipation of any action that may be taken on that suggestion.

The CHAIRMAN. Did you recommend this to the Secretary?

Mr. EVANS. Yes, sir; that was talked over with the Secretary, and the Secretary wishes it. And he thinks that it will be an additional safeguard.

The CHAIRMAN. It strikes me that this is like locking the door after the horse is stolen.

Mr. LORIMER. Is this audit to be made after the account is paid?

Mr. EVANS. Yes, it is an audit between my office and the Treasury Department.

Mr. LORIMER. Before the account is paid?

Mr. EVANS. No, sir; after it is paid.

Mr. LORIMER. After the account is paid?

Mr. EVANS. Yes, sir; before the account is paid and referred to the Treasury Department.

Mr. GRAFF. You pay the accounts and submit them to the Treasury afterwards?

Mr. EVANS. Yes, sir.

Mr. GRAFF. And approve them.

Mr. EVANS. Yes, sir.

The CHAIRMAN. Mr. Evans is a bonded officer, and he takes the responsibility on any of his accounts that are paid and are refused by the Treasury. On any such accounts he has to make good. That is correct?

Mr. EVANS. Yes, sir; that is correct, and the Treasury has just doubled my bond.

The CHAIRMAN. How much bond do you have to give?

Mr. EVANS. $50,000.

The CHAIRMAN. What kind of a bond do you give?

Mr. EVANS. The bond of a security company.

Mr. SCOTT. Would this second auditor have access to exactly the same papers that the present Auditor has access to?

Mr. EVANS. Precisely.

Mr. SCOTT. Nothing more or nothing less?

Mr. EVANS. Nothing more and nothing less.

The CHAIRMAN. The officers of the Treasury Department have to furnish additional bonds?

Mr. EVANS. Yes, sir.

The CHAIRMAN. The same amount that you do?

Mr. EVANS. Yes; as the old bonds lapse in issuing new bonds they make the amounts the same.

The CHAIRMAN. How much do you have to pay for that bond of yours?

Mr. EVANS. It is costing me about $125.

The CHAIRMAN. $125 a year?

Mr. EVANS. Yes, sir.

Mr. HENRY. Have there been any discrepancies in the accounts that have made these recommendations which have been made seem necessary?

Mr. EVANS. This has really come up on account of the War Department trouble, the trouble with the disbursing clerk there. If you will remember, a short time ago the disbursing clerk of the War Department died and after his death it came out that he had been raising vouchers after they had been paid, and in one instance he increased a voucher from a very small sum to the amount of $10,000, and it was paid and allowed by the Treasury.

Mr. HENRY. That was some years ago?

Mr. EVANS. Not very long ago?

The CHAIRMAN. How did he do that; how did he get that voucher paid?

Mr. HENRY. It had been paid, had it not?

Mr. EVANS. No, sir; he raised the voucher from a small amount, whatever it was, to $10,000. That voucher went to the Treasury, and there was nothing on the face of it to show any irregularity in any way, and it was allowed there, and he was given credit for it, and he drew a check for $10,000 and made it come in a roundabout way, so that he got the difference between the small amount of the original voucher, whatever it was, and the $10,000.

Mr. SCOTT. Suppose you tell us the manner, the method, in which your appropriation is drawn from the Treasury?

Mr. EVANS. In the first place I make a requisition on the Treasury, which is signed by the Secretary. That goes to the Treasury, and it goes to the division of bookkeeping and warrants. They see whether there is money on their books, sufficient money, to cover this amount. They refer it to the auditor, who audits my accounts, and he compares it with his books and sees that it is all regular as far as is shown.

The CHAIRMAN. The Treasury keeps account of every one of these funds?

Mr. EVANS. Of everything.

The CHAIRMAN. Of each bureau fund?

Mr. EVANS. Yes, sir. Then it goes back to the division of bookkeeping and warrants, and they enter it up in their books, and from there it goes to the Secretary of the Treasury, who signs it; and then it goes from there to the Comptroller, who sees that it is all regular as far as his office is concerned; and it goes from the Comptroller back to the Secretary of the Treasury, and from the Secretary of the Treasury down to the division of accounts, and from the accounts division

into the cash room, where it goes to my credit on their books; and when it goes on their books I can draw against it, and not until then.

Mr. SCOTT. What governs you in the amount of your requisition?

Mr. EVANS. The number of vouchers that I have for payment and in sight, and I draw that requisition against the different appropriations.

Mr. SCOTT. How often do you draw a requisition—once a week or once a day?

Mr. EVANS. That depends altogether on the way the vouchers accumulate.

Mr. SCOTT. It is not a matter of periodicity?

Mr. EVANS. No, sir. In the first half of the month there are a great many more vouchers than we have in the last part of the month, and a large portion of the vouchers coming in the early part of the month are salary vouchers—pay rolls.

Mr. SCOTT. Do you pay those vouchers in cash or by check?

Mr. EVANS. By check, personal check.

Mr. SCOTT. Against the Treasury of the United States?

Mr. EVANS. Against the assistant treasurer of the United States in Chicago and——

The CHAIRMAN. You do not pay by your personal check?

Mr. EVANS. No, sir; by official check.

Mr. SCOTT. I mean that the check is signed by yourself officially?

Mr. EVANS. Yes, sir. I have a credit in Washington and with the assistant treasurer in New York and with the assistant treasurer in Chicago, so as to make it convenient for people out in the West to have their checks cashed.

The CHAIRMAN. Now, if you by any chance audit a voucher wrongfully, you are charged with it?

Mr. EVANS. I am charged with it; yes, sir.

Mr. ADAMS. It might happen that if you were to pay an account and the warrant was issued by the Treasury, a warrant issued there, and then this new auditor should come in, his work would be liable to occur after the transaction was all completed, as I understand it, the work of this supervising auditor?

Mr. EVANS. Yes, sir; after the transaction is completed and the voucher paid.

Mr. ADAMS. If a man comes in who is an outsider and he has a bill against your Department, and he gets that bill paid and goes out with the money, and the Auditor comes in and finds an error in that payment——

Mr. EVANS. Then my bond is good for it.

Mr. ADAMS. Your bond is good for it?

Mr. EVANS. Yes, sir.

Mr. SCOTT. Would they not discover that at the Treasury Department?

Mr. EVANS. Yes; in all probability they would.

The CHAIRMAN. How many years have you been in the Department?

Mr. EVANS. Twenty-nine years.

The CHAIRMAN. What did you start at?

Mr. EVANS. I started as a laborer at $540 a year in the seed division, and I went there expecting to be there about six months.

The CHAIRMAN. And you have been there ever since?

Mr. EVANS. Yes; I got married and expenses accumulated, and——
Mr. ADAMS. You could not get away?
Mr. EVANS. Yes, sir.
Mr. HAUGEN. This assistant chief properly belongs to your office?
Mr. EVANS. Yes. Mr. Zapponi.
Mr. HAUGEN. He should be retained there?
Mr. EVANS. Yes, sir; he is a part of my division.
Mr. HAUGEN. It will be practicable, then, to assign the disbursing officers to any of the different bureaus or divisions?
Mr. EVANS. It would be practicable. There would be no advantage in it.
Mr. HAUGEN. There would be no advantage?
Mr. EVANS. No, sir; no advantage at all.
Mr. HAUGEN. The cashier; where is he?
Mr. EVANS. He is in my office.
Mr. HAUGEN. Did you not state that there were two men in your office detailed to the different divisions?
Mr. EVANS. No, sir; they are detailed from other divisions to me. The cashier is one.
Mr. HAUGEN. There is only one man detailed by you.
Mr. EVANS. Yes, sir; only one detailed by me; that is to the Weather Bureau.
Mr. HAUGEN. The reason that I asked was, I thought there was a suggestion here. That this man would be transferred to the Weather Bureau, Mr. Moore's division?
Mr. EVANS. Transferred to the Weather Bureau?
Mr. HAUGEN. Yes. There was a suggestion of it.
Mr. EVANS. There would be no advantage in that.
Mr. HAUGEN. I should think that it would be advantageous to have it under you?
Mr. EVANS. Yes, I think so; and then the Government would have to deal with me instead of with two or three persons.
Mr. HAUGEN. It would simply lead up to a disbursing office in every division or department of the Bureau.
Mr. EVANS. It might come to that.
The CHAIRMAN. Do you not have charge of the contingent fund?
Mr. EVANS. Yes, sir.
The CHAIRMAN. There is no increase asked there?
Mr. EVANS. Nothing asked there.
The CHAIRMAN. There is no change in that. Are there any of these other subdivisions that you have? You have not any others, have you?
Mr. EVANS. No; the supply division comes, in a great measure, under me.
The CHAIRMAN. Do you call that contingent?
Mr. EVANS. The expenses there are paid largely from the contingent. All the stationery and supplies of that nature are paid from the contingent. All supplies for general use are paid for out of the contingent fund.
Mr. LORIMER. I would like to ask why, if this auditor is appointed, the auditing can not be done before the money is paid out.
Mr. EVANS. Why it should not be done?
Mr. LORIMER. Why can it not be done before the money is paid, so as to check any discrepancy that might occur in the examination of the first auditor.

Mr. EVANS. The idea would be that in case there is any connivance on my part with anyone under my direct supervision while the account is in my hands, that after that there will be another audit made which will catch any irregularity or fraud.

Mr. ADAMS. Mr. Lorimer wants to know why that could not de done before the account is paid.

Mr. EVANS. It could be done before.

Mr. LORIMER. It does not necessarily follow that this man is to be appointed to prevent the first auditor from stealing. I take it that he is appointed largely to detect any error that might honestly be made. And why should not, if we are going to make an appropriation of this kind, this auditor perform his duties before the money is gone?

Mr. EVANS. He could make the audit before the amount was paid, and the accounts could be made to be paid on his audit.

Mr. SCOTT. Has there ever been any other case, to your knowledge, except the one which you mentioned in the War Department, of a voucher being raised?

Mr. EVANS. Well, I do not recall positively any case where a voucher has been raised. There have been other irregularities.

Mr. SCOTT. In the way of false vouchers?

Mr. EVANS. Yes, sir; in the case of the disbursing clerk of the State Department, several years ago, Mr. Keikhofer. Then there was the case of General Burnside, some years ago. They both got into trouble in that way. And it was the same way in the Department of Justice some two years ago, where some irregularities were committed, and they made a change there. So that it is not an unusual occurrence.

Mr. SCOTT. The system of bookkeeping in all these Departments is such that all irregularities of this kind are certain to be detected sooner or later, is it not?

Mr. EVANS. Yes, sir; I think, without presuming to take any unnecessary credit to myself, that the system of the Department of Agriculture relative to checks is perhaps as complete and thorough as can be found in any of the other departments.

Mr. HAUGEN. What checks have you in your Department? How are the accounts checked?

Mr. EVANS. An account, for instance, is audited by one man, and then that will be reviewed by a second man. Then it will go to the Secretary, and the Secretary will approve it; and then it will come back and go to the cashier, and the cashier looks it over and enters it in his day book, and he passes it to the draft clerk, and the draft clerk will draw the check for it. Then it goes from the draft clerk—the check goes to the draft clerk, and the voucher will go to another clerk and he will compare them and see that the amount and all is correct, and then they write a letter transmitting that check, explaining just what it is for. Then that voucher will be passed to the bookkeeper, and the bookkeeper enters it against the proper appropriation, and then at the end of each day's transactions the several bookkeepers and the cashier a ndthe draft clerk, who keeps the check book, compare notes, compare the vouchers, compare the amount on each voucher and the several entries, and the check stubs; so that it it would be practically impossible for anyone of those persons to perpetrate a fraud.

Mr. HAUGEN. How many entries are made of a single check?

Mr. EVANS. Of each check? There would be the entry on the stub

and the entry of the bookkeepers—there are two bookkeepers—the liability bookkeeper and then the bookkeeper who takes up an account after it has been paid. We have the liability bookkeeper, and we have the cashier, and as I say, no one of those persons can perpetrate a fraud without the others knowing of it.

Mr. HAUGEN. These are entered up on the different books?

Mr. EVANS. Yes, sir.

Mr. HAUGEN. On the different sets of books, and one is a check on the other?

Mr. EVANS. Yes, sir; one is a check on the other, and then the auditor, who originally audits the account, has his record. Practically each account goes through six different hands before it is finally in shape to go to the Treasury Department, and then the Treasury Department sends its experts down at least once a year, or oftener, and they go over my accounts, and all my books, and everything I have there—the office is turned over to them and they spend two or three or four days, whatever time it may take them to go through all the transactions.

Mr. LORIMER. When a voucher comes to you for a purchase made by the Department, how do you ascertain whether or not the goods have been delivered?

Mr. EVANS. The voucher is prepared and goes to the division receiving the goods, and the clerk who receives the goods initials that, and the chief of the division certifies to the receipt of the goods, and if there is any question at all with me I have one of my clerks take that voucher and check it up with the other office.

Mr. LORIMER. When the Department comes to audit your accounts do they go right down to the point where you began?

Mr. EVANS. Yes, sir.

Mr. LORIMER. I do not see what is the need of an auditor, then.

The CHAIRMAN. Do you wish to be heard on the other points Mr. Evans?

Mr. ADAMS. This suggestion did not originate at all with your Department? It came entirely from the Treasury?

Mr. EVANS. It was a recommendation.

The CHAIRMAN. And it was indorsed by the Secretary?

Mr. EVANS. It was to anticipate what might required, possibly, by the Treasury Department. The Secretary of the Treasury has not officially announced his decision in the matter as yet, but we anticipate that.

Mr. HAUGEN. The pay roll is sent to you by the chief of each different division and bureau, and certified to as to the amount to be paid to each clerk?

Mr. EVANS. No, sir; the pay rolls are prepared in my office and sent to the different bureaus and divisions, and then they are certified there, and they are also certified by the chief clerk of the Department and approved by the Secretary.

Mr. HAUGEN. Then you pay the amount certified?

Mr. EVANS. I pay the amount certified, and the division or bureau certifies to me on a separate slip the time of the employee, what he is entitled to, and any deductions that are necessary, on account of absence or otherwise.

The CHAIRMAN. It strikes me that it is guarded enough, and the present method seems to be well guarded.

Mr. EVANS. I think so, sir. The Treasury Department experts are, or seem to be, satisfied with it.

The CHAIRMAN. You are bonded?

Mr. EVANS. Yes, sir.

The CHAIRMAN. That bond would cover any change in a voucher?

Mr. EVANS. Yes, sir. My bond is good for all my acts.

Mr. SCOTT. Is any other officer in your division bonded?

Mr. EVANS. The cashier and my assistants are bonded to me.

Mr. SCOTT. In what sum each.

Mr. EVANS. $10,000 each. That covers any amount of money they would handle at one time.

Mr. HAUGEN. There is not any need of this additional supervising officer, then, is there?

Mr. EVANS. I beg your pardon. I did not hear you.

Mr. HAUGEN. I say, is there any need of this additional supervising officer?

Mr. EVANS. It is not essential, Mr. Chairman, I think. As I say, it comes between my office and the Treasury Department. It is a duplication, that is all. It probably might be considered as an additional safeguard.

Mr. SCOTT. Do you ever handle more than $50,000 yourself?

Mr. EVANS. I do not; no, sir.

Mr. HAUGEN. You stated a while ago that your accounts were checked by some experts from the Treasury Department.

Mr. LORIMER. Twice a year?

Mr. HAUGEN. Yes; twice a year.

Mr. LORIMER. And he audits that away down to the delivery of the goods.

Mr. EVANS. I have credit at the Treasury Department sometimes for more than $50,000, because it is necessary. I might start business this morning with $50,000, and to close business in the afternoon I might not have $5,000. It depends on the number of vouchers that I have ready for payment. So that it might make it necessary to put in requisitions in order to have sufficient money to meet the demands.

The CHAIRMAN. Are there any further questions?

Mr. SCOTT. Do you submit vouchers along with your requisition?

Mr. EVANS. No; I state in my request that I have paid vouchers since the last requisition amounting to so much, and that I have vouchers ready for payment amounting to so much. That is stated in the requisition. And in the Treasury Department these vouchers are there subject to inspection at any moment. Then they check that amount up with the number of vouchers that I have already paid and the amount of the vouchers turned over to them.

Mr. SCOTT. If it should happen, then, that vouchers should come in for a greater amount than you have to your credit, you would hold those vouchers up until you could make a requisition?

Mr. EVANS. Yes, sir.

Mr. SCOTT. Or until you had been notified that the amount had been placed to your credit?

Mr. EVANS. Yes, sir.

The CHAIRMAN. What is the limit of this, six months or a year? You generally used to have a statement.

Mr. EVANS. I have one here for this year.

The CHAIRMAN. For the last six months?

Mr. EVANS. No, sir; for the last fiscal year, 1903; but we have spent more than one-half of the appropriation—as we always do in the first of the year—the appropriation for 1903. We have about $320,000 which is still undrawn; but I suppose that there are about $75,000 or $80,000 of liabilities which are against that, and the balance will be turned back to the Treasury.

The CHAIRMAN. That is for 1903?

Mr. EVANS. Yes, sir.

The CHAIRMAN. You say about three hundred and odd thousand dollars for 1903?

Mr. EVANS. $320,000.

The CHAIRMAN. For 1903. You say that there are vouchers for how much against that?

Mr. EVANS. About $80,000.

The CHAIRMAN. That would leave $240,000.

Mr. EVANS. Yes, sir.

The CHAIRMAN. To be turned back into the Treasury?

Mr. EVANS. Yes, sir; I think that will go back into the Treasury.

The CHAIRMAN. From what appropriation does that come?

Mr. EVANS. Over $200,000 of that would be from the urgent deficiency of last year for the Bureau of Animal Industry.

The CHAIRMAN. It is all right there?

Mr. EVANS. Yes, sir.

Mr. SCOTT. How long after the close of the fiscal year does this money remain to your credit?

Mr. EVANS. For two years after the end of the fiscal year. It is three years in all before it is finally covered into the Treasury.

Mr. SCOTT. If it is not drawn within two years after the appropriation it reverts without any further action into the Treasury?

Mr. EVANS. Yes, sir.

Mr. MORGAN. Does your statement show the amount turned back to the Treasury, of which you spoke?

Mr. EVANS. Yes, sir. My statement shows the amount that has been expended and the amount available. The amount drawn from the Treasury on warrants.

The CHAIRMAN. And the amount that has lapsed by time is about $200,000, and that is practically all there?

Mr. EVANS. Yes, a part of it.

The CHAIRMAN. I did not know but that we had found a place where you had not expended the amount that we had given you?

Mr. GRAFF. If it remains there three years, how can it have lapsed?

Mr. EVANS. It has not lapsed for 1903. All appropriations lapse after three full fiscal years.

Mr. GRAFF. After what?

Mr. EVANS. After three full fiscal years.

Mr. GRAFF. Then this $200,000 has not lapsed?

Mr. EVANS. No, sir. It will be available for a year and a half yet, that $200,000.

The CHAIRMAN. Are there any further questions that the members of the committee wish to ask Mr. Evans?

There being no further questions, at 3.25 o'clock p. m. the committee adjourned until to-morrow, Thursday, January 14, 1904, at 10.30 o'clock a. m.

COMMITTEE ON AGRICULTURE,
*January 14, 1904—10.30 a. m.*

Hon. James W. Wadsworth, chairman.

The CHAIRMAN. Mr. Dodge, on page 27 of the estimate, you have asked for an increase from $35,000 to $65,000—really an increase of $45,000, because $15,000, according to the estimate, which heretofore has been taken from your lump sum, is transferred to the Chemistry Division. Go on in your own way and tell us what you propose to do and what you have been doing.

**STATEMENTS OF MARTIN DODGE, DIRECTOR OF THE OFFICE OF PUBLIC-ROAD INQUIRIES OF THE DEPARTMENT OF AGRICULTURE.**

Mr. DODGE. The request for the increase is based primarily upon two facts: One is that we have more demand for assistance than we can respond to with the help that we have. Of course, you understand, I suppose, that we do not pay money in aid of any work of any kind, but we have a number of persons employed by appointment of the Secretary, whose services are available for such work as is called upon; and I find that there are many States, especially in the Southwest and in the far West, that receive no assistance of any kind, and receive but little attention from us, because we have not a sufficient number of men to send. And another reason for asking for an increase is, that heretofore the railroad companies have given us free transportation of machinery, but they have lately refused to do that in some instances; and I have reason to think that they might cut off that altogether, and in that case we would be almost paralyzed. I thought it was wise to treat the States as nearly alike as possible.

It is known to many members of the committee, especially the older members, that work was started years ago, and General Stone was the first director. Much of the work he did was confined to the East. Since I have had charge of the office I have been working more in the West and in the South. I have gone into 22 different States and assisted in the construction of object-lesson roads. I have gone into a larger number of States and assisted in convention work, addressing legislatures and committees of legislatures, explained whatever topic might be up for discussion; and I must say to the committee that the information we have given has been acted on very generally. It seems to be highly appreciated, and the theory that we work on is that it is desirable to cooperate in the building up of the system of roads. Of course you know, in the first instance, the Government did build and pay the entire cost of a national road and some others, but later they abandoned that policy in all of these States.

I think the whole matter was turned over to the local authorities, being the county commissioners, the township trustees, road supervisors, and petty officers having small jurisdiction and small revenues. But within the last few years several of the different States have set a good example in showing that a general fund raised by general taxation and applied so as to be a portion of the cost of this road building is very beneficial. It takes off a portion of the burden that rests upon the owners of agricultural lands. It seems that the burden has been

so heavy that the farmers have been either unable or unwilling to bear it, so as to bring us in very good results.

I say we have had a very beneficial illustration and object lesson to the whole country, and to the whole world, for that matter; that when a State takes hold of this work and raises a general fund it is a measure of relief to the agriculturists. You take notice of the fact that half of the population in the older States—at least in the northern States—is concentrated in cities, and a good deal more than half of the wealth, and under the prevailing system—that is, under the system that has prevailed up to very lately—all of that population of wealth is relieved from sharing in the burden of cost and improvement; but if you adopt a method of a general fund, of course they are brought in to the extent that the general fund furnishes a portion of the cost.

The CHAIRMAN. Pardon me for interrupting you, but is not this a line of thought more applicable to the consideration of the general road bill when we reach that? We want this morning to confine ourselves strictly to the appropriation of the public road increase; and to bring you back, perhaps, to what information the committee needs this morning, I will take this question in your item, entitled "Experiments and object lessons in road building," and ask what you propose to do under that new legislation. Do you propose to go into several States and build sample roads?

Mr. DODGE. No, sir; not to pay the cost of building. We respond to requests from different sections of the country to send men and machinery to aid, and we find that the aid which we give and which perhaps is not more than equal to 10 per cent of the cost of the road is so highly appreciated that these requests are multiplying on us.

Mr. SCOTT. You have been doing this work for some time?

Mr. DODGE. Yes, sir; about three years.

Mr. SCOTT. What is the object of the new language in this paragraph?

The CHAIRMAN. The committee will notice in italics what we term "New legislation"—"Object lessons in road building;" the next is "Employment of experts."

Mr. CASSINGHAM. What page is that on?

The CHAIRMAN. On page 27. The title of the paragraph is "Public road inquiries."

Mr. DODGE. Mr. Chairman, I have not noticed just how it was printed here. I suppose the words in italics are new words?

The CHAIRMAN. Yes, sir; that is what we call "new legislation."

Mr. DODGE. It is not the thought or purpose of the Department to do anything different than what we have done, but simply to do more. We do not propose to build any road, but simply to give assistance, in the way I have partly stated, to those who are in a position to go forward with the work, but are in doubt as to how to proceed. We find there are a good many people, a good many communities, that have got to the point of desiring to do something, and they have some means to do with, but they often are in doubt as to material to be used, and they send for us to advise them in that respect. We either send an expert to examine or request them to send samples of the different road-building material that is common in their section of the country.

After ascertaining the most suitable for use we advise them accordingly, and advise them that, if they have sufficient money or labor and

power, in the way of animals and teams, to do the work, we will send the rock-crushing machinery, the rock crusher and rollers, and earth-handling machinery, and skilled persons to operate that machinery and show them how to build a section. Sometimes we make as much as half a mile, and generally try to make about a mile. In one or two instances I have gone so far as to construct 2 miles in this way. That is, I pay no money, but I send a man to superintend the work and another one to operate the machinery. That is the extent of the——

The CHAIRMAN. As to this machinery, I see further on in "new legislation" you want to buy machinery. You say, "for necessary office fixtures and supplies, apparatus, machinery, and materials." The Department has built object roads, then?

Mr. DODGE. In this way; we have never built a road by purchasing the material and building the road apart from cooperation. We simply give the service of our men to direct this work, and we secure machinery. We have been able to do that heretofore by manufacturers, who, in order to have the indorsement of the Government officials, in so far as that is given by the use of machinery, have been willing to furnish it to us. I am inclined to think that they will continue to do so, but am not absolutely sure. It is this way, if they have an abundance of machinery in stock, they are willing to oblige us, but if they have demand for it, of course they do not like to oblige us. Sometimes we have not been able to get everything we wanted.

The CHAIRMAN. Road machinery consists of the modern scraper, the stone crusher and roller, does it not? That is about what machinery you use?

Mr. DODGE. We have an automatic spreading cart, so when the crusher has finished the crushing of a rock and leaves it in a bin, and that goes by gravity into the cart, and is spread without the use of manual labor.

The CHAIRMAN. It is something on the manure-spreading type?

Mr. DODGE. Well, possibly; it does not require relifting or reshelving. It is a great saving by showing how this can be done from the field and finished without the expenditure of a great amount of labor. We are able to show people how they can produce roads for about $3,000 a mile, which I think are fully as good as many they have built at $6,000 a mile. Now, in my county, Cuyahoga County, Ohio, they have been building roads for the last ten years that cost from $12,000 to $20,000 a mile. I was requested to give something in the way of information and instruction in object lessons, which I have done; and we have produced roads in parts of that county, and one in the adjoining county, and it seems the roads that we have built at $3,000 a mile are as good as those at $12,000 a mile.

Mr. HENRY. How wide is the road?

Mr. DODGE. Twelve feet wide.

Mr. HENRY. How deep is the stone?

Mr. DODGE. Eight inches.

Mr. HENRY. Is that enough?

Mr. DODGE. We think it is.

Mr. HENRY. Does your machinery handle the coarser stone or only the finished?

Mr. DODGE. It handles the crushed stone. Sometimes we put down a base of uncrushed stone. We do not recommend that. If we have

a sufficient quantity of suitable machinery we prefer to have it all crushed and make the road of small stone.

Mr. HENRY. Do you think a road 12 feet wide is wide enough for all purposes?

Mr. DODGE. For a country road we think it is all right.

Mr. HENRY. Two teams can not pass abreast on a road 12 feet wide.

Mr. DODGE. They can pass. Two single carriages can pass upon 12 feet of road.

The CHAIRMAN. Two carriages could just about do so.

Mr. HENRY. It would be close work.

Mr. GRAFF. How do you keep the road material from spreading out onto the sides of the road?

Mr. DODGE. We repair the roads by means of scrapers and other tools, so as to form a shoulder, before depositing the stone. The stone is deposited upon the roadbed, which is made to conform with the finished surface, so far as the curve is concerned, and that is rolled and made as hard as we can make it before anything is spread on it.

Mr. BURLESON. Do you think a deposit of 8 inches will stand upon a black, waxy soil 6 feet thick?

Mr. DODGE. Well, probably it would. Of course, if this soil is fully saturated with moisture there might be, under great weight, some depression, but we are not troubled about the foundation, as a general thing, and I think 8 inches is quite sufficient in almost every case. The same question you ask me I remember was asked of Macadam when he was before the committee of the House of Commons. It was contended before his time that it was necessary to put in heavy foundation of large stone according to the Telford method, and he contended that large stone was unnecessary, and it was a waste to put in so much material.

Mr. BURLESON. Provided your road is waterproof?

Mr. DODGE. They asked him the very question, whether it was so in ordinary conditions in building over a bog, and he contended, in answer to that question, it was often preferable to have a little elasticity, and he could build with the small stone over any sort of bog or soft land.

Mr. ADAMS. Do I understand you to say there are roads built in Ohio that cost from $12,000 to $20,000 a mile?

Mr. DODGE. Yes, sir.

Mr. ADAMS. Outside of corporation limits?

Mr. DODGE. All of the roads. In Cuyahoga County—Cleveland is the county seat of that county—they used, before, the plank road, built by companies and subject to toll. They were built only about 8 or 8½ feet wide, a sufficient width to carry single vehicles. Of course, the theory of these narrow roads is that the loaded wagon is coming toward the market, and the empty wagon returning can easily turn out and give the road. Although the road is, of course, not hard, it would be sufficiently hard to bear an empty vehicle.

So in many places, especially about Cleveland, the roads were only built 8 feet wide. A few years ago the county commissioners adopted the policy of buying these roads and making them free roads, and they soon took up the plank and put down other material, mostly brick. They only made these roads 8 feet wide, the same as the plank roads, counting on the fact that the empty returning teams would give

the entire road, which they generally do, to the loaded teams coming in; and it was claimed by our people in the beginning that about $3,500 a mile would be sufficient to build those roads; but when they came to the work it increased rapidly. The cost went up to as high as $20,000 a mile, and the smallest cost is reported by the engineer as $12,500 a mile. That includes grading.

The CHAIRMAN. Material is available there, too, is it not?

Mr. DODGE. We have no rock except bowlders; that is, no road-building rock. We have the sandstone.

The CHAIRMAN. You have rock sufficient for the foundation, but not for the top coating?

Mr. DODGE. Yes, sir; we have rock of that kind. If you use an inferior rock for a foundation it is desirable to have greater thickness than I speak of. When I speak of 8 inches being sufficient, I think it ought to be of homogeneous rock—consolidated.

Mr. SCOTT. What methods are used in keeping these roadways clean after being constructed?

Mr. DODGE. I do not know if there is any system for keeping them clean. They are not likely to be injured much by litter. The narrow road will not only keep itself cleaner, but it will stand, I think, longer without repair; because, with the wide road, as soon as you have a soft place or small depression, it will hold the moisture and that softens the mass, whereas a narrow road will shed the moisture, and litter disappears very rapidly.

Mr. ADAMS. You speak of $3,000 a mile as the expense of a macadamized road. That is very interesting to me. But you can not quite make that as a general statement because of the varying cost of material in different localities?

Mr. DODGE. I do not say that is a universal price. I said, especially, had we built in Cuyahoga County, Ohio, some of those object-lesson roads that exceeded that amount.

Mr. ADAMS. It is a very low cost?

Mr. DODGE. A very low cost. It seems to me that cost would be a great deal if our assistance were to be withdrawn. We do not pay any money. I give the aid I have in the way of the skilled superintendents and the machinery in the way I have said. Of course, we have plans blocked out in advance for almost every conceivable kind of road and condition of soil, so we know at once what to do; and I have no doubt it is very beneficial service to all those who receive it, and I think it is a matter of sincere regret that I have to deny so many applications that are very reasonable indeed.

Mr. HENRY. The roads that you refer to in Ohio that were built for $3,000 a mile, were they trap-rock roads?

Mr. DODGE. No, sir; those roads were built of the granite bowlders.

Mr. HENRY. Is that material durable for roads?

Mr. DODGE. Yes, sir; very durable.

Mr. HENRY. What material do you use for a binder with the granite that you use.

Mr. DODGE. Sometimes we do not have to use any. You understand the bowlders are not of uniform——

Mr. HENRY. Hardness?

Mr. DODGE. Hardness; nor really of the same formation in every case. We have a variety of rock, and it is generally found a mixture of all will furnish a sufficient binder, but if it lacks the binder we will

put on a little gravel sometimes; and in one instance last year up in Red River Valley of the North, where they all said it was impossible to build any macadamized roads at all, partly because of lack of material and partly because the material they had was granite and destitute of the binding quality, we went there and built three roads of granite and made the filler, or the binder, out of the common soil, which is an exceedingly viscous soil. We spread it on in this way and found it made a consolidation of the mass that was extremely good, and have the best of reports from those roads. I visited one of the roads about a year after it was built and found they were in extremely good condition, and I have reports from the others.

So that we have demonstrated for the Red River Valley that they have material that is very satisfactory for the work when combined with the other substances that are so common there. And I will say in that connection that at Grand Forks, the last place where we put in an object-lesson road, we built for about $3,000 a mile a road that was as good in every respect as what they were building on the opposite side of the river at $12,000 a mile, except it was not quite so wide. They had let a contract on the other side of the river and the road was being built when I was there.

Mr. ADAMS. You speak of these requests that come to you. Please state explicitly what they are and who they come from.

Mr. DODGE. They come from the road officials in nearly every case. Once in a while we get a request from the chambers of commerce. In the smaller cities of the West the chambers of commerce are active in introducing helpful improvements, not only pertaining to the cities in which the chambers are located, but the circumjacent territory, and in many instances preliminary negotiations are made through the secretaries of the chambers of commerce; but we do not go into any city. If we cooperate through their initiative, we locate the road outside of the city and entirely in the agricultural region; but they have been helpful to us in the matter of assembling the cooperating forces. You understand that in order to carry on this work it is necessary to have the assistance of quite a number of elements. Of course the primary thing is the community itself. If the community does not wish anything, we do not do anything; if they do wish to have something done and are able to do their part and we are in a position so that we can afford any aid, we always do it. And I regret exceedingly that I have not been able to go farther into the Southwest and to spread into the other States to a great extent.

Mr. ADAMS. In how many States have you been?

Mr. DODGE. Twenty-two States altogether.

Mr. BOWIE. What are those States?

Mr. DODGE. Every one of the Southern States, except Florida and Texas——

Mr. BOWIE. Where did you go in Alabama—what part of Alabama?

Mr. DODGE. Mobile, Montgomery—that is, they were the headquarters. I will say that in those Southern States we have the assistance of the national association and of the railroad company to an unusual extent, in this, that the railroad company offered us a train, at our service, fully equipped, and the manufacturers in the different parts of the country gave us 8 or 9 carloads of machinery.

The national association, organized at Chicago in 1903, took the initiative in that respect. I want to say in this connection, that Mr.

Richardson, the secretary of the association, at that time and ever since, is here at the present time. He happens to be in the city, and I would be very glad if the committee would see fit to hear him some time on this matter. The national association made the proposition to me to cooperate with them and the railroad companies, and in the Southern States the work I refer to was done through this cooperative method, and we only did a very small amount in each State.

Mr. BOWIE. The Southern Railway Company was the company that took so much interest in it, was it not?

Mr. DODGE. Yes, sir. I speak of building half a mile, a mile, and two miles, in Michigan; but in these Southern States the greatest number, probably, of the 22 I mentioned, we did not build so much. It is desirable to build, at least, half a mile. It is desirable it should be done in the most scientific and economical manner. You can hardly do either one of those things in the hasty trips that are according to schedule time, because we are interrupted by bad weather and often delays are caused by unexpected failures. So, when I spead of going into this large number of States, I do not want you to understand I have done that the way I would like. I think if this committee would see fit, in its wisdom, to provide us with a sufficient fund, so that we could go to every State and build, anyway, four object lessons, in four sections of the State, of perhaps a mile in length, and show them what could be done with their material, and with proper machinery and with the proper mixtures, that it would be of almost incalculable benefit.

Mr. SCOTT. How long have you been doing this work in the 22 States? How many years will that cover?

Mr. DODGE. About three years. Of course, General Stone, for about six years, was at the head of the office, and he did a few small pieces—one in New York, one in New Jersey, and perhaps two or three other small cases. It was a matter of very great doubt what should be done. Of course, I think we all understand that this is an unsettled question. We do not any of us feel certain just what to do or just how far to go. I have been feeling my way carefully, and had some doubts as to the beneficial results, but I am free to say to the committee that the reports coming in every way, by letters and by oral communications, all show that the people receiving the benefits are pleased with the benefits, and they think well of the Government that is willing to do something in a small way that comes close to the homes of the people.

Mr. SCOTT. As I understand it, then, you want this increase chiefly for the purpose of being able to extend this work of sample road building?

Mr. DODGE. Yes, sir.

Mr. SCOTT. In the event that the increase were granted, how much of it would you say would probably be spent in office work, in additions to your office force here in Washington?

Mr. DODGE. There would be no increase at all; we do not require any increase in office force. It would be given to outside work. I would like to say in this connection that the Secretary has appointed for three years past four resident agents—I think, perhaps, the committee is informed, but possibly some of them are not—but out of the appropriations which have been made, $6,000 have been devoted to the payment of four resident agents at $1,500 each.

The CHAIRMAN. The country was divided into four districts?

Mr. DODGE. Yes, sir; four districts and a resident agent at each one was appointed, and then $10,000 was devoted to the laboratory work; and this year they have asked for 18, as the chairman has said.

Mr. SCOTT. In that connection, you are carrying now on your lump-sum roll one chemist?

Mr. DODGE. No, sir. That is in the Chemical Division. That would be taken care of, and has been taken care of, out of the $10,000 that has been set over. Your act of appropriation, of course, makes a lump sum of it, but the Secretary has made the apportionment of the fund and set over $10,000 each year for that work, and this chemist is paid, and an engineer, out of that, and all the office force and the machinery that they have bought in that work has been taken care of out of the $10,000.

Then $6,000, as I have said, has also been set aside for the payment of four resident agents, so it has left me, I think, but an exceedingly small sum out of which, of course, I had to pay the office force. Our office force is not large, is not expensive, but what we really need is a larger number of persons in the field to respond to the very numerous and, I think, very reasonable requests. As I recollect, Mr. Scott, you had a request for some work in your State, but we have never been able to respond to that, although we did go to the State in 1900 and do a little work.

Mr. SCOTT. I understand that that $10,000 of the appropriation which you had last year was set apart for chemistry work?

Mr. DODGE. Yes, sir.

Mr. SCOTT. And $6,000 for the resident agents?

Mr. DODGE. Yes, sir.

Mr. SCOTT. So that left you only about $4,000—adding the cost of your office force to the $10,000 appropriation for chemical work, and $6,000 for the resident agents, you are only left about $4,000 for the miscellaneous work?

Mr. DODGE. Yes, sir; traveling expense and miscellaneous work, and all.

Mr. ADAMS. What is the practical relation of chemistry to road building?

Mr. DODGE. The only practical relation, so far as I know, is ascertaining the properties of material. There has been some doubt and some question among scientific men as to what process took place in the consolidation. You understand, the angular fragments of rock when reduced to about a uniform size will consolidate under proper treatment with pressure; they consolidate and make a mass almost like solid rock itself. It is impervious to water. That chemical change, or physical change, was questioned, and they are investigating that. I do not know really to what extent the chemical feature cuts a figure, but, as I understand it, most of the work in the testing laboratory is done by the machine to stand the physical properties of the rock.

Mr. BURLESON. As I understand you, Mr. Dodge, this $30,000 increase would be expended in building roads as object lessons, principally?

Mr. DODGE. That is, in cooperating in building. I do not want to be misunderstood. We would not take any money to go to any place on our own motion and build any roads, but we would try to respond to those who requested us to assist them.

Mr. BURLESON. About how much of road could you build in these States that you have never visited at all—about how would be its pro rata, about?

Mr. DODGE. It would be exceedingly small.

Mr. BURLESON. A hundred yards?

Mr. DODGE. I do not think you have a proper idea of it. You all the time think about our building, but we do not build; we only assist and instruct those who are ready to build. For instance, to give you a little illustration that comes to my mind at the present time, the commissioner of public works of the city of Detroit came to our office a few days ago, and said he had been authorized by new acts of legislation on the part of the council to purchase all the brick that would be necessary to build all the streets they intend to build during the next year. Always heretofore in that city, and I think in all cities, they have let the contract to a contractor, and he has secured his brick, but they have changed the law there and the commissioner is authorized to buy about 8,000,000 brick. He came to us to ascertain what was the best to do to determine the quality of his brick.

We can not test all of the brick that would be used for such an occasion, but we offered to test some and give him our advice. If anyone in Texas should apply, which they have already, we would not take any of the money that you may give us—however little or however much—we would not take the money and go there and build 100 yards of road. We say to them, "If you have the labor and material and the animal power, or the fuel to furnish steam power, to work the machines, and desire to have us do so, we will send skilled men to assist you in building half a mile, or a mile, and maybe 2 miles," and we believe, according to our past experience, the little mite we put in will enable them to build more and better roads. I have already stated that in my own county we built, at a cost of about $3,000—. I am using that language in connection with this explanation that we build with the materials and labor furnished—we built roads at a cost of about $3,000 which corresponded very well with those that would cost $12,000. I want to make it clear that the thing we do is not to build and pay for as the Government is building harbors or deepening rivers. We do not pay the cost.

The CHAIRMAN. What do you want to buy machinery for?

Mr. DODGE. I do not want to buy machinery, Mr. Chairman, unless——

The CHAIRMAN. You have estimated for machinery.

Mr. DODGE (continuing). Unless these gentlemen would refuse us, which I have sometimes thought they might; but I will say, with the close of this year, since this request was made, that I have communications from several manufacturers professing a willingness to furnish still further. I would not use that money to buy unless we were stalled for want of it, and it is possible we would not have to do that.

The CHAIRMAN. This machinery is exhibited at all the State fairs?

Mr. DODGE. Yes, sir.

The CHAIRMAN. Have you ever tried to do any object work at the State fairs?

Mr. DODGE. Yes, sir; we have at two State fairs—the Illinois State fair in 1900 and at Minneapolis in 1902. We have done two object lessons at those two places.

The CHAIRMAN. I remember that the Secretary, at the time he made

the request for these four men, said he was going to organize the country into four districts, and assign to each district what might be called a "road lecturer," with the object in view of arousing the interest of the people in the necessity for better roads; and that he did not propose to build any roads; simply proposed to tell them, by means of these lectures, how to build them, etc., and what material to use. Has that organization been kept up?

Mr. DODGE. Yes, sir; that organization has been kept up, and the gentlemen in the field do give most of their time in instruction, but they also discover material and send it for testing, and they have discovered——

The CHAIRMAN. Who are those four gentlemen?

Mr. DODGE. Professor Holmes, of South Carolina, is the representative of the Southern district.

Mr. LEVER. What State?

Mr. DODGE. Of North Carolina, I mean.

Mr. BURLESON. He is in charge of the geological display at the World's Fair?

Mr. DODGE. He is, and we have allowed him, since he was appointed to that, to make a substitute of another gentleman.

Mr. LAMB. What was his name?

Mr. DODGE. W. L. Spoon.

The CHAIRMAN. Is not Mr. Holmes in the experimental station in North Carolina?

Mr. DODGE. He was; but I think not now. He used to be the State geologist of North Carolina, but Mr. Holmes has been an exceedingly valuable and efficient man in this service, and has written many publications, which he keeps up. He is issuing bulletins in his own State.

Mr. LAMB. Is he lecturing now?

Mr. DODGE. He gives a good many lectures, and he has also introduced the method of combining the raw clay with the sand, so as to make a mixture. Mr. Spoon has sort of grown up under his tuition, and we have allowed him for the last year to make this substitution. Whether he would be able to give any time to it from now on, is a question.

Mr. BURLESON. On that very point; you say no road building has been undertaken in Texas and that no expert has ever visited that great State as a lecturer?

Mr. DODGE. Mr. Holmes did about two or three years age.

Mr. BURLESON. At what point?

Mr. DODGE I do not know as he gave lectures at any point, but he made a trip through there and reported upon the general conditions. I have already stated that I thought the Southwest had been neglected. I want to refresh your recollection about what I said as to Mr. Stone giving much attention to the Northeast; and since I have been in charge of the office I have been giving much to the South and West; but the Southwest I have not been able to reach, but expect to do so. Professor Holmes was appointed under this plan that the chairman has understood, and has had the special jurisdiction of that. It is a pretty large division.

Mr. BURLESON. Right on that point I will say that we are accustomed to living on hope.

Mr. DODGE. I think it is a pretty large jurisdiction. I have not fully answered the question, because you interrupted. I have stated

that Professor Holmes has charge of that section of the country, and Mr. Richardson, who is here, has charge of the prairie country, beginning with Ohio, and extending west to the Rocky Mountains. Mr. James W. Abbott, of Denver, Colo., has charge of the mountain and western country, and Mr. J. F. Brown, civil engineer, of Cleveland, Ohio, has charge of the other division, and we think, of course, that the Northwest has had during the years of General Stone's administration a pretty fair share of attention, and we think they have made great progress, and that they are able to help themselves; and as a result of that I have been giving much attention to the Northeast. I have given as much as I could to the other sections, but they are very large, and it is impossible, as you all know, to get over such great territory with the very small number of men that I have had at my disposal. I would like to say, when the winter season comes, as it has now, we furlough all but two of our outside men.

The CHAIRMAN. Do you not use the winter months for lectures and institute work?

Mr. DODGE. Yes, sir; we do. We furlough the machinery men, and we have two expert builders——

The CHAIRMAN. Do they not furnish the machinery men with their machines?

Mr. DODGE. They generally designate the person, but they require us to pay his wages. We have less responsibility for the care and safety of the machine by having them designate a person whom they know to be skillful, and which we might not know. We pay them during just the temporary season. If we take a month to build a road in Texas, we pay the operator for that month, and then he goes off.

Mr. LAMB. How much road did you assist in building near Richmond, in Henrico County?

Mr. DODGE. That was a very small bit. That was done with a train—the "Good Roads Train" went there, and the bad weather came on—I think three days out of the six.

Mr. LAMB. You had a very bad time there?

Mr. DODGE. That, I think, was in the city of Richmond, too, if I remember.

Mr. LAMB. Just outside—just in the county of Henrico.

Mr. DODGE. I think it was.

Mr. LAMB. Did you have an opportunity to examine the roads in Henrico County?

Mr. DODGE. Somewhat. I went out one day.

Mr. LAMB. You must have seen that they had given attention to them?

Mr. DODGE. Yes, sir.

Mr. LAMB. They seem to be studying good roads there?

Mr. HAUGEN. You stated a moment ago you were now building roads at the small cost of $3,000 a mile; I take it that that is the lowest estimate at which a road can be built?

Mr. DODGE. Yes, the lowest estimate of that class of road. It is a high class of road, with finished rock surface, and well done. We can build a much cheaper road of gravel, and a much cheaper road of a mixture of sand and clay. Captain Lamb has referred to the excellent condition of roads about Richmond. Those were built with a mixture of clay and sand.

Mr. HAUGEN. Did I understand that you had built some roads in Iowa?

Mr. DODGE. No, sir.

Mr. HAUGEN. In the Red River Valley—some $3,000 for building and grading?

Mr. DODGE. Yes, sir.

Mr. HAUGEN. What would be your estimate for my State, in Iowa, outside——

Mr. DODGE. I think we can build a good road there for $3,000 a mile, exclusive of grading.

Mr. ADAMS. That depends entirely on the accessibility of the right kind of rock, does it not?

Mr. DODGE. It does not depend so much on that as you think, because, as you know very well, the rates of freight are the same on the long haul as they are on the short haul. That question has been fought for years; it is claimed there is unjust discrimination made on the part of the railroads because they charged the same for the long haul as the short haul. It really does not make as much difference as you suppose under that, for the rate of freight is almost uniform. We have quite a remarkable illustration of that in the State of Tennessee. We built a road down at Jackson, Tenn., from material furnished from near Cairo, Ill., and it was so satisfactory that in two years from that time they extended the road 7 miles, bringing all the material from Illinois.

The CHAIRMAN. Is not Jackson in the limestone belt?

Mr. DODGE. No, sir; I think not.

Mr. HAUGEN. Have you any estimate of building these roads in a single State—for instance, the State of Iowa?

Mr. DODGE. We have not any estimate made with especial reference to that.

Mr. HAUGEN. The fact of the case is, it would cost more than one-quarter of the real estate of the State?

Mr. DODGE. Oh, no.

Mr. HAUGEN. I think it is safe to say that in our State we have at least 110,000 miles of road, and, at $3,000 a mile, that would be about $330,000,000, would it not?

Mr. DODGE. Well, possibly.

Mr. HAUGEN. I think the assessed valuation of my State is about $370,000,000.

Mr. DODGE. The assessed valuation is a great deal less than the real valuation.

Mr. HAUGEN. The assessed valuation of my State is one-quarter of the value.

Mr. DODGE. Do you find anything on the map to indicate whether that——

The CHAIRMAN. I thought Jackson was near enough to Columbia to be in the limestone belt. What was that material?

Mr. DODGE. That was what they call a noviculite. It is a very rare material, but it is suitable for road building, and I believe if the attention of the people round about that situation—that is southern Illinois and over across the river in Missouri—if their attention was called to the extreme usefulness of that material, it would be worth hundreds and thousands and millions of dollars.

I desire to state to the gentleman from Iowa that it is not possible

that the cost of building roads at $3,000 a mile would approximate anything like half of the value of the land. I do not know what your land is assessed at——

Mr. HAUGEN. If you will permit me right here; they asked a question here about selling the land at the assessed value. I would say that the $370,000,000 is 31 per cent of the value of the land, according to the reports made to the census enumerators; so that $370,000,000 is one-quarter of the value of the real estate in the State of Iowa.

Mr. DODGE. Is that the decennial appraisement of 1900? Are you giving the result of the appraisement of 1900 on land?

Mr. HAUGEN. No, sir.

Mr. DODGE. When was that?

Mr. HAUGEN. In 1890.

Mr. DODGE. Land was at a very low ebb at that time. I would like to state to the gentleman from Iowa that, so far as we have any knowledge or experience from observation or testimony of any kind, we find that the cost of the road, whatever it may be, whether it is $3,000 or $6,000 a mile, adds a great deal more than its cost to the value of the land. You do not substract.

Mr. HAUGEN. What do you estimate the value of these lands from the building of these roads?

Mr. DODGE. I made an estimate of that cost at one time. I do not know that I can hold it in memory, but it was based upon the idea that there should be 2 miles of road for every 640 acres of land.

Mr. HAUGEN. That was the basis I had.

Mr. DODGE. I can not now recall those figures or make the computation instantly.

Mr. ADAMS. That would make about $1 an acre?

Mr. CASSINGHAM. About $5 an acre.

Mr. HAUGEN. That is $6,000 for every section. One hundred and sixty acres would be $1,500—about $10 an acre.

Mr. BURLESON. It is somewhat of a severe tax on land.

Mr. HAUGEN. Is it not a fact that the common graded road, such as we have in Iowa, is far superior to the roads you propose to build, about nine months out of the year?

Mr. DODGE. The graded road is the best road there is when it is dry, and in proper shape it is all right.

Mr. HAUGEN. You take it in the winter with the sleigh and in the dry season of the year, which would probably be about nine months of the year, it would be far superior to the road that you propose to build.

Mr. DODGE. Of course they would be just alike in time of sleighing; one would be as good as another. So far as superiority is concerned, I think the summer road is all right, and I recommend, in connection with what you say, and in connection with what I have already said about the 12-foot road, we should always make the earth road adjacent to the other, so that they are both open for traffic all the time; and when the dirt road is better, which it often is, it takes the traffic off of the stone road, and increases its life.

The CHAIRMAN. Have you not found that the modern scraper has done wonders for our roads all over the country wherever they have been introduced?

Mr. DODGE. Yes, sir.

The CHAIRMAN. In the district in which I live, which has been set-

tled for one hundred and fifty years, they have increased 50 per cent in the last fifteen years.

Mr. DODGE. Undoubtedly.

The gentleman from Iowa seems to have it in his mind that if anything at all is done it must be done with stone road at a cost of $3,000 a mile. That is not what I am contending for at all. I have already stated that we produced the sand and clay roads in the South, as Captain Lamb has called attention to here, at a cost of probably $300 a mile, and they are exceedingly good.

Mr. HAUGEN. How do you propose to build such roads outside of the ordinary grading?

Mr. DODGE. We mix the sand and clay. If it is a clay road we spread sand on, and if it is a sand road we spread clay on, until the whole thing is mixed to the point of puddling. We add from time to time, according as observation reveals the necessity for it, enough sand to take up the excess in moisture.

Mr. HAUGEN. That is what the ordinary road supervisor does at the present time; that is no improvement on the present system.

Mr. DODGE. The ordinary supervisor does not do that way. If it is a clay road he uses clay; if it is a sand road he uses sand. We haul the sand on the clay road and haul clay on the sand road, and use such a mixture that it becomes a consolidated mass that is hard and durable. It is really quite a discovery and very helpful. Now, we believe that we shall be able to take clay, that is so common in your country, and burn that into angular fragments without the necessity of molding as they do for brick, and make a substance that is practically as hard as brick, which can be used on the surface of these roads and diminish the cost very greatly. We are not contending that every road should be improved with stone.

Mr. HAUGEN. Is not that being done by the railroads at the present time?

Mr. DODGE. It has been done for ballast, but it has never been done on any common road that I know of for common traffic. It should be done. That is a case where I think it would be warrantable for the committee to authorize the entire building by the Government; because you can not find any community, probably, that would be willing to go into anything that is so much of an experiment as that is.

Mr. ADAMS. Let me ask you about this machinery once more, Mr. Dodge; is your machinery given to you by the manufacturers?

Mr. DODGE. They give us the loan. They do not give us the machinery.

The CHAIRMAN. They furnish the machinery and allow a man to accompany it, and we pay the man.

Mr. ADAMS. They do that for advertising purposes?

Mr. DODGE. Yes, sir.

Mr. ADAMS. Would you not prefer to buy your machinery and select such as you thought was best?

Mr. DODGE. I think that is a good plan—that I be allowed to do it.

The CHAIRMAN. That would be an advertisement of certain kinds of machinery.

Mr. ADAMS. At the same time it would give these gentlemen an opportunity to go into the market and get the very best there was, and not depend upon the charity of machinery manufacturers.

Mr. DODGE. I recommended that that should be done, but I must say

we have done very well. I was rather disappointed that the committee did not allow the money for that purpose, but we really have done exceedingly well, and perhaps as well as we would have done by buying the machinery; but the question is, how long this will continue. The machinery companies are all getting into trusts, like everything else, and I do not know——

The CHAIRMAN. They have got no better way to advertise their goods than this. If I was engaged in that business I would endeavor to have the Goverment exhibit my goods around the country. I would furnish the goods and furnish a man to run them, too; and I would not ask the Government to pay the man. I could not have a better advertisement.

Mr. HAUGEN. What discoveries have you made in building roads that would be of benefit?

Mr. DODGE. I think a very valuable discovery is this that I have referred to in the mixing of sand and clay.

Mr. HAUGEN. When was that discovered?

Mr. DODGE. It is a growth that results from many trials and long years of observation. It is a new thing. Also the vitrification of the clay.

Mr. HAUGHEN. Fifteen years ago the very same thing was done by the road supervisor in my own county.

Mr. DODGE. That is a credit to him. Did it work all right?

Mr. HAUGHEN. Worked very satisfactorily; yes, sir.

Mr. DODGE. I am giving Professor Holmes great credit for that, because, so far as I know, he has done more of it and has introduced it to the public notice. This, as you say, is a good thing, and it ought to be used very generally, but it is not known very generally, and furthermore those who do know probably may not know just how to proceed in the most economical manner and how to determine the proportions and quantities.

Mr. HAUGHEN. Can not this information be disseminated through bulletins?

Mr. DODGE. We are doing that; and we would like to say in reference to Mr. Spoon, who is operating under the authority of Professor Holmes, in the Southern division, I called on him only the day before yesterday to go to the farmers' institutes in Maryland and explain that very process for a period of one month. For the following month he is to go to Raleigh, to the Agricultural College, and explain to the students there. We aim to keep these field men, that do the work of the summer time, at work in the winter time, explaining these processes—all that we discover in that respect.

The CHAIRMAN. You speak of this mixture of clay and sand as a discovery. The exact proportion may be a discovery, but we have known that in our country for years—that the thing to try on a sand road was clay and on a clay road was sand.

Mr. BURLESON. What is the best proportion to use, Mr. Dodge?

Mr. DODGE. That has to be determined by the quality of sand and the quality of clay on observation. I should think approximately half and half. There is no mystery about this, but it is useful information, and, of course, it is given out through oral instructions.

Mr. LEVER. Did you build any roads in Columbia, S. C., in Richland County?

Mr. DODGE. We have not built any sand-clay roads.

Mr. LEVER. Have you ever examined those roads there?

Mr. DODGE. I took a short trip around about Columbia when I visited there.

Mr. LEVER. What do you think it would cost a mile to build such a road with sand and clay as they have there?

Mr. DODGE. About $300 a mile, I should think.

Mr. LEVER. If you had to haul the clay from any distance, that would cut some figure in the cost?

Mr. DODGE. Yes, sir.

Mr. BURLESON. Do I understand you to say that is the best character of roads that can be built at that place?

Mr. DODGE. No; not at all. That is the best thing to do, considering the price.

Mr. BURLESON. What I meant, is that the best character of road for those people to build?

Mr. DODGE. Now, you take it in approaches to your cities, and it might be necessary to harden the surface with something more durable, You could put on a coating of stone. That works very well and satisfactorily.

Mr. LEVER. That is about the cheapest road you could possibly build?

Mr. DODGE. I believe it is.

Mr. HAUGEN. About a year ago when I was driving through Wisconsin, I found they were treating a sandy road there by sprinkling oil; is that one of your discoveries?

Mr. DODGE. I can not say it is one of our discoveries; but we have assembled all the facts together pertaining to that, and issue a bulletin instructing the people how to do it. Mr. Abbott, our western representative, whom I mentioned a few moments ago, has devoted a good deal of attention to that in California, where they have probably done more than in any other place. He has made an exhaustive study of it, and has made a thorough report, which is published, and we have had very many calls for that. A suitable thing, I believe, would be vitrified clay, broken in angular fragments, and treated as broken rock, would be all right. We want to go further than that before we issue any statement about it.

Mr. HAUGEN. This oil has to be applied very frequently, does it not?

Mr. DODGE. Once a year, I think.

Mr. GRAFF. Have you made an investigation of the best road material for central Illinois, where they have the black soil?

Mr. DODGE. This noviculate I have referred to, that is so common in southern Illinois, would be an excellent thing.

Mr. GRAFF. What could this material be purchased for in southern Illinois?

Mr. DODGE. It is a cheap product. It comes without any labor in quarrying, and I think it costs about 25 cents a ton.

Mr. GRAFF. At the quarry?

Mr. DODGE. Yes, sir.

The CHAIRMAN. Will it stand frost after it is taken out of the quarry?

Mr. DODGE. It seems to stand it very well.

The CHAIRMAN. How much of a trial have you given it?

Mr. DODGE. The two years that it has been in use.

The CHAIRMAN. In Jackson?

Mr. DODGE. Yes, sir; I wish to say in further answer to this question, it is most likely that the black soil of your country could be vitrified the same as clay. We have made some experiments with the black soil further down in Mississippi, and find it works all right. We expect that the black soil of your country would be all right, if it were properly treated, and it would make a very cheap road.

Mr. GRAFF. You have not made any experiments with it?

Mr. DODGE. We have made experiments in the laboratory, but we have not made any in roads for actual use.

Mr. GRAFF. Many times there for three months in the year, in the spring, it would be impossible to pull an empty farm wagon over the road.

Mr. DODGE. Yes, sir; I understand that.

The CHAIRMAN. Is it that long—three months?

Mr. GRAFF. Probably one month. It is simply impassable. The rural carriers are able to go around only on foot. It is the best soil in Illinois. And the reason why the farmers there are prejudiced against road building is on account of the fear of taxation and incurring of great expense. You meet with that prejudice whenever a reformer attempts to preach good roads in central Illinois. He has a hard task.

Mr. DODGE. I think myself the burden is a little hard. I agree with the sentiments as expressed generally about that. It is rather too much of a burden for the agriculturists to bear alone, and that is one reason I have stated that they appreciate very highly in New York and in New Jersey the assistance that is given by the States, and they also appreciate very highly the little assistance that has been given them in the way I have stated here.

The CHAIRMAN. Is not the road problem of the South a comparatively easy one, in view of the fact that you do not have to compete with the frost to any great extent?

Mr. DODGE. I think it is an easy problem in that respect, but the law of compensation seems to work there as it does everywhere else. While they have an easier task, they have less means with which to do it. They do not have so much of a revenue in any of their States and counties as they do in the North. While it costs more to build in the North, the revenues and resources of the North are proportionately greater.

Mr. HAUGEN. Did I understand you to say you had built roads in cities or in towns?

Mr. DODGE. There was one or two cases where this "Good-Road Train" visited cities, and I thought they had stopped in Richmond, but Captain Lamb corrected me. I am not sure whether they did it in any place. They make their headquarters sometimes in the city, but they go outside, and, as I said, we cooperate with the chambers of commerce. In some instances they have raised the money, or a portion of it, to defray the cost, but we always insisted on the road being built outside of the city.

Mr. BURLESON. You speak of the gratitude of the agriculturist for the assistance rendered him by the State and the little assistance rendered him by the Federal Government; do you think he overlooks the fact that he is bearing the greater portion of that burden?

Mr. DODGE. No; I think not. I think he is a little conscious of

that, and is glad of a little help, and would be glad for more. I remember very well in Fargo, when we had quite an important meeting there, one gentleman from the country made a speech in which he said that if you gave a man 50 cents he would do $5 worth of work to get it. That is about the way with the work we do.

Mr. BURLESON. That is mistaken economy, is it not?

Mr. DODGE. Not if they put the $5.50 together and make five dollars and a half out of it, and especially if they stimulate the community to activity by reason of exertion or this desire to get 50 cents. It would be a clear gain.

Mr. BURLESON. At last, the community bears the burden.

Mr. DODGE. I believe the community bears the burden. You are burdening the people in the country by taking half their revenue from them, and you do not return to them half of that which you take.

The CHAIRMAN. Mr. Dodge, have you got any figures in your Bureau showing the average haul to the farmer?

Mr. DODGE. Yes, sir.

The CHAIRMAN. What is it?

Mr. DODGE. About 12 miles.

The CHAIRMAN. The average haul of each farmer in the United States—of each farmer to his market?

Mr. DODGE. Yes, sir.

Mr. ADAMS. Do you not think that is pretty high?

Mr. DODGE. That includes very long hauls in the mountain States and in the Southern States.

The CHAIRMAN. It would be hardly fair to include the arid region, and all that.

Mr. DODGE. I think that figure is based on the idea that the tonnage for all distances would be of equal amount; subject to any error in that respect, I believe that figure would be correct. As the distance increases the quantity decreases, and this estimate, or the quotient derived from the computation which was made by General Stone, gives 12 and a fraction as the average; but I do not think he took into account all of the varying quantities. Of course, you want to take quantity into consideration, for the mile haul has more quantity as a 12-mile haul.

Mr. ADAMS. In addresses prepared by 87 Wisconsin farmers' institutes, they made quite an elaborate estimate as to that very matter, and all also obtained with reasonable degree of correctness the tonnage of the State which was transported from farms to market, and estimated that the average haul was 6 miles, and that cost over and above what the cost would have been if the roads had been properly graded, and the money which up to that time had been expended had been intelligently expended, made a difference in the annual cost to the farmers of that State in moving their products of $6,000,000 a year.

Mr. GRAFF. Did they estimate the haul of 6 miles to be the distance both ways?

Mr. ADAMS. Yes; that is my calculation. No; I am mistaken.

The CHAIRMAN. Perhaps Mr. Stone's estimate covers both ways?

Mr. DODGE. I had an estimate for the State of Ohio of about five. I think General Stone estimated only one way, but I know he took very long hauls in the South and West.

The CHAIRMAN. I made a statement yesterday to a gentleman to whom I was talking that in my State it was not over 2½ miles. If it is 6 in Wisconsin I should say it was less in my State, because we are gridironed with railroads.

Mr. DODGE. I would like to state to the gentleman with regard to diminishing the amount of revenue that is taken from the people, whatever they might do, as a matter of fact they have not done it, and I do not think you would make any mistake if you would be liberal in appropriating to benefit the rural districts.

Mr. GRAFF. Have you been able to see any marked effect in interest the farmer has taken in road building and in the actual building of roads, through the work of your department? And if so, give us some instances of it.

Mr. DODGE. I have noticed remarkable changes in that respect. I believe them all to be based, however, on the expectation that they would have assistance. I would call the gentleman's attention to some testimonials published in the report. I took occasion to request reports from the different places where these object-lesson roads have been built, after a considerable lapse of time—one, two, and three years' time—and I published a number of these testimonials in a report. I would be very glad if the gentlemen would read them, especially to show the effect after the road was built, and the beneficial results that would come and were recognized in the community. You will find a number of such reports by way of letters that I have included, and I think, if you can get the time to read them, it would throw considerable light on this question. I must say I was greatly pleased, almost surprised, at the uniform testimony given, and often by persons I did not know.

Mr. GRAFF. With reference to central Illinois and to road building in that country, gravel has been practically the only thing used. What do you think of that material for central Illinois?

Mr. DODGE. Gravel is very good. Of course there is a great variety of gravel, but the hard gravel, that is not too large, is exceedingly useful for road building.

Mr. BURLESON. But gravel upon a black soil, without something to bind it, will sink just like lead in water.

Mr. DODGE. That will be the case. It needs something that rests like a cushion over the mass; must be consolidated by this process in order to make sure it would not settle. When you get a heavy pressure on a portion of it, like a horse's foot or a narrow-tired wagon, it will cut through.

Mr. GRAFF. Is this material that you have obtained from Cairo for your operations in the South a stony substance?

Mr. DODGE. It seems to be a sort of granulated rock that is accompanied by a powder, some of which is so fine as to be almost like a powder, and by spreading the powder in with the other it makes a filler that comes to a very hard, smooth, durable surface.

Mr. ADAMS. What sort of expression do you get from the people you have helped in this matter of road building?

Mr. DODGE. Very favorable expressions. Without any exception they always want us to do more than we are able to. When we have built half a mile they want us to go ahead a mile; when we have built a mile they want us to go ahead with 2 miles. There are a great many instances where individuals have furnished money to carry on the work after the public money was spent.

Mr. BOWIE. May I ask you a question? Perhaps you have already explained it, but it is not in my mind. You have asked for an increase in the lump sum of $30,000; but, as I understand, that is an actual increase of $45,000, because $15,000 now chargeable against the lump sum you propose to transfer to some other department and let it be carried against some other lump sum. Ten thousand dollars off from $35,000 will be $25,000. Under what theory was the $10,000 charged to this lump sum at all?

Mr. DODGE. The theory of that did not originate with myself. I am not asking to have this done. It is the Secretary's request. The Secretary, as I have already stated, has divided this fund which was heretofore appropriated into three portions, one portion of $10,000 for the testing laboratory, another portion of $6,000 for the resident agents, and the balance for——

Mr. BOWIE. Office expenses?

Mr. DODGE. And force; and whatever work we could do in the way of object lessons. Now the laboratory has been pretty well developed. It seems, however, they think they need a little more. The laboratory work, I will say, is in the building where the Chemical Bureau is situated, and they work in collaboration, and I suppose the theory is that it would be better for them to work for us, so it was divided. I was not particular about it myself at all; it was not suggested by me, but it was believed by the chief of the division and by the Secretary and by the chief of the road-material laboratory that it would be better to have it so. I have no objection to it.

Mr. BOWIE. Let me ask you another question: Suppose we consent to the transfer of the chemical work to another lump sum appropriation, raising that other a sufficient amount to take care of it, would it not leave you a net increase of $10,000 for your general work, even if we left your lump sum appropriation at $35,000?

Mr. DODGE. Yes, sir; it would.

Mr. BOWIE. You would get the increase; so you are interested in it to that extent, so far as the work of your department is concerned?

Mr. DODGE. Yes, sir.

Mr. HAUGEN. When these estimates were made, were not the $15,000 included in the estimate?

Mr. DODGE. Not in the estimate you have cited here. It was included in my report.

Mr. HAUGEN. Did you expect the $15,000 besides the $65,000?

Mr. DODGE. Yes; I remember now. They did call me in conference about this matter—the Secretary and Doctor Wiley of the Chemical Bureau—and the Secretary took it all under advisement and finally divided the figures in this way and asked for the two different amounts.

Thereupon the committee adjourned until 2 o'clock p. m.

AFTER RECESS.

## IRRIGATION AND AGRICULTURAL ENGINEERING INVESTIGATIONS.

### STATEMENT OF HON. W. R. SMITH, M. C., OF TEXAS.

Mr. SMITH. Mr. Chairman, I desire to thank the committee for this privilege, and to say that I shall consume but a very few minutes in presenting the remarks that I wish to make. I want to make a state-

ment with reference to the continuation of the appropriation, perhaps an increase of it, that has heretofore been made for the purpose of carrying on experiments and investigations in irrigation throughout the country.

I do not desire to discuss this matter generally, but merely to make a statement as to the conditions prevailing in my State, in so far as they apply to this question.

There is a pressing necessity for the work that has been carried on by this bill, in what we call the semiarid region of the State of Texas. This region is in the western part of the State and embraces perhaps 150,000 square miles, or something like 100,000,000 acres, a territory about equal in size to all the New England States, New York, and Pennsylvania combined. The lands in that section of the State, or most of them, as a general rule, are very fertile and very productive whenever there is sufficient rainfall and whenever the crops are put under irrigation. That section of the State is rapidly settling up by farmers—an industrious, thrifty set of farmers, from all parts of the United States, from almost every State in the Union. To give you an idea, gentlemen, of the growth and development of that country, I desire to state that we have gained two Congressmen within the last ten years, since the last apportionment. I mean in the western part of the State. I am not speaking of the eastern part of the State, where they usually have sufficient rainfall. As I say, this portion of the State is very fertile. There is no more productive land, perhaps, anywhere in the whole country than is to be found in that part of Texas. The only obstacle in the way of the farmer is the want of water. As a general rule, there is not sufficient rainfall for the crops. Frequently the crops are completely destroyed, and they are almost every year injured greatly by the drought.

That part of the State, as I say, is in great need, right at this particular time, of the usual experiments that have been carried on by the Department. There are a number of rivers traversing the arid region of the State of Texas, running from the northwest to the southeast, with a great many smaller tributaries, through which during the year a great deal of water flows, and, of course, for the want of proper irrigation work in construction, the water is wasted and lost to the farmers. Furthermore, there are a great many draws and natural depressions where water can be stored for irrigation purposes, if the farmers understood how to go at it. In addition to that, through almost all of that country plenty of underground water can be found at a reasonable depth, and in some places an abundance of artesian water at a depth of from 90 to 250 feet.

Along one of the rivers are two or three different irrigation plants, owned and controlled by large corporations, and they are farming under those irrigation plants very successfully; but in the greater part of the country there is no irrigation whatever, and I believe if the farmers were properly instructed, if proper experiments were made down there, where there is a small water supply, the farmers of that section could at once take up the work, if they understood it, and in a great part of that section of the State furnish plenty of water to raise abundant crops, where they are now almost failing in their efforts to carry on farming successfully.

Gentlemen, I do not know how long these irrigation experiments have been carried on by the Department of Agriculture, but some

several years, I understand, or at least last year the appropriation was something like $65,000. This money has been expended in different parts of the country in quite a number of different States of the Union, but not 1 cent of it has ever been spent in the section of the State that I now speak of. I believe there has been a little expended in the eastern part of the State where rice culture is being carried on, but in this great semiarid region of the State that I speak of, not 1 cent, so far as I know, has ever been expended, and the Government has never sent anybody there to make experiments.

I do not say that the State of Texas has been discriminated against by the gentlemen. I do not contend that at all. Of course they had to take up their work in some part of the country and pursue it in the way they thought best, but for some reason they have not reached our State. Now, if the appropriation that has heretofore been made has been insufficient to reach that section of the country, I hope the committee will increase it to the extent that will justify the Department of Agriculture in going into that section of the State and doing for those people what it has been doing for other people in other parts of the country.

Mr. BURLESON. As I understand you, Judge, what you want is some experiments made with a view of determining whether the small sources of water supply there can be conserved and utilized for irrigation purposes?

Mr. SMITH. Yes, sir; that is one of the objects of the experiment, but I think it would be well to carry on nearly all of the experiments that have been usual by the Department, showing those people, who are absolutely ignorant of the methods of irrigating, and of raising crops by irrigation, how to apply the water, when to apply it, and so on, and, as you say, how to utilize the small supply of water.

I believe, gentlemen, that is about all I desire to present. As I say, I do not care to take up the general discussion of the propriety of making the appropriation further than to say that I hope the committee will make an appropriation that is sufficient to reach that part of the country which is, right at this time, so badly needed.

Mr. GRAFF. How much of an area have they there that is now irrigated?

Mr. SMITH. It is very small. I do not suppose that they have over 30,000 or 40,000 acres out of 100,000,000 acres unirrigated.

Mr. GRAFF. Have they commenced to enlarge the area?

Mr. SMITH. Wherever it can be done, yes, sir—they are experimenting with it. This irrigation that I speak of—all that is worth speaking of—is where it is carried on by the ditch companies in the larger streams.

Mr. SCOTT. Have you done anything there, Judge, in the way of raising water?

Mr. SMITH. No, sir.

Mr. SCOTT. You stated there was plenty of it?

Mr. SMITH. No, sir; we have not tried that except by artesian water along the west side of the Pecos River. There is some irrigation by artesian wells.

The CHAIRMAN. Is your home in that part of the State?

Mr. SMITH. Yes, sir.

Mr. BROOKS. These places where you want experiments tried are, in a great many instances, is I understand it, places where the sources

of supply are too small to justify Government irrigation, even if they were public lands?

Mr. SMITH. Yes, sir; we have no public lands in our State.

Mr. BROOKS. What I want to bring out is that they are small enterprises that do not justify irrigation on a large scale, but would abundantly justify the individual farmer doing it if he can do it intelligently?

Mr. SMITH. Yes, sir; that is the point.

Mr. BOWIE. He needs the experiment as a demonstration.

Mr. GRAFF. What did these experiments consist of that were had by the Department of Agriculture?

Mr. SMITH. Those experiments can be explained better by Mr. Mead, who, I believe, will appear before the committee after me. He can explain them more satisfactorily, more in detail, and I will leave that to him.

Mr. BURLESON. I would be glad, Judge, if you would make a short statement to the committee about the ownership of public lands in Texas, and why it is that Texas will not benefit under the general irrigation law as passed.

Mr. SMITH. When Texas was admitted as a State into the Union she reserved all her public domain to herself. None of that went to the Government, and there never has been any Government land in the State of Texas. The general irrigation act, as I understand it, only applies to those States and Territories where there are public lands of the Government, so the Interior Department, which has that work in charge, will not enter the State of Texas or do any work in the State at all.

Mr. HENRY. Why would it not be the preliminary step for the State of Texas to enact legislation in the line of legislation that has been enacted by Congress, by providing for the sale of these lands and that the proceeds shall be applied to irrigation purposes?

Mr. BURLESON. Most of that land belongs to individuals.

Mr. SMITH. Most of it belongs to individuals, and the lands the State still owns belong to the school fund of the State and that fund can not be diverted to any other purpose. Those lands are being rapidly taken up by actual settlers at a nominal price. The lands are very cheap.

The CHAIRMAN. How are these settlers supporting themselves?

Mr. SMITH. By farming and stock raising in connection with their farms.

Mr. BURLESON. And when they have the proper amount of rain, by making most abundant crops.

Mr. SMITH. Yes; it is the most productive country on earth when they have the rain.

The CHAIRMAN. Some years you have enough?

Mr. BURLESON. Sometimes.

Mr. LORIMER. What is the crop in the irrigated country?

Mr. SMITH. They have a variety of crops. They have corn and the lighter food stuffs, and cotton, grapes, and fruits.

Mr. LORIMER. In the rainy season what will the soil produce to the acre of corn?

Mr. SMITH. Well, the corn crop is not grown as successfully as some other crops, but I have seen all the way from 35 to 60 bushels of corn raised to the acre. Under irrigation, I will say to the committee, I have seen grown 2 bales of cotton to the acre; I have seen 6

tons of alfalfa to the acre; I have seen $100 worth of grapes to the acre taken from the land.

Mr. HENRY. Does the cotton-boll weevil infest that land?

Mr. SMITH. No, sir; the cotton-boll weevil has not reached that section of the State yet, but we are expecting it.

The CHAIRMAN. We are much obliged to you, Mr. Smith. Now, Mr. Mead, I think we had better hear you, as long as we have touched on this irrigation subject.

## STATEMENT OF ELWOOD MEAD, OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. You may go on, Mr. Mead, in your own way and tell us what you have done in the last year and what you propose to do with the increase asked for, etc.

Mr. MEAD. The work of last year has followed along the same line generally as the work of the previous year, and I can perhaps best give the committee an idea of the work we have done and what we propose to do by taking up the three climatic sections of the country, the arid, semi-arid, and humid regions of the country, and telling the problems we are dealing with and something of the methods we are following.

Beginning with the arid region and taking the Pacific coast, the State where irrigation has the greatest importance is California. There the great question is to make water that is now used in the irrigation of one acre of land irrigate two acres of land, by the adoption of better methods.

You will understand that practically every man now irrigating in California went there knowing nothing about irrigation, and there are probably 10,000 farmers going to California every year and irrigating for the first time. They are taking up an entirely new industry. It is like a man going from the counter in the dry goods store and undertaking to plough and plant and carry on all of the operations of a farm. The difference is almost as great in the operations of irrigation and in the operations in a humid country.

Mr. BOWIE. Is it not also true that the fellow who goes there and takes it up for the first time thinks he knows more about it than any one else?

Mr. MEAD. I think so. In California the development has gone far enough so that the necessity for the economical use of water is imperative. Take it in the southern part of the State at this season—they are confronted by that situation. In the citrous fruit belt, where both land and water are enormously valuable, there has been a great temptation to expansion—to put much more land under irrigation than can be safely watered in the methods that farmers of the kind I have spoken of would naturally bring into operation. What they must do there in order to protect and save the lives of the trees that are already planted is to bring about better methods of supplying water, and those are things that farmers under those conditions, if they ever learn them at all, would only learn in a very long series of years and at a great loss to the country.

Mr. SCOTT. That suggests a question I was going to ask right there, Mr. Mead. You have been carrying on this work in California for some time; you have published a very handsome and elaborate report

about it. I would like to know whether your experience has shown that the farmers are to any considerable degree profiting by the work you have done there.

Mr. MEAD. Decidedly, yes, sir; there is no question about that whatever.

Mr. BROOKS. And is not that same bulletin with regard to the distribution of water there a great deal of use in other lines?

Mr. MEAD. I think so.

Mr. SCOTT. I should think it would be.

Mr. BROOKS. In my State the bulletin is very valuable, indeed, in the economical use of water in different soils.

Mr. MEAD. The interest in and appreciation of the work we are doing in California is shown by the fact that the State legislature at its session last year appropriated $10,000 to assist in the prosecution of the work in California, and they have left that $10,000—$5,000 to be expended each year—absolutely under our direction.

The CHAIRMAN. Under the direction of your Bureau?

Mr. MEAD. Yes; of Doctor True—under the Office of the Experiment Stations.

The CHAIRMAN. Has any other State done the same thing?

Mr. MEAD. Yes, sir. It has not appropriated so much, but the State of Nevada appropriated $2,000 for the same sort of work.

The CHAIRMAN. Has Colorado appropriated any money.

Mr. MEAD. No, sir.

The CHAIRMAN. Colorado is a very rich State.

Mr. BROOKS. They have not appropriated money in that way, but they have appropriated very large sums in other ways.

Mr. SCOTT. Let me ask the gentleman from Colorado in what way they did appropriate a very large sum?

Mr. BROOKS. We maintain a State engineer whose duty it is to follow out lines of work very much like those Mr. Mead is talking about now. He has a corps of assistants, and does a great deal of work in that line.

Mr. SCOTT. It is devoted almost exclusively to the irrigation work?

Mr. BROOKS. Yes, sir.

Mr. BOWIE. It goes to salaries, like everything else, does it?

Mr. BROOKS. Yes; partly to salaries. Mr. Mead can tell you about that.

Mr. MEAD. The work we are doing in California is to determine for the people of the State, by a series of experiments carried on in the southern and central districts of the State, how much water is needed; to determine the minimum amount of water that is needed in the production of crops in that region, and to determine how that water can be applied to the best advantage. Those are questions of application.

There is another factor that enters into economy in the use of water, and that is distribution, the waste from loss in canals. A great many canals in California were built at a time when it was not understood that canals through some cause would leak like a sieve, and the result of the operation of canals of that character has been that a great deal of the water that entered the canal was lost to the canal company so far as the distribution was concerned, and it has filled up large areas of the soil with seepage water, which, instead of being a benefit, has proved a very serious injury and has made the question of the removal of

seepage water—the question of drainage—a matter of great moment in certain sections.

So that we are studying the question of how to handle those canals, carrying on experiments to determine whether or not the canals can be treated in such a way as to stop the excessive losses.

The CHAIRMAN. Are these canals mostly owned by companies?

Mr. MEAD. The greater part of the canals in California are cooperative canals, owned by the farmers. We are not carrying on any investigation under company canals.

The CHAIRMAN. Under what?

Mr. MEAD. Under company canals. The principal study of seepage, in which we have made a report since I last appeared before the committee, embraced a district of 25 square miles, where, when the water was turned in the canal last spring, it rose at the rate of half an inch, and it was 6 feet below the surface before water was turned in. That left an ample soil surplus for trees and plants to grow in. By the 1st of June it had risen to within 2 feet of the surface in certain sections of the country, and was smothering out the roots of all kinds of plants, certainly all kinds of trees. There they must supplement their irrigation system by a drainage system, and indeed just such measurements and experiments as we are carrying on to enable those people to plan a drainage system that will be of the right kind. They realize it and they are waiting for the results of our work. We have been requested to publish, and have published, as a circular the results of last year's measurements in advance of our ordinary reports for the benefit of those people.

Mr. SCOTT. Would it not be cheaper and better to construct canals which will not leak than to build leaky canals and then have to put in an expensive system of drainage afterwards?

Mr. MEAD. We do not know whether it is within the limits of reasonable cost to construct canals that will not leak. What we are endeavoring to ascertain for those people is what is the kind of coating that will make those canals nonleakable. That is one of the things that is being studied all over the world at the present time, not only here but elsewhere. I will say that this summer I saw where an investment of nearly a million dollars had been made in cementing canals that had proved failures, and now they are doing what we are doing in advance of that sort of improvement in California. They are making experiments with other kinds of coating material.

The CHAIRMAN. What was the cause? Was it failure of the cement?

Mr. MEAD. Freezing.

Mr. BURLESON. You mean the cement would crack?

Mr. MEAD. Yes. Not freezing alone. It froze in the winter, and then in the summer time whenever the canal was empty the intense heat of the sun would dry it out so quickly that it would be dry on one side and wet on the other, and would crack. It was filled full of cracks.

The CHAIRMAN. That cement was badly made, was it not?

Mr. LORIMER. How thick was it coated?

Mr. MEAD. Just as thin as they could make it, probably between a quarter of an inch and half an inch.

Mr. LORIMER. That would crack anywhere.

Mr. BROOKS. Where was that experiment? Where did that failure occur?

Mr. MEAD. In Italy.

There is another phase of economical use of water in different parts of the West that we are dealing with in California, and I speak of it here simply as an illustration of the kind of questions we are studying in the arid region. I can explain that by giving a concrete illustration.

In the valley of the Lagrange River, in California, they have country that can be farmed without irrigation. It is very much the same kind of country you have in Texas. Farming is hazardous. The only sure crop they have there is wheat, and it is impossible to grow wheat continuously on the same land without destroying its fertility; and they have reached a point where they must diversify their crops. There is a community of farmers that settled and occupied that whole country. They had a change all at once. They have spent over $2,000,000 in building canals. They raised the money by levying an assessment on the land of the farmers there, and the canals are the common property of the farmers in those districts. One of the canals irrigates 80,000 acres of land and another irrigates almost the same amount. There are 150,000 acres under the two canals.

Here is a community of several thousand farmers beginning to irrigate for the first time. They have to handle several hundred miles of canal and to manage a distribution system that in order to be efficient and successful needs the same kind of organization that is needed by a railroad or express system. What happened the first year was this: Work began to be active, and they did not know how much water each man ought to have. They had not made any apportionment of the supply to each individual. Proper arrangements were made for the regulation of gates, and they left everybody free to take water as they pleased. The man at the upper end of the canal took more than he needed and the man at the lower end went without. At the end of the first season they were up against this proposition. They either had to spend half a million dollars more to build a canal so large that that wasteful use could not absorb the supply, if they were going to supply the man at the lower end of the ditches and laterals, or they had to inaugurate some sort of economic system of distribution.

So we have been petitioned by both of those districts to assist them this year in a determination of how much water is needed for an acre of land in that country so that they can make their regulations fit their necessities, a proper method of policing, and the establishment of by-laws and regulations to determine how their gates shall be raised and lowered. They also ask us to begin now a record there to determine whether or not the leakage of those canals, the wastage in the use of water by farmers, is going to cause the soil water to rise and flood out the lower lands as it has in some other cases, so as to force them to institute a drainage system entirely or their crops are lost.

We have that same question of how to set about making water, under the ignorant and unskillful use of the beginner, do a larger duty in a great many of the communities of the West. Take the Yakima Valley in Washington. There is a valley that is very fertile, very productive, and hence it is the scene of an active settlement and development in irrigation, and they now have canals that will water probably 200,000 acres of land. I do not remember the exact area. They have about 100,000 acres under irrigation, and last year they used the whole sup-

ply of the stream. Those canals can be extended to irrigate 300,000 acres of land, and yet do that without an excessive duty of water—do it with a less duty of water; that is, the applying of a less quantity of water to the land than is done in Colorado; and the whole question of whether they have 100,000 acres of land irrigated or 300,000 acres of land irrigated rests on the establishment of better practices on the part of those farmers.

Mr. BROOKS. Is it true that as a usual thing the tendency is to over-irrigate and waste water?

Mr. MEAD. It is with the beginner. It alway is.

Mr. BROOKS. Your idea is that there can be a more economical use of water instituted under the direction of this Bureau?

Mr. MEAD. Oh, yes. I think the work we are doing is going to result ultimately in making the water that now irrigates an acre of land irrigate 2 acres, and that means larger profits, of course.

Mr. BROOKS. That is just the point, the less water the best results.

Mr. MEAD. Yes, to a certain point. The same situation exists in Utah. There we are cooperating. I will say the work we are doing in Washington is being carried on in cooperation with the State agricultural college and experiment station, and there is such an interest in the work that we are doing in the Yakima Valley that they are desirous that next year we should issue monthly bulletins which will give to the settlers and the ditch owners of that country an idea of what is actually taking place in the application of water to those lands, how much they are putting on the lands from month to month, so that they can guage themselves whether they are making advances in their lessening the use of water, because they all realize—the ditch companies realize, the farmers that are not irrigating all their land realize—that the complete development of that country rests entirely on the adoption of better practices in the use of water.

Mr. BOWIE. How many thousand acres of land have you already irrigated there now?

Mr. MEAD. In the Yakima Valley?

Mr. BOWIE. In that western country which you have been discussing.

Mr. MEAD. It is approximately 10,000,000 acres.

Mr. BOWIE. In which you expect to increase the sufficiency of the water supply so that it will cover 20,000,000 acres?

Mr. MEAD. Yes; there is about 10,000,000 acres irrigated, and about 5,000,000 additional acres under canal already built that is not irrigated, and I feel certain that it is a safe proposition, by better methods of administration and operation of the canal, that you can operate every acre of that additional 5,000,000 acres without any additional canals or any additional water supply. That covers the principal line of our work in the arid region. Now, let us take up the semiarid region.

Mr. BROOKS. May I ask you a question before you do that?

Mr. MEAD. Yes.

Mr. BROOKS. Does the presence of seepage permanently injure the land?

Mr. MEAD. No, sir.

Mr. BROOKS. If it can be removed, the land will be restored to its original condition?

Mr. MEAD. Entirely. Drainage is not only a remedy for the sur-

plus water that comes into the land, but it is also an effective means of removing the alkali, which is simply brought to the surface by this accumulation of soil water.

Mr. BOWIE. I want to ask you before you get away into another heading, while it is on my mind, this question: Congress has recently passed the irrigation act, of which, of course, you are advised. Since the passage of that act, what is the necessity of this work that you are doing now and for this appropriation? That act turns over all the proceeds of the sale of the land to be applied to irrigation purposes.

Mr. MEAD. No, it does not turn it over to be used for those purposes at all. That money is to be expended entirely in the location and construction of works. What we are doing is aiding the farmers under ditches already built to use water to better advantage.

Mr. BOWIE. That act does not apply to your work at all?

Mr. MEAD. Not at all. It does not authorize expenditures for that purpose at all. That deals with unirrigated countries. It is not only a different field, but it occupies a different geographical territory. It deals with the country where irrigation does not prevail. We are dealing with it where it is an issue.

The CHAIRMAN. This deals more particularly with what you might call the agriculture of irrigation.

Mr. BOWIE. Private ownership?

Mr. MEAD. Yes.

Mr. SCOTT. Your view of it, I presume, would be that the fact that the country is going into the business on a very large scale renders your work all the more important?

Mr. MEAD. I think so. I think the Government has the same interest as a private individual in having farmers educated to use water to the best advantage.

Mr. BOWIE. Undoubtedly. I was just trying to gather the connection between the two lines of work.

Mr. MEAD. When I come to speak about drainage I will come back to the arid region on the question of seepage. Drainage is a separate proposition.

Mr. BROOKS. And alkali?

Mr. MEAD. Yes, sir.

Mr. BROOKS. Let me ask you one question there in regard to this private ownership. As I understand it, your work is the application of the water to the soil after it has been collected and stored by the Government in the larger reservoirs?

Mr. MEAD. At the present time we are dealing entirely with the water after it has been collected and stored by private individuals. We are dealing with the development that has already been accomplished by the individuals.

Mr. BROOKS. But that would be your relation to the Geological Survey?

Mr. MEAD. Yes, sir.

Now, coming to the semiarid region, there is a great belt of country that extends from Canada down to almost the Gulf of Mexico, that lies between the boundaries where you can get crops by rainfall and where you can not. That region happens to be one of the most fertile regions of the whole country, and one of the places which is most attractive to the farmer, because it is a broad-plains country, which is just suited to the plow and the reaper. In certain sections of the

country that attraction has drawn in whole counties of people, and then they have been depopulated again. Certain counties in that region have been peopled and depopulated two or three times. Rainy seasons would bring them in, and dry seasons drove them out. There is no question in my mind but that that country is going to be permanently settled, permanently inhabited, but it has got to be by a peculiar kind of agriculture.

You have got to develop the kind of agriculture that is suited to that country, and the kind of agriculture that I think would succeed there is this: That each farmer must have a relatively large area of land for general cultivation, but he must supplement what he can do in that line by having 10 or 20 acres of land that he can irrigate, for which he can have a water supply each year. On that 10 or 20 acres of land he can be assured every year of a garden. He can be assured of a little fruit, and he can be assured of a few acres of alfalfa to take care of his milch cows and feed animals, so that when a season of drought does come he will not have to take off what he is making in the fat years to support him in the lean years. He will be able to make a living on his small irrigated area and will have to depend for his prosperity on the fat years. By a system of farming of that kind you can, I believe, give a stability and attractiveness to the agriculture of that country, just the same stability and attractiveness that it has in other parts of the country.

In the first years that we were carrying on these investigations we had to deal with two general questions. One was the determination of how much water was being used, because we were being bombarded with interrogatories from everywhere, and we had to carry on through that region a large number of measurements to determine what farmers were going on under the unskillful methods, and we had to carry on certain investigations similar to the one referred to in California to determine what was the system—the legal and social institutions that they were working under.

But we have made considerable progress. I do not feel that there is the same necessity for expending money along those lines that there was before, and last year we made a beginning in the study of what could be done with small quantities of water in the semiarid region—that is, to determine what it would cost to procure it, determine the best methods of supplying, and the best methods of distributing it and using it.

It is a peculiar question there because you have not what they have along large rivers, the possibility of developing means of economy by using large volumes. You must use large quantities and you must develop a system based on the idea that you are only going to have small quantities of water to distribute and apply. Last year we did some work in western Kansas in cooperation with the State experiment station. They appropriated $1,000 to aid in that investigation. We instituted some inquiries in western Texas, and I made two visits to the Wichita River to study the conditions existing there. This, in a broad way, is what happened there. In probably two years out of three they can raise a fine grain crop. Probably the third year they have a failure. But with the application of a very small quantity of water in the fat years I am satisfied those grain crops could be doubled if the water supply could only be supplemented by a very small additional supply.

Mr. SCOTT. Would the application of this small supply of water save the crop in the lean years?

Mr. MEAD. Yes; it is probable that in lean years you could not save your whole crop. In the lean years in many sections you would have to confine it to your 10 or 20 acre garden and alfalfa patch, but there are relatively large areas—I do not mean the whole country, but probably 10 per cent of the whole country—where it could be irrigated every year.

Mr. SCOTT. Your work in Kansas was carried on at Hays City?

Mr. MEAD. Yes, sir.

Mr. SCOTT. Will you tell us what you did there?

Mr. MEAD. Yes; we laid out 10 acres of land for irrigation, put down a well and installed a pumping plant, and irrigated during the season the staple farm products to determine what would be the effect of irrigation, and to ascertain what was the cost of pumping. Those were the two things we did last year. That is as far as we tried to go with them. Last year happened to be in that section of Kansas a fat year. They had what everybody believed to be an ample rainfall, but the increase in yields in the different crops that were irrigated varied from 25 to 77 per cent. So that it showed its value even in the best year.

Mr. SCOTT. What did you demonstrate there as to the cost of pumping?

Mr. MEAD. It paid, even in that year.

Mr. SCOTT. Can you give an idea as to the actual cost?

Mr. MEAD. No; I can not without figures, and I did not bring those with me.

Mr. BURLESON. What is approximate cost of the outfit?

Mr. MEAD. The outfit costs about $1,000.

Mr. HAUGEN. How deep did you have to go for the water?

Mr. MEAD. Between 20 and 30 feet. The well is 30 feet deep, but the water level varied.

Mr. HAUGEN. The expense depends largely on the distance you have to lift?

Mr. MEAD. Yes; the expense of lifting depends on the height.

Mr. BROOKS. Are those pump plants easily within the reach of the individual farmer?

Mr. MEAD. Yes, sir.

Mr. BROOKS. You are conducting experiments, are you not, on the line of finding out the depth of the subterranean water supply?

Mr. MEAD. No; we have not been carrying on our experiments with that in view. What we are doing is to determine the best means of applying water; that is, to find out how many acres of land you can irrigate with a cubic foot per second of water; how you can spread that out so as to get the most out of it. That is the fundamental idea.

Mr. SCOTT. Have you concluded your work at Hays, or do you expect to continue it this year?

Mr. MEAD. We expect to continue it, and we expect to supplement that by work farther west in the State.

Mr. SCOTT. What power do you use in lifting the water?

Mr. MEAD. That depends on different places.

Mr. LAMB. What kind of power did you use at Hays?

Mr. MEAD. We simply used last year an ordinary traction engine.

Mr. BURLESON. I understand you could carry on a system of experi-

mentation in the conditions described by Judge Smith and Mr. Brooks, so as to illustrate to the farmer that it is practicable and would pay?

Mr. MEAD. Yes.

Mr. BURLESON. You can do it?

Mr. MEAD. Yes; and I think we ought to do it. I think that is one of the fields of work to which we ought to give considerable attention, because it is one of those emergency questions. Here is a country that is filling up with people, and the question of their staying there depends very largely on the adoption of a kind of agriculture suited to that country.

Mr. BURLESON. You are asking for an increase of $5,000?

Mr. MEAD. Yes.

Mr. BURLESON. Will that be sufficient to carry on these experiments?

Mr. MEAD. Yes, sir.

Mr. BURLESON. If you get what you ask (the $5,000), that will enable you to carry on this system of experiments in the semiarid region?

Mr. MEAD. Yes.

Mr. BURLESON. To show the farmer what can be done with small sources of water supply?

Mr. MEAD. Yes. This kind of agriculture is not limited to that particular belt. As we come to understand the arid region better, we are finding out it is not a solid dry region. It is scattered throughout detached areas of land that have exactly those conditions where you can grow certain crops every year. You can grow all kinds of crops some years, and by the addition of a small quantity of water you can greatly increase the area that it will pay to cultivate without the adoption of complete irrigation.

We have been doing work to promote that kind of development with, I think, great benefit to particular sections of the country in showing what can be done to conserve moisture in certain parts of Montana, Idaho, and Oregon.

In Oregon we are carrying on precisely what we propose to carry on in Kansas, Texas, and Oklahoma. There are about 3,000,000 acres of land in Oregon right on the border line between ability to grow crops without irrigation and certain failure in attempting to do it, and success is based entirely on this idea of making the best possible use of all the available water supply. It is not a question of crops; it is not a question of soil. It is a question of using the water that is available to make farming permanently profitable in that region; so that the experiments we propose to carry on will be carried on not alone in this district, although that will be the principal field, but we will carry them on also, as we did last year, in Oregon. We have carried them on for two years in Montana.

When we come to the humid part of the country, we began several years ago in connection with the State experiment stations of New Jersey, Wisconsin, and Missouri to determine what was the field of profitable irrigation in the eastern part of the United States. Irrigation in Europe is not confined to the dry parts of Europe. They irrigate in Germany, in Switzerland, in Italy—where the rainfall is greater than in any part of the Mississippi Valley—and it has been my belief from the first that as the population increases and we adopt more intensive cultivation irrigation will become more and more an important factor in agriculture in the eastern part of the United States.

The work in New Jersey was to determine how far irrigation could be used to aid the market gardener and in the irrigation of sandy lands.

Mr. SCOTT. Let me inquire whether any work of that kind had been done by private individuals in New Jersey at all before you undertook it.

Mr. MEAD. Yes, sir; some few market gardeners, I have found out since, have been irrigating there for twenty-five years; but it was not generally understood, and our work has certainly had the effect of extending its adoption by market gardeners, in a great measure. That has been the principal usefulness of our work in the East; and a canvass of the market gardeners in the vicinity of New York and Boston shows that irrigation is becoming now the rule and not the exception in all the progressive market garden districts. In Wisconsin our work is to help in putting the growing of cranberries on a satisfactory financial footing. For fifteen years they have been trying to grow cranberries in Wisconsin. They have the climate and the soil, and they have a great market for them; but the balance has been on the wrong side of the ledger most of the time. The trouble has been that they did not know when to put water on and when to take it off, and that is the vital issue with cranberries. It wants to be put on at the right time and taken off promptly at the right time, and that means a study of the size of ditches, the kind of ditches, preparation of fields, to enable that to be done. That is what we are doing in cooperation with the State experiment station of Wisconsin.

In Missouri the question is just how far and in what way irrigation can be made use of in the Mississippi Valley, and the results of the irrigation of small fruits and of nursery stock shows that it is going to be one of the features of their production in the future. I think that much has been determined; but there still remain questions of how to irrigate in this eastern country. The question of whether you can do it best by a sprinkling or by volume is a thing about which the market gardeners are all quarreling; and we hope to continue that line of work with the idea of betterment in future years.

We have been requested by the State experiment stations of New York and New Jersey to place in the eastern section of the country this year a man who understands irrigation, a skilled and experienced irrigator, to study the conditions here and to advise them what his conclusions are in regard to the field of irrigation in this part of the country. It depends on what the committee does whether we do it or not. I think the expenditure of a few hundred dollars for the services of a man in the summer is one of those things that could be made wisely, but it is a thing that we can easily drop.

But I believe throughout the whole humid section of the United States, wherever intensive cultivation is adopted, irrigation is going to be employed as an insurance and as a means of increasing the yield. I believe irrigation is going to be used as it is in Europe as an adjunct of dairymen. The adoption of irrigation in Italy, where they have 40 inches of rainfall, enables the farmers of that section to furnish the British army with the most of its cheese, and it has doubled the selling value of the land and trebled its production in the last twenty years.

Mr. SCOTT. Is that connection between irrigation and cheese made by means of the larger forage crop that can be grown by means of irrigation?

Mr. MEAD. Yes. Two things enter into it; one is that the very dry, hot summers destroy their pastures there——

The CHAIRMAN. Where was that did you say, Mr. Mead?

Mr. MEAD. In Italy, in the Valley of the Po. The other thing is that being able during the hot, dry months of the summer to have fresh and green food to supply to dairies so increases their yield as to make a great factor in the annual output of produce. They get more off of their land, they get more out of their cows, and I believe that is one of the things where irrigation, when a water supply can be had anywhere under 30 feet, will be largely adopted in the eastern part of the United States.

In the southern part of the country we have this year been measuring in five places the amount of water used in the irrigation of rice, to determine the duty of water in that section. We took that up at the request of the rice growers of Louisiana.

Mr. BROOKS. What do you mean by the duty of water?

Mr. MEAD. The amount of water required to irrigate an acre of land.

Mr. BROOKS. Does that vary according to the soil and climatic conditions?

Mr. MEAD. Yes.

Mr. BROOKS. Is that one of the problems you are studying?

Mr. MEAD. Yes, sir.

Along the Atlantic seaboard we have made several visits at the request of the rice growers to advise with them about some of the questions that concern the reestablishment of the rice irrigation along the seaboard, and I think we can, by continuing that friendly service at no very great expense, assist materially in the carrying out of certain reforms that they believe in, that they ought to be encouraged in adopting, making use of the experience we have had in the western country, by advising them how to go about it.

Two years ago we were authorized to begin studies of drainage in connection with irrigation; and there had been before that time—in fact, from the very beginning of this investigation—requests for us to study the seepage problem of the West. With the study of drainage we took up, in connection with certain districts, the study of whether lands could be drained best by ditches from the lower end, or by ditches that reached up and cut off the seepage supply from the canals that were flooding the land—that is, certain peculiar questions connected with the preparation of drainage plans, under irrigation, contrasted with the preparation of drainage plans in the East. The publication of our reports on drainage in the West brought us last year a large number of inquiries from communities in the East for advice about the same matter, and I think was assisted by the fact that we had in our employ, I believe, the best drainage engineer in the country. At least, he is the man who is recognized throughout the Mississippi Valley as an undoubted expert in farm drainage. Last year our drainage experts met with communities and advised with them on definite projects upon land, all told, to the amount of $1,300,000 in value. About half of these were in the arid region and about half of them in the humid region.

I believe the drainage work ought to be extended east. There are large sections of the country in the Mississippi Valley and along the

Gulf coast, in farming districts, where a little study and advice and preparation of plans will serve to bring under cultivation lands that are now absolutely worthless, and that if they were reclaimed would be just as valuable as the arable lands. The people who own them are willing to undertake the expense if they can be assured beforehand, if they can feel confident, that the measures they are adopting will be successful and the lands productive. The people are ready to occupy them to-day, and there is a field there for the extension of the country that we ought to aid in bringing into cultivation. So that in our estimate this year we have provided an increase in the amount of appropriation that will be used for salaries and traveling expenses and in other ways for drainage. It is just double what it was last year, and we have employed two men in the State of Washington.

Mr. BURLESON. Is that character of work intended to be embraced under this expression, "agricultural engineering," that you have embodied in the estimate?

Mr. MEAD. Yes.

Mr. HENRY. Have you anything to add to the very interesting explanation you gave us last year in regard to the lands that had been injured by overirrigation, the alkali lands of Utah and other sections? What progress have you made in that particular? Have you anything more to add?

Mr. MEAD. Yes, I will just give some concrete illustrations.

In the Yakima Valley is a considerable area of land under ditches. When they began to irrigate the ground the water was 60 feet below the surface. Last spring the surface of the ground was covered. The water had reached the surface. Now, some of that land was devoted to hop culture, and it sold from $150 to $200 an acre. The people who went there went to an arid region, and when they found they were living over a swamp, it was an entirely new proposition to them to know how to go about changing those conditions. To have adopted the methods of drainage that are employed in the east would have subjected them to very great and needless expense, because they would probably put down drains a certain distance apart, just as they did in the east, and made an underdrainage. It would have carried off the water, but would have made great expense. We made a plan that involved just a single intercepting ditch. Our expert went there and studied that country, determined where the water was coming from, what ditches were leaking, measured the ditches to find out the ones that leaked, finally located the direction from which the seepage water was coming, and laid out an intercepting ditch without any underdrainage, and they formed themselves into a community enterprise and built it.

Mr. BROOKS. And that was successful, was it?

Mr. MEAD. Yes, sir. We have done the same thing for the Gray Bull Valley in Wyoming. There the work has not been carried out, but it will be carried out and will be a success. This work is having an influence on other communities.

Mr. BURLESON. How much saving did that result in to those people?

Mr. MEAD. There were about 12,000 acres in the Yakima Valley, and I suppose it would be a conservative estimate to say it was worth $120,000. The land would be practically valueless without it. We saved certainly $10 an acre on those 12,000 acres.

Mr. BURLESON. On the cost of the different character of drainage?

Mr. MEAD. Yes, sir.

I believe that covers in a general way the lines of work we are carrying on.

I have, however, omitted one feature, the studies of laws and institutions relating to irrigation. The only new work that we inaugurated in that respect this year was a study of the interstate water right question, in conformity to a provision that was inserted in the appropriation bill last year, as to the rights of irrigation in riparian proprietors.

Mr. BROOKS. Is that interstate question becoming an important one in the irrigation regions?

Mr. MEAD. Yes, sir.

Mr. BROOKS. Why?

Mr. MEAD. It is becoming an important one, because as you exhaust streams and utilize them, it creates a shortage on both sides of the line and makes necessary an adjustment on many streams that was not necessary when there was little use of the water, and free water to people on both sides of the line. The matter is now in the Supreme Court of the United States.

In the work that we undertook, before undertaking anything, we looked over the country, and this is the situation. The place where the riparian doctrine and where the rights of the irrigators come most directly in contact with each other is in streams that flow east from the Rocky Mountains. That seemed to be the best place to settle the question. We conferred with the governors and attorneys-general of Kansas and Nebraska, Colorado and Wyoming, with the State engineers of the three States that have State engineers, and all of them welcomed this investigation most heartily, and all of them agreed as to the field where it would be most useful.

Now, what we are doing is not taking up the question of a determination of decisions, or studying the legal questions at all. We are simply gathering the facts as to what has been the effect of the diversion and use of water on irrigation—just simply studying the physical conditions along those streams, so that whenever this question does come up there will be one concrete illustration of just what the conditions are.

Mr. BROOKS. Is that the crux of the controversy between the States, as to the amount of diversion there has been in taking out the water higher up the stream?

Mr. MEAD. Well, yes, that is part of it; but I think this is the view that we have of the importance of our work—that it would certainly contribute to a right settlement of this matter if the people who have to decide upon it could know from an impartial source and from investigations that were carried on in a thorough way just exactly what the conditions were, and what effect irrigation did have on the application of these two doctrines and on the welfare of the people living on the streams.

Mr. SCOTT. Have you been called upon by representatives of the States of Colorado or Kansas for the results of these investigations?

Mr. MEAD. No, sir.

Mr. HAUGEN. What are the experiment stations doing along this line in the different States?

Mr. MEAD. In all of the arid States but one they are cooperating

with us and doing work. That is, we are working together along the lines of our work. Then they are doing a great deal of additional work on other lines, on local and special questions.

Mr. BURLESON. In what part of the United States is the most money being invested at this time in irrigation work?

Mr. MEAD. Probably this year in California; last year it was Louisiana. There was more money going into irrigation, for the past two years, in Louisiana and Texas than in any other part of the United States.

Mr. BROOKS. And that land is under private ownership?

Mr. MEAD. Yes.

Mr. BROOKS. And therefore not under the Interior Department?

Mr. MEAD. All the land in California is under private ownership, too.

Mr. BROOKS. And the same thing is true with regard to a good deal of the Kansas and Nebraska lands?

Mr. MEAD. Yes.

Mr. BROOKS. And South Dakota lands?

Mr. MEAD. Yes.

Mr. BROOKS. Then this work of yours is outside the field of the Interior Department?

Mr. MEAD. The greater part of the work we are doing is on ground under private ownership.

Mr. SCOTT. Is the work which has been done in Louisiana and Texas the result in any degree of your work, or done in any particular way under your advice, or was it undertaken wholly as a private enterprise and with private initiative?

Mr. MEAD. Private initiative entirely.

Mr. BURLESON. But they benefited largely by the suggestions you made?

Mr. MEAD. I think we can claim one thing in Louisiana and Texas that would entitle us to an appropriation if we had never done anything else. That is, we showed the people down there how to build contours over which they could run their harvesters. They were building abrupt ditches, abrupt banks, on their contours to hold the water in particular places. We showed them how they did that thing in California, where there was a long rounded turn over which they could drive their harvesters. That is one improvement that we introduced in the rice cultivation.

Mr. GRAFF. Do you mean that you made the ditch wider and the approaches more gradual?

Mr. MEAD. Yes; and the banks.

Mr. GRAFF. The banks more gradual, so they could drive right into the ditch and out of it again?

Mr. MEAD. Yes.

The CHAIRMAN. What have you done along the lines of the laws of the several States? You remember that was a point under discussion last year, and it was one of the wedges that restarted this appropriation after it had been allowed to lapse four years.

Mr. MEAD. Yes; I feel this way. The work we have done in that line has been of very great service. The passage of the Utah irrigation law, we are assured by the State engineer and others who were instrumental in its passage, would not have been possible without it.

The CHAIRMAN. Just state to the committee the difficulties you

labored under at first owing to these different laws in different States, so the members can understand the question a little more fully.

Mr. MEAD. You will understand that irrigation in this country has grown up very rapidly. It has been developed by people who had been accustomed to working independently of each other. When they went West they were confronted with and thought most about the physical obstacles, the leveling of the lands, the getting out of the ditch, and they did not appreciate at its true importance the necessity of the people who live along the river, and who are all dependent on one single water supply, securing an organization that would protect the man at the lower end of the stream when there were enough users above him to take the entire supply. They went on in that kind of development, without organization, without system, until all at once they came up to this situation. Here were a large number of rivers with more ditches than the river would fill, and there was no sort of law, no sort of regulation that would protect the rights of the people who were entitled to that water supply, and no provision for any possible division of it.

The first thing, to get out of that chaotic situation, was to ascertain just what the facts were, to go on certain typical streams and measure the facts as to the location, the kind of laws that existed there, the kind of measures they adopted, so that each farmer would get what he thought was his share of this common fund flowing down through the channel. That was the leading line of our investigation in the earlier years of this investigation. That was the fundamental line at that time; but having collected the facts appertaining to that line of work I do not believe it has the same importance now. The publication of those reports has had a great influence on public sentiment and has led to the enactment of laws reforming those rules.

Mr. SCOTT. That is one of the problems, then, that you have to a large degree solved?

Mr. MEAD. Yes. I do not say we have solved it, but I will say it has ceased to be the important problem, and there is no particular need at the present time, if these reports illustrating them are published, to go on with that the same way we did before. It is probable that in time, with changing conditions, it may need further investigation, but not at the present time.

Mr. SCOTT. Can you indicate any other lines of work that you have, to a considerable degree or wholly, completed? How about the investigation in California? I asked you a few moments ago to what extent the people there had profited by it. You answered, I believe, that they had profited by it to a very large degree. Will it be necessary to repeat that work or to continue it?

Mr. MEAD. You mean the kind of work that was done in bulletin 100?

Mr. SCOTT. Yes.

Mr. MEAD. No; we are not carrying on that kind of work in California now at all.

Mr. SCOTT. That is what I wanted to know.

Mr. MEAD. No; our work in California now is along these lines: To determine, in a country where water rents are $45 an inch in a year, how you can distribute that water most economically, how you can apply it so as to make an inch of it go over the greatest possible area of land and to secure the largest yields. That is one question.

The other is the question of stopping seepage losses, the improvement of methods of drainage, and the organization of some of those new districts in this rapid development that is going on there; that is, the organization of the people themselves, so that they can handle their affairs, their water, their ditches, so as to get the right results out of them.

I have omitted in going over this one other thing. That is an important subject of investigation in California, and will be a factor in our States in the semiarid region. It is this matter of pumping water for irrigation. Within the last five years several million dollars have been invested in pumps by individual farmers to irrigate their ten, twenty, or forty acres of land. That is becoming and has already become a great feature in irrigation. In the Santa Clara Valley in California there are over 1,500 pumps going. I think it is safe to say that in the beginning of that work for every $10 the farmers spent they lost $1 by putting down the wrong kind of wells, using the wrong kind of engines and the wrong kind of pumps, which were not suited to their peculiar conditions.

The CHAIRMAN. Were they not the best available at that time?

Mr. MEAD. No; they could have obtained others.

The CHAIRMAN. For many years we had thrashing machines and mowers that were the best obtainable at that time?

Mr. MEAD. Yes. What I mean is this, that farmers went and put down rotary pumps when centrifugal pumps would have been better, while the rotary might have been better in another place.

Mr. BROOKS. Are the farmers showing an appreciation of this work, and are you getting inquiries from it in other sections?

Mr. MEAD. Yes.

Mr. BROOKS. Coming to a question which is suggested by Mr. Burleson's comments in regard to the small farmers, are they cooperating, and do they appreciate the work you are doing?

Mr. MEAD. Yes, sir.

Mr. BROOKS. And is that work enlarging among the small farmers as the result of your own work?

Mr. MEAD. Oh, yes; we have met with the most gratifying reception for this work and a consequent increase in the number of practical inquiries from farmers all over the country.

The CHAIRMAN. How many offices do you maintain now, Mr. Mead?

Mr. MEAD. Two.

The CHAIRMAN. One in Wyoming and one here?

Mr. MEAD. Yes.

The CHAIRMAN. How much rent do you pay in Cheyenne?

Mr. MEAD. $720 a year.

The CHAIRMAN. You estimate here for the rent of a building in Washington. Where is your headquarters now?

Mr. MEAD. In the Department.

The CHAIRMAN. What is the need of a new building?

Mr. MEAD. Well, I was not consulted about that estimate for rent here, so I do not assume any responsibility for that. I did not know it was in there until I saw the estimate.

The CHAIRMAN. You are satisfied where you are now?

Mr. MEAD. Yes, sir; we are satisfied where we are. I have no doubt they would like to get rid of us, because we work almost on top of one another in the little rooms we have.

The CHAIRMAN. But in the summer time you are out in the field nearly all of the time with most of your force, are you not?

Mr. MEAD. Personally, I am; yes, sir.

The CHAIRMAN. You have not much force here in the summer time?

Mr. MEAD. We have to keep sending out a force of men.

The CHAIRMAN. How much force do you keep here in the summer time, when crowding would be objectionable?

Mr. MEAD. We get along easier in the summer time than we do in the winter. The crowding is in the winter.

The CHAIRMAN. How much force is here in the summer time? How many people have you here, in numbers? Did you state that?

Mr. MEAD. I should say five or six. There is one connected with the distribution of publications. We have to attend to that. Then there is simply the force that is connected with the editing of bulletins That goes on during the summer. It goes through the whole year, but all our field men, all our engineers, are put in the field in the summer.

Mr. HENRY. How large a number of employees do you keep in your Wyoming station?

Mr. MEAD. That varies, of course, in the winter and summer quite largely.

The CHAIRMAN. Do you think it is necessary to keep up an office there also? Is not all your work returned here really to be put in shape for distribution?

Mr. MEAD. I think it is economy to keep it up.

The CHAIRMAN. You do?

Mr. MEAD. Yes. In the first place, we would have to have new offices if we had all our force here. We would have to rent offices here. We have got just as many people in the rooms we are occupying now as we can keep, and we have some of our force out in the library, in the alcoves there.

Mr. HENRY. In other words, the maintenance of the office in Wyoming is not an extra expense?

Mr. MEAD. No. Then another thing. In our work of measuring water we have to have quite a large number of instruments for keeping records. They have to be brought in and corrected and checked up and tested every year. We have a station in Wyoming that the State has fixed up for us free of cost that we are able to utilize. We have not anything of the kind here.

The CHAIRMAN. Did you say Wyoming had done something toward paying expenses in cooperation with the experiment stations?

Mr. MEAD. Yes, sir.

The CHAIRMAN. Then California, Nevada, Wyoming, and what other State has helped you—Kansas?

Mr. MEAD. Yes, sir.

The CHAIRMAN. Washington?

Mr. MEAD. Yes, sir; quite a number of the stations have helped us.

The CHAIRMAN. I mean, have any other States contributed money, besides those I have mentioned, to be expended by you?

Mr. MEAD. They have not contributed money outright, but the different experiment stations have aided us in our work for equipment and men.

Mr. HAUGEN. How many of these arid and semiarid States are there?

Mr. MEAD. Sixteen or seventeen.

Mr. HAUGEN. We appropriate, then, about $4,000 for each State?

Mr. MEAD. Yes; but we are working in the whole country. It is not all being expended out there.

Mr. SCOTT. When you were before us last year you spoke of having an investigator in Egypt. Can you give us briefly the result of his work?

Mr. MEAD. Yes. The investigation of irrigation in Egypt was undertaken because of the interest shown in the oldest irrigation country in the world, the completion of the two great dams there, and the widely existing desire for information on the part of people of this country as to whether or not we could not learn from Egypt some lessons that would be of great service to this country. We went there to see just what lessons Egypt did have for us in our development.

The results of that have been that the information that was gathered regarding the construction of those dams has been of great service to engineers. The facts that we learned regarding drainage and its influence on the removal of alkali, have served to show that drainage is a remedy for alkali, and some of the devices used in pumping can be used here.

Those are the positive gain that come from it. So far as concerns the adoption of their methods, their laws, or their system of controlling irrigation, they show we can not adopt them. That is a negative result, but it is still a valuable result because it tended to clear up what was a widely spread misconception in this country.

There was one thing we did not anticipate that was an altogether unexpected benefit from that report. I do not believe there has been a prominent cotton grower, or certainly a cotton factory, that has not applied for that report to find out what influence these improvements in Egypt were going to have on the cotton industry in this country. We had a gentleman from New York here yesterday to inquire about that matter. They wanted to find out how far the influence on growing long staple cotton would go on prices in this country, and the report covers that ground.

Mr. BROOKS. You spoke of the work you are doing in Wisconsin. Mr. Adams was not here at that time, and I would like to have you repeat it.

Mr. MEAD. I stated we were cooperating with the experiment station in Wisconsin in the development of methods for the irrigation of the cranberry beds of Wisconsin. That is, the devising of a system for the applying and removal of water. It does not simply mean the devising of a method of fixing the form and shape of ditches, but where you have got a large area of country where there is little fall, it seems you have got to fix a plan that a larger number of people can work together on, so that the removal of water from one man's bed will not remove the water from the bed of the man below him.

Mr. BROOKS. That work is embodied in Bulletin 130?

Mr. MEAD. Yes, sir.

Mr. ADAMS. Are you still engaged in that cranberry work?

Mr. MEAD. Yes, sir.

Mr. SCOTT. You spent last summer in Italy?

Mr. MEAD. Yes, sir.

Mr. SCOTT. Could you tell us briefly the results that you think will come from that investigation?

Mr. MEAD. The studies in Italy were undertaken because there were no reports on Italian irrigation within the last half century, and in that time it has come to be the foremost irrigating country in Europe. I went there to see what had brought about that supremacy, what their administrative methods were. I went there with the idea that its lessons would be for the arid region, but they are both for the arid and the humid regions. In the valley of the Po, where I spent the entire two months that I was over there, the sections are the most densely populated of any part of Europe, and more densely populated than Egypt. There are agricultural districts there that supply 800 people to the square mile, and the lessons of Italian irrigation are the great success and ability that they have shown in the distribution of water. They have worked out a system there by which an association of farmers, 14,000 irrigants working under one system, operate 9,000 miles of canals, and in fifty years there has not been a lawsuit nor a failure to pay their water rent. It is a remarkable system. I saw another section where there are 8,000 irrigators working under a system.

Mr. HENRY. Is this in northern Italy?

Mr. MEAD. Yes, sir; along the Po. That is the very thing in which we are weak in this country, in the organization to work together peacefully and harmoniously.

Mr. ADAMS. Is that a purely business organization without any connection whatever, semi or complete, with the Government?

Mr. MEAD. Yes.

Mr. ADAMS. It is absolutely an independent private enterprise.

Mr. MEAD. Yes, sir. The one that has 14,000 members rents a large number of Government canals and operates them. The canals were turned over to them by the Government to operate them. This system in Italy was created by the then minister of agriculture of Italy, and he was the first president of the parent volunteer association. It grew out of exactly the same kind of difficulties we are having in the West at the present time.

Mr. BROOKS. Have those difficulties been one of the major causes of trouble among irrigators in the West?

Mr. MEAD. Yes.

Mr. BROOKS. And the streams there are appropriated a good many times over in volume?

Mr. MEAD. Yes.

Mr. BROOKS. Do you know any facts about any of those instances?

Mr. MEAD. Oh, yes; there is no doubt about overappropriation there, but I think if you can get the farmers along a stream, the farmers that live under a canal, to realize that they are part of a system, that they all have a common interest in a common water supply and get them to organize together for its distribution, you get over all those difficulties.

Mr. BROOKS. You mean that with the adoption of a proper system, even though a stream is appropriated eight or ten times, as it sometimes is, the water will, to some extent, at least, be divided?

Mr. MEAD. Yes, sir.

Mr. ADAMS. Does that association embrace all the farmers within the irrigated territory?

Mr. MEAD. Yes; of that particular district.

Mr. ADAMS. It takes them all in, every one?

Mr. MEAD. Every one.

The CHAIRMAN. Have you gotten through with Italy.

Mr. MEAD. Yes, sir.

The CHAIRMAN. Then the money that was used for the Egyptian and Italian investigation can be used along other lines?

Mr. MEAD. Yes, sir.

The CHAIRMAN. What was about the sum spent in those two investigations?

Mr. MEAD. About $1,000 in each one.

Mr. SCOTT. Of course that did not include the expenses of the report.

Mr. MEAD. No; I do not know what the expense of printing the Egyptian report was. Probably about $1,000.

Mr. SCOTT. It was a little over $1,100.

Mr. MEAD. Yes.

Mr. BROOKS. Do you mean the work of collecting this matter was all done for $1,000?

Mr. MEAD. Yes, sir.

The CHAIRMAN. Exclusive of salaries?

Mr. MEAD. Yes, sir; so far as my salary is concerned, it did not count, for one month. I spent my vacation there and the Government got $200.

The CHAIRMAN. Are you not entitled to a vacation with pay?

Mr. MEAD. Yes; but I was willing to spend it over there.

The CHAIRMAN. If there are no further questions to be asked Mr. Mead, we will go on with Doctor True. We are much obliged to you, Mr. Mead.

## STATEMENT OF DR. A. C. TRUE, DIRECTOR OF OFFICE OF EXPERIMENT STATIONS, DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. Gentlemen, Doctor True is the head of the experiment station work. That division appears on page 25 of the estimates.

Doctor TRUE. Before we leave this matter of irrigation, Mr. Chairman, if I may be permitted, I want to say just a word or two.

The CHAIRMAN. Very well.

Doctor TRUE. This irrigation appropriation, under the orders of the Secretary of Agriculture, is intrusted to the care of the office of experiment stations, so that I am responsible for that as well as for the other work, and I want the committee to be aware of the general policy under which, under the instructions of the Secretary of Agriculture, this work is being carried on.

We are endeavoring, as Mr. Mead has pointed out, to build up work along distinctly agricultural lines, so as to have for irrigation in the Department of Agriculture a distinct field and a field which properly belongs within the domain of the Department of Agriculture. Wherever any question has arisen as to the conduct of our work with that of the Geological Survey or any other branch of the service we have made a careful study of the matter and have endeavored to remove causes of friction and to keep our work within strictly agricultural lines.

Another thing is this, as a matter of general policy, that we are not attempting to build up a large force and to spread the work out to cover the individual States. That is, we are undertaking nothing in the character of a general survey. Our object is to assemble a sufficient body of experts to study definite problems. We must study them in

localities, but it is not simply a question of an individual locality and the interests involved in that locality when we go to make study. We do not want to go into any locality unless there is some question there, the study of which we think will bring out results which will be of use broadly. So that there need be no fear with reference to that matter that we shall try to spread this work out and make a great survey or anything of that sort.

Mr. Mead has spoken of some of the lines of work, and yet he has omitted one direction in which our work is developing, which is reflected in the Book of Estimates in the suggestion for the broadening of the type of this work and in the use of certain things a little different from what was used last year. Mr. Mead has already pointed out that the work under this appropriation is no longer confined to irrigation, but covers drainage and questions relating to the application of power, not only to irrigation, but to other agricultural purposes.

Mr. SCOTT. Is that what you mean, Doctor True, by this phrase "agricultural engineering?"

Doctor TRUE. That is what we mean by the phrase "agricultural engineering." That matter of drainage, of course, is not a matter at all confined to the irrigated regions. For example, when I was out in Iowa last summer, visiting the experiment station there, I spent a good deal of my time on the cars passing through that State, in discussing with men questions relating to drainage of large tracts of land in Iowa. They need, in some respects, as it appears to me, to change their drainage laws. They need to adopt better methods of drainage. There are large tracts of land where lately they have had a great deal of trouble, in Iowa as well as in other States; so that there are large questions relating to drainage, and we are taking those up as Mr. Mead has indicated.

Beyond that the farmers of the country, and particularly of the West—that is, beyond the Alleghenies—are coming to take a great deal more interest in problems relating to the proper care of their farm machinery and the use of the best kinds of machinery for specific purposes.

It is a curious thing that while in this country we have been the largest users of agricultural machinery, the Department of Agriculture has never taken any direct interest in that matter and never had any funds at its disposal which it could use for investigation along that line, so that the whole matter has been left to the manufacturers of machinery. But even the manufacturers themselves are now coming to realize that to make the best kind of machinery and specialize that machinery, as the farmers desire more and more to have it specialized, they should have in their employ a class of experts who have not only studied mechanical engineering in the ordinary way, but have studied it with reference to the agricultural use of the product.

So, to meet the demands of the farmers and the demands of the manufacturers, the agricultural colleges are taking up the study of problems relating to farm machinery. They are organizing courses of instruction along those lines. They are putting up special buildings for use in those courses.

We have had recently in the the State of Iowa a fine building put up by the agricultural college which will be wholly used for instruction and for investigation along these lines. Wisconsin has an appropriation of $15,000 this year for a special farm engineering building.

When we take up work at the agricultural colleges and experiment stations, they find that there is not in this country at hand the data on which to base the courses of instruction and that there have been no systematic investigations of the problems relating to farm machinery.

What we would like to do is to help the agricultural colleges and experiment stations along this line just as we have been helping them in other lines; and so we have asked that the title of the appropriation shall be changed so as to read "Irrigation and agricultural engineering," and that the wording of the act shall be such as to permit us to extend our investigations along that line.

The CHAIRMAN. What investigation do you make with regard to agricultural machinery? We had this up last year, you remember, and I took the ground that if the Government was going into that sort of thing of course it would naturally lead to a recommendation. It would be of no benefit unless you recommended finally some plow, or some cultivator, or other machine that was superior to all others. Then where are you, if the Government is going into that business?

Doctor TRUE. That is not the kind of work we propose to do.

The CHAIRMAN. Would it not lead to that inevitably?

Doctor TRUE. I think not. Investigations along these same lines are being conducted in the European governments. The German Government is helping the German manufacturers to-day to devise special forms of machinery for use in Germany, so as to keep out the American machines which are getting in to a considerable extent. The French Government has maintained in the city of Paris for a considerable number of years an experiment station wholly devoted to the study of farm machinery, endeavoring to determine the correct principles on which machinery should be made; not to make particular machines and put them on the market, but to study the problems connected with the making of machines in a more general way; and I do not see that there is any difficulty in the colleges and stations marking out a useful line of work in this direction, as they have in other directions.

What we propose to do first is indicated in the report of the Office of Experiment Stations. That is, we would like to collect and publish information in regard to the evolution and character and the uses of farm implements and machinery.

The CHAIRMAN. You are still addressing yourself, then, to the irrigation item?

Doctor TRUE. The irrigation item; yes, sir. That knowledge does not exist at present in this country.

The CHAIRMAN. Why should that thing come under the irrigation item?

Doctor TRUE. It comes under the irrigation item if that item is broadened to read "irrigation and agricultural engineering."

Mr. BURLESON. Is that what that is intended for—irrigation and agricultural engineering? I thought it was intended to embrace the system of drainage.

Doctor TRUE. Well, it does. The term "agricultural engineering" embraces drainage and irrigation—the whole thing. If you wipe out "irrigation" it will leave it "agricultural engineering." We would not object to that.

Mr. BURLESON. What possible benefit would it be to the farmer to issue a bulletin on the evolution of the plow, commencing with the first one and bringing it up to a 4-disk harrow? What possible benefit would it be?

Doctor TRUE. A bulletin of that kind would not he so much for popular distribution as to give the material which would form the basis for the work of the teachers and educators in the agricultural colleges and experiment stations. Of course that is what the Department is constantly doing. We are investigating that subject and issuing technical bulletins, which we distribute only in small editions in order that they may be the basis for work the results of which will reach out further, but beyond that we would make and encourage the experiment stations to make laboratory and practical tests involving the study of the principles of construction and methods of operation of farm implements and machinery, with special reference to their efficiency and economy.

That work is, as I said, already begun in some of our larger agricultural institutions, notably in the States of Illinois, Minnesota, Wisconsin, and Iowa, and they are appealing to us to enter upon this work so as to furnish them with the information which is necessary for them to successfully maintain these courses of instruction, and also to investigate further the problems that are brought to their attention.

Mr. SCOTT. If they have already begun this work, why can they not dig out that information themselves?

Doctor TRUE. Well, for the same reason that they can not do the other work that the Department of Agriculture is doing. Here is the proposition in Wisconsin, taking a concrete illustration. The legislature of Wisconsin has given the college of agriculture an appropriation of $15,000 to put up a farm engineering building. They have employed, also with an appropriation from the legislature, a professor of farm engineering. That is as far as at present they feel able to go.

Mr. SCOTT. And that professor of farm engineering wants you to furnish him with information to conduct his department, does he?

Doctor TRUE. Yes; he wants us to help him to put the work on a good basis.

Mr. SCOTT. It rather seems to me that if he is a professor of farm engineering and qualified for the position, he ought to be able to conduct that work himself.

Doctor TRUE. You must understand this, that this is a new line of work in this country, and what the colleges have to do practically, in employing teachers along that line, is to take men who have been trained in engineering in our engineering schools and then to set them to work to study these special topics which relate to the farm.

Mr. SCOTT. And it is precisely because this has been done in the State of Wisconsin that it occurred to me unnecessary to undertake it here.

Doctor TRUE. But the State of Wisconsin can only do a little part of what needs to be done. That is, the situation in that direction is just what it is in other directions in which the Department of Agriculture is working.

Mr. HAUGEN. What is the object sought? Is it to determine the relative value of the different machines and how to construct implements?

Doctor TRUE. Both of those objects; that is, to determine whether

the machines in use are the best that could be devised, whether the principles of their construction are the best and most economical that could be devised.

Mr. ADAMS. Professor, the subject of farm engineering, I should think, would also naturally cover the subject of the use of power upon the farm.

Doctor TRUE. Certainly.

Mr. ADAMS. And the adaptation or adjustment of that power, the manner in which it should be located in the farm buildings, and where it can be economically employed.

Doctor TRUE. Certainly.

Mr. HAUGEN. This, then, leads up to what the chairman has referred to—a recommendation. You find one implement of greater value than another, and it would be your duty, of course, to recommend that machine or implement?

Doctor TRUE. Oh, no.

The CHAIRMAN. Are you not obliged to announce that fact?

Doctor TRUE. Not with reference to a special machine.

Mr. HAUGEN. What good would it be unless it was announced?

Doctor TRUE. What we would announce is that machinery constructed in accordance with certain principles is the best.

Mr. BURLESON. For instance, Keating makes a certain disk plow. Moline makes a certain disk plow that is essentially different. If you found the principles involved in that Keating plow would be the best, and you pronounced in favor of it, would not that be an advertisement for the Keating plow over the Moline plow? Would not that, as Mr. Haugen says, be the sum and substance of all that could be done?

Mr. SCOTT. If you describe the principle that you determine is the correct one in a certain machine, do you not suppose the manufacturer of that machine would be smart enough to fit that description of a principle to his machine and use it as an advertisement?

Doctor TRUE. I should think he would be wise enough—I hope he would—to adapt the machine to the correct principle if it was discovered.

Mr. HAUGEN. Would not the farmer be the first one to discover the merits of the different machines?

Doctor TRUE. I do not think so necessarily; no, sir.

Mr. HAUGEN. I mean the farmer or whoever operated the machine in preference to the manufacturer of the implement.

Doctor TRUE. I think the farmer in a general way is just as liable to make mistakes with reference to the use of machines as he is with reference to the crops that he raises.

Mr. SCOTT Have you spent any money on this work during the past year?

Doctor TRUE. On this particular work?

Mr. SCOTT. Yes.

Doctor TRUE. No, sir.

Mr. SCOTT. You have not undertaken it at all?

Doctor TRUE. No, sir.

The CHAIRMAN. He was not authorized to do so. The doctor advocated this thing last year, and the committee refused it.

Mr. HENRY. Is it not true that the farmer becomes attached to the machine he uses and thinks it the best machine, and if he has a Buck-

eye mower he thinks it is better than any other mower, and so with the plow he uses? Do you think your report would overcome that prejudice in favor of a machine that possibly might not be as good as the other machine that he did not like?

Doctor TRUE. It think it would be an influence in that direction with reference to machines just as it is with reference to varieties of tobacco or anything else which the Department would make.

Mr. LORIMER. Do you know, Doctor, whether the Illinois college has taken up this investigation in connection with the technical department of their school, or is it just specifically to disseminate information to the farmers of the State?

Doctor TRUE. In Illinois?

Mr. LORIMER. Yes; I thought you said Illinois.

Doctor TRUE. Yes; Illinois, as you doubtless know, has, in recent years, put up an expensive building for the use of its college of agriculture.

Mr. LORIMER. Yes.

Doctor TRUE. Another one of the large departments in that building is used for this work relating to farm machinery.

Mr. LORIMER. You know they have a technical department there. Is that just added to the technical department?

Doctor TRUE. No, this work is connected with the department of agriculture in the university, not with the engineering department. It is a special work.

The CHAIRMAN. Doctor, are you through with that item?

Doctor TRUE. Yes; I have nothing further to say upon that subject.

The CHAIRMAN. Now, coming back to your agricultural experiment stations, on page 25, there seems to be a little misprint here. Have you asked for $15,000 increase or $5,000 increase?

Doctor TRUE. $5,000.

The CHAIRMAN. Then that is all right. There is no misprint about it.

Doctor TRUE. Yes; there is a misprint. That is on page 25 of the Book of Estimates the total sum is stated at $815,000. That is a change from ten to fifteen, and that is as it should be.

Mr. SCOTT. It ought to be $815,000, ought it not?

Doctor TRUE. Yes. Now, to account for that $815,000, there should be on page 26——

The CHAIRMAN. Including the preparation and printings of charts, diagrams, etc.?

Doctor TRUE. Yes. Above that, under the item relating to the farmers' institute work, it should be——

The CHAIRMAN. We understand that. We will reach that later. Now, reading that paragraph there you will see this: "Forty thousand dollars of which sum shall be payable upon the order of the Secretary of Agriculture, to enable him to carry out the provisions of section three of said act of March second, eighteen hundred and eighty-seven." Just explain to the committee what that is. The older members perhaps know it, but the new members do not.

Mr. TRUE. That money is used for the maintenance of the office of experiment stations, which acts as a central agency for the agricultural experiment stations and agricultural colleges throughout the country, publishing the results of their work in different forms for distribution through the country; so that the results obtained in any

one State are brought to the attention of the people in all the States. Last year, in pursuing that work, you will observe by looking at the report of the general editor of the Department, there were issued from the office of experiment stations farmers' bulletins amounting to just about two million copies, or one-third of the total output of the Department. Now those bulletins, for the most part, recorded the results obtained from the experiment stations in different States and also kindred institutions in other countries. They were put in popular form, and of course they were called for by members of Congress, which means that there was a general demand for them. It is that general work of promoting the interests of the agricultural colleges and experiment stations and preparing publications based upon the publications of these institutions that constitute the principal work of the office of experiment stations.

Mr. GRAFF. Those bulletins were issued by the experiment station itself, were they?

Doctor TRUE. No; the experiment station in any one State issues its own bulletin. It is required under the law to issue one at least every three months. We get all the bulletins of all the stations here at Washington. Then we work them over in various forms, taking out of them those results more especially which are of general application, and on the station bulletins from all the States we make up farmers' bulletins that are distributed in the regular way by the members of Congress and by the Department, the object being to make the results obtained in any one State available to the farmers in all the other States, so far as their use throughout the country goes.

Mr. SCOTT. Immediately following that appears here this statement: "Fifteen thousand dollars of which sum shall be expended by the Secretary of Agriculture to investigate and report to Congress upon the agricultural resources and capabilities of Alaska."

The CHAIRMAN. And it goes on: "And to establish and maintain agricultural experiment stations in said Territory." Doctor, I wish you would recast this paragraph. Alaska is injected there right in the middle of what you might call the legislation requiring you to look after certain matters relating to experiment stations. I would take those three stations, the Alaskan, the Hawaiian, and the Porto Rican, and put them together.

Doctor TRUE. Yes; this paragraph is, of course, the growth of years, and the language has seemed to work all right.

The CHAIRMAN. Do not change the language, but just change the order.

Mr. HENRY. It is a repetition of the same language. Could it not be continuous and say "the stations of Porto Rico, Hawaii, and Alaska?"

The CHAIRMAN. We give each one of them $15,000.

Mr. HENRY. Well, the provisions are practically the same.

Doctor TRUE. There are some little differences. There is at least one difference that I think of now. In the case of Alaska we undertake to publish everything here at Washington, there being no facilities of publication there. In the other cases we publish in the islands themselves.

Mr. SCOTT. I was misled by the insertion of that semicolon after "Alaska." I read it this way: "Fifteen thousand dollars of which sum shall be expended by the Secretary of Agriculture to investigate

and report to Congress upon the agricultural resources and capibilities of Alaska;" I naturally supposed that was the entire purpose of that $15,000. So it seems to me there ought to be only a comma there if the succeeding clause is to be included under that $15,000.

Doctor TRUE. Yes; I should think that would be better.

The CHAIRMAN. You go on in that paragraph and say: "And the Secretary of Agriculture shall prescribe the form of the annual financial statement required by section three of said act of March second, eighteen hundred and eighty-seven." You leave the act of March 2, 1887, temporarily injected into the item there of the Alaska business.

Doctor TRUE. That came about because the Alaska station was established first, and before the Porto Rico and Hawaiian stations.

The CHAIRMAN. Not before the other stations?

Doctor TRUE. Yes; before the Porto Rico and Hawaiian stations.

The CHAIRMAN. Yes, but section 3 of the act of March 2, 1887, does not refer to Porto Rico or to Hawaii. It refers to the act under which we gave this money to all the experiment stations in the several States and Territories.

Doctor TRUE. As far as the language of the act is concerned, it has always been a mystery to me why it was put the way it is. Of course I had nothing to do with it.

The CHAIRMAN. Suppose you recast that, without changing its meaning in any way, and send us up a copy.

Doctor TRUE. Yes; I shall be glad to do so.

The CHAIRMAN. Now you may go on, Doctor, if you will.

Mr. HAUGEN. On page 26 you add the word "experiment" in connection with the appropriation for Hawaii. How does that happen?

Doctor TRUE. It happens that that was called an agricultural station in the last act.

The CHAIRMAN. I think it is just an omission.

Doctor TRUE. Yes; the word "experiment" was dropped out. That is not a vital matter.

Mr. HAUGEN. Are these bulletins that are sent out by the stations sent out under the frank of the Agricultural Department?

Doctor TRUE. No, sir; each station has its own frank under the general law.

Mr. HAUGEN. They have their own frank?

Doctor TRUE. The director of the station has his frank.

The CHAIRMAN. Coming down to the end of paragraph 1, page 26, the committee will notice that last year we put in this new proviso:

*Provided,* That five thousand dollars of this sum shall be used by the Secretary of Agriculture to investigate and report upon the organization and progress of farmers' institutes in the several States and Territories, and upon similar organizations in foreign countries, with special suggestions of plans and methods for making such organization more effective for the dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations and of improved methods of agricultural practice,

And the Department wants added—

including the preparation and printing of charts, diagrams, photographs and lantern slides for use in connection with lectures delivered at farmers' institutes.

Those words in italics are the cause of the increase asked for. Am I right, Doctor?

Doctor TRUE. Yes, sir; so it provides. Instead of $5,000 it should read $10,000. That is where the mistake was made.

The CHAIRMAN. Are you not going into a sort of show business there, when you get lantern slides and all that sort of thing?

Doctor TRUE. I would be glad to explain just what we mean by that.

The CHAIRMAN. I wish you would.

Mr. GRAFF. You say that ought to be $10,000 instead of $5,000?

Doctor TRUE. Yes; that ought to be $10,000 instead of $5,000.

Mr. GRAFF. Right after the word "provided?"

Doctor TRUE. Yes. We have at present $5,000. That is used to pay for the salaries of an officer called a farmers' institute specialist, who has a salary of $2,000, and one clerk, who at present has a salary of $840. The balance of the money for the most part is used in paying the traveling expenses of this agent, who must necessarily, in order to do the work that we desire him to do, travel about in the different States, confer with the State directors of institutes, and speak at representative meetings and come in touch with the members who are doing the work in the institutes. Now, the institute system of the United States has grown to be a very large enterprise. According to the data which we have collected more thoroughly this year than ever before, there were held during the past year in the United States about 3,700 institutes, and these were attended by over 900,000 persons. You can see that that is a very large force of people to receive instructions through the institutes, and if this work can be properly organized and made most efficient, it will be a great agency for the proper dissemination of the results obtained by the Department and the agricultural experiment stations.

At present instruction is given in those institutes by about 4,000 different people. Of that number about 900 are men who are paid to attend the institutes in a general way in the respective States. They are called regular institute lecturers. The other 3,000 are local men largely who are called in to give a lecture or two at the individual institute.

Now, as the institute system develops in this country, there is a greater and greater demand that the institute lecturers and speakers shall not only give their own experience as successful farmers in some particular line, but that they shall be able to interpret that experience in the light of what the experiment stations and institutions have determined and the general experience. That makes it necessary that this body of lecturers should keep up to date in these matters that relate to the improvement of farm practice and the results of scientific investigation along those lines, and everywhere we find that the State superintendent of the farmers' institutes are trying to get men who can do this, and failing that, because it is hard to find them, they are trying in various ways to train these men so that they will be better adapted to do what the farmers want them to do in the institutes.

One large feature of our work, as we have planned it, is to help these farmers' institute lecturers get the information which they need, and to supply them, in any reasonable way, with facilities for making the best use of this information.

The CHAIRMAN. Right there, Doctor, that was just what you told us last year and we inserted the item, but we had no idea you were going into sending lecturers around yourself. We thought you were going to supply the information for these lecturers, but we did not think you were going into what I might call the show business, with

lantern slides and all that. If you remember the conversation at the time, you said you would only require a small sum to supplement and keep moving along this institute work.

Doctor TRUE. That is exactly the policy now.

The CHAIRMAN. Now you come to us with an estimate of $5,000. That is doubling up the sum in less than six months. That sum has only been available since the 1st day of July, and you want $5,000 for the printing of charts, diagrams and photographs, and lantern slides for use in connection with lectures delivered at farmers' institutes. I think from that language you intend to have your own lecturer deliver this lecture.

Doctor TRUE. That is not the idea.

The CHAIRMAN. The language certainly would imply that.

Doctor TRUE. The idea is this: Take, for example, the working dairy. I suppose there will be hundreds of lectures on dairying given at the farmers' institutes, and it seems to me it would be a useful thing if the Department was in a position to chart some of the very useful results that are being obtained from time to time in the work of the stations and in other ways, and send those charts out, so that the institute lecturers could have them to use in the institutes. That is a form of publication which does not differ essentially from what the Department is already doing and has done in the past.

The CHAIRMAN. But how about the use of lantern slides?

Doctor TRUE. As regards the lantern slides, it is the same principle.

The CHAIRMAN. That means casting your pictures, etc., on a sheet, does it not?

Doctor TRUE. It is a more and more common and useful means of illustration.

The CHAIRMAN. I do not deny its usefulness, perhaps, but ought we to go in that business? It never was intended last year when we gave the appropriation that you should go on those lines.

Doctor TRUE. We could establish here in Washington, I think, an exchange system with reference to lantern slides which would be very useful to the institutes, which would not involve any large expense, and which would enable us to send the lantern slides, illustrative of the work of the Department and of the stations, all around the country in a single season, reaching in that way thousands of people who would never get these results otherwise.

Mr. SCOTT. Can you not do that gradually with the appropriation you have?

Doctor TRUE. I do not see that we can, with the appropriation we have.

Mr. HAUGEN. These lecturers are paid, are they not?

The CHAIRMAN. The State institute lecturers are.

Doctor TRUE. They are paid very small sums.

Mr. HAUGEN. A number of them make a business of it, do they not, and receive so much a lecture?

Doctor TRUE. Yes; it is a side business as a rule. The institutes only run for a limited term in each State.

The CHAIRMAN. During the winter. That is the only time you can run them properly.

Mr. ADAMS. Mr. Chairman, let me state for Mr. Haugen's information that I spent three years in the institute work. I attended hundreds of meetings and assisted in those meetings more or less and met

tens of thousands of farmers; and here is just what I found, as an illustration, as I imagine, of the work which the doctor is endeavoring to do. Governor Hoard is a specialist in talking about dairy cows and beef cows; and he had prepared, because he had enough interest in it and sufficient means, a number of oil paintings, crude, perhaps, but still as large as that map, giving different types of cows, the dairy cow and the beef cow, and then, of course, illustrating the different breeds. Of course that is very useful in a practical demonstration to a farm audience, where you are trying to impress upon them what the real dairy cow is or what the beef type is. That also extends to other fields, such as sheep. Not only that, but Professor King, down here, when he was lecturing in our institutes upon the subject of farm buildings, which is a very practical and important subject, would illustrate his lecture very effectively by the use of charts, and in fact he really required them. Then the charts which show the composition of feeding stuffs can be made quite impressive when properly prepared. These individual workers, working in the States for small salaries, of course are not always able to obtain these things in the best form. I imagine the object of the professor in this matter and of the Department would be to supply all these institute workers to as great an extent as possible throughout the country with illustrations of that character, which would be in the best form. Is that correct, Professor?

Doctor TRUE. Yes; that is it.

Mr. HAUGEN. I understood you to say there are thousands of these lecturers in this country.

Mr. ADAMS. Oh, no.

Mr. HAUGEN. I understood you to say there were a number of thousands of lecturers.

Doctor TRUE. The number of regulary employed lecturers is about 900. Then, there are besides that several thousand local men who occasionally lecture.

Mr. HAUGEN. Would you undertake to supply all of them?

Doctor TRUE. Certainly not. We are not asking for money enough to do any very large thing.

Mr. BOWIE. You just want to pick out a few?

Doctor TRUE. A few of the best things and use them in the best way.

Mr. HAUGEN. But that would practically lead up, would it not, to lantern slides for every lecturer? It would not do to discriminate, would it?

Doctor TRUE. It would not be our idea to give these lantern slides away. It would be simply a matter of loaning the lantern slides, so that the same lantern slides might be used ultimately in every State of the Union.

Mr. HAUGEN. Every lecturer would want to use them, and you would have to have them, would you not, in order not to discriminate?

Mr. BURLESON. They could be used like a circulating library.

Mr. LORIMER. How many slides would you use in each lecture? How many would they average?

Doctor TRUE. From 30 to 50, I should say.

Mr. LORIMER. Are they plain or colored slides, or both?

Doctor TRUE. We would use both at times, but mostly plain slides.

Mr. LORIMER. A set of slides for a lecturer would cost about $10.

The best lamp you could get would cost about $60, which would be about $75 for each lecture outfit.

Doctor TRUE. We would not undertake to supply the lanterns.

Mr. LORIMER. You would supply the slides?

Doctor TRUE. Yes.

Mr. LORIMER. Then a sufficient number of slides, colored and uncolored, would cost about $10 for each lecture.

Doctor TRUE. Yes.

Mr. LORIMER. How many of those would you want? How many sets would supply the country, or the sections that you want to send them to?

Doctor TRUE. That is a matter we have not worked out at all.

Mr. LORIMER. Have you any idea? Would you want a dozen sets or a hundred sets?

Doctor TRUE. I should think one hundred sets would not be a very large number.

Mr. GRAFF. That would be $1,000.

The CHAIRMAN. It would necessitate boxing and all that, so that they could be sent by express.

Mr. LORIMER. Ten dollars a set would pay for them.

Mr. HAUGEN. The lamp would cost $60, did you say?

Mr. LORIMER. He said he would not supply the lamp.

Mr. HAUGEN. How would they supply the lamp?

Mr. LORIMER. You could get a lamp all the way from $5 to $100. The $5 is about as good as the $100 lamp, if you put the right sort of light in it. Then I suppose they would arrange their own screen. It would cost about $5,000 to get as many slides as you would want.

Doctor TRUE. That covers all in the appropriation in which there is any change suggested.

The CHAIRMAN. Is there anything further you want to say to the committee of your own accord, Doctor, that the questioning has not brought out?

Doctor TRUE. I do not know that there is anything specially Mr. Chairman. Of course you understand that the next item comes under my jurisdiction as well?

The CHAIRMAN. Nutrition?

Doctor TRUE. Yes.

The CHAIRMAN. We will not go into that.

The subcommittee (at 4.30 o'clock p. m.) adjourned until Friday morning, January 15, 1904, at 10 o'clock.

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COMMITTEE ON AGRICULTURE,
*January 15, 1904—at 10.30 a. m.*

## STATEMENT OF S. R. BURCH, CHIEF CLERK OF THE DEPARTMENT OF AGRICULTURE.

The CHAIRMAN. We consider page 1 to-day of the estimates. Mr. Burch, looking down the list there we find the first new matter suggested is, "One solicitor at $2,500 per year."

Mr. BURCH. Yes, sir.

The CHAIRMAN. Tell us what good reason the Department has for that?

Mr. BURCH. I will read a little brief here showing the work he has done and the necessity for it:

The principal legislation for law officers of the various Departments is the act of 1870, which provided for the Treasury, Post-Office, Interior, and State Departments; the War and Navy Departments were already provided with judge-advocates-general. At that time there was no Department of Agriculture, merely a small bureau; hence it was not provided for in the act of 1870, and the omission has never been supplied. Since 1870 the War Department and the Navy Department have each been provided with a civilian law officer in addition to the judge-advocates-general. The new Department of Commerce and Labor has 17 attorneys, in addition to several higher law officers. The Department of Agriculture has at present one acting law officer paid the salary estimated for from a general fund, but as the work belongs to all the bureaus and divisions it is thought unfair to require one bureau to carry the entire expense, and more desirable to have a statutory place on the roll of the Secretary. This change from a lump sum to a statutory place is in accord with the expressed policy of the committee.

Now, showing the work performed by the acting law officer of the Department of Agriculture during the fiscal year 1903:

Court cases, 8—convictions, 6; nollied, 1; lost, 1. Number of cases presented to grand jury (assisting United States attorneys), 15. Cases briefed on request of district attorneys, 2.

The criminal prosecutions are based upon the animal-quarantine and meat-inspection laws of the Bureau of Animal Industry, and of the renovated-butter act of the same Bureau. The number of convictions secured under these acts during the fiscal year 1903 was 6, and no convictions had ever before been secured thereunder.

The office duties of the acting law officer are heavy. Number of leases, agreements, options, etc., prepared was 168, and the aggregate amount involved was something over one and one-half millions of dollars. The majority of these papers related to the work of the Bureau of Plant Industry and the division of entomology, the latter division requiring agreements for boll-weevil work. Considerable advice and research has been called by the operation of the pure-food law under the direction of the Bureau of Chemistry. Nearly 500 contracts for the purchase of supplies were drawn during the year, and of course affected all the bureaus and divisions of the Department. The Secretary and chiefs of bureaus, etc., have been advised almost daily as to the legal aspects of proposed policies. Two cases still pending in the Court of Claims have received considerable attention. One of these cases is the New York Market Gardeners' Association *v.* The United States for a balance claimed to be due on a seed contract.

Mr. BOWIE. Let me ask you a question; you transfer the solicitor which you already have, from the lump sum to the statutory sum?

Mr. BURCH. That is what we request.

Mr. BOWIE. What is he paid from now?

Mr. BURCH. From the Bureau of Animal Industry. He was first put on because of the violation of laws, and prosecuted a good many cases.

The CHAIRMAN. Mr. Burch, did I understand you to say that all the other departments have these solicitors?

Mr. BURCH. They certainly have; every one of them has a law department and a great many law officers.

The CHAIRMAN. What is the use of a law department in the Government, then?

Mr. BURCH. It would be impossible for the Department of Justice to furnish a solicitor at the time needed; they would have to detail one from that Department to be constantly on hand to transact the business that is necessary to be done.

The CHAIRMAN. Is not that really the way it ought to be?

Mr. BURCH. If you provide the man that is necessary, of course.

The CHAIRMAN. This man's opinion has no force of law? If the

Department of Agriculture wants an opinion of the law of the Government they would have to go to the Attorney-General to get it?

Mr. BURCH. It has this effect; he has a legal mind and prepares all these papers and goes into the United States courts and assists the United States courts. The court officers have refused to take up many cases he has taken up, and he has furnished the evidence and assisted the attorneys, which they have given him great credit for in accomplishing the results.

The CHAIRMAN. Do you know whether these solicitors or attorneys in the several departments are paid for from the law department?

Mr. BURCH. They are paid by every department; each pays for its own law officers. There is not a department except the Agricultural Department but has a law department.

The CHAIRMAN. I believe it is all wrong. I think they ought to be employed by the Department of Justice and then detailed to the several departments. That might be of practical use. I do not see how you can appoint a law officer and have him try your cases.

Mr. BURCH. He is, and has been recognized as such. He assists the United States attorneys throughout the country. He goes and secures the evidence and he tries the cases.

The CHAIRMAN. The cases are tried?

Mr. BURCH. They are tried.

The CHAIRMAN. That is my point; I thought you read from your brief there that he tried these cases.

Mr. BURCH. He has assisted in these cases, and convictions have been secured through the evidence he has worked up, and when he has briefed the cases for the attorneys; they absolutely refused in several cases, and said that they had no case; and he furnished the evidence and secured convictions.

Mr. BOWIE. He acted as associate counsel in many of the cases?

Mr. BURCH. Yes, sir; but that is not the principal thing—these prosecutions for violation of the law—but it is making the contracts that will stand in law and looking up evidence in regard to this pure-food business in the Chemistry Division. He is constantly at work searching through the statutes in regard to the business pertaining to the Department. He is drawing these contracts, letters of authority, and he has as much work as any other man in the Department. We had about as well do without a chief clerk or a Department clerk.

The CHAIRMAN. He has not any color of law; that is all there is about it. The law business of the Government is supposed to be carried on by the law department. He acts in an advisory capacity, perhaps?

Mr. BURCH. Yes.

Mr. SCOTT. I presume that is chiefly what his office is.

The CHAIRMAN. All of these Departments have Auditors from the Treasury—the Auditor for the Post-office Department, and so on; I can see perhaps the necessity for a man down there who has a good knowledge of law, in an advisory way; but my point is that he should form a part of the force of the law department of the Government and be detailed there.

Mr. BURCH. I will say for the information of the committee that the Department of Justice is very slow in taking action. Last spring, in June or May, I contracted for a piece of land. Let me make a little statement which will show you the condition we would be in if we

depended on the law department. I contracted for a piece of land, to be paid for out of the appropriation that would be available on July 1. I contracted in May for that property. The man who sold to me was old and feeble and was anxious to sell because he wanted to divide this money. We got the deed and abstract and submitted them to the Department of Justice, and the man I bought from died in January (the 26th or 27th) and in September (six or eight months after) we got the title that we requested early in May; we got the opinion of the attorney.

Mr. BOWIE. After the man was dead?

Mr. BURCH. The man was dead; and then it took two or three weeks longer, until the administrator was appointed, before we could pay for it.

Mr. BOWIE. The point I wanted to make by my question was, that when you transfer an officer of this sort from the lump-sum to the statutory roll that increases the statutory roll and ought to increase the lump-sum roll. Now, does it have that effect?

Mr. BURCH. It does, in a measure. It only takes the expense off of one Bureau and puts it on to another, and properly.

Mr. BOWIE. Is there a lump-sum reduction in the whole estimate?

Mr. BURCH. I do not suppose there is; because the Department is growing and the necessities are more. You can see very plainly they all have to increase, have to continue to do the same work they are doing, with the prospect of more; and the duties of the Department are growing each year, and the demands are greater.

The CHAIRMAN. The committee has always opposed this on the ground I have mentioned, that it is a part of the work of the law department. I notice also, Colonel, that heretofore you have estimated at $2,000 and now you raise him to $2,500?

Mr. BURCH. He is getting $2,500 now.

The CHAIRMAN. The last two years he has been stated as of $2,000 on the statutory roll?

Mr. BURCH. That is very true. He has been considered by the Secretary as being valuable and not overpaid at that.

The CHAIRMAN. What would you have done, supposing we had allowed him at $2,000?

Mr. BURCH. We would have asked you for an increase.

The CHAIRMAN. The Department submitted at $2,000 for him last year and the year before that, and the committee took the ground that it is a part of the work of the law department to furnish its officers to do this work, at any rate. If you have been paying him $2,500 on the lump sum and we put him on the statutory roll at $2,000, how would the Department meet that question?

Mr. BURCH. It would be for him to determine whether he would accept it or go to some other department where he could get more.

Mr. SCOTT. What are you paying your present law clerk?

Mr. BURCH. $2,500.

The CHAIRMAN. How long have you been paying him that?

Mr. BURCH. Three or four months—some time in September, I think, August or September—I do not remember.

Mr. GRAFF. Is he a regularly admitted lawyer.

Mr. BURCH. Oh, yes; admitted to the bar here.

Mr. GRAFF. How long has he been in practice here?

Mr. BURCH. I could not tell you.

Mr. GRAFF. When was he admitted to the bar?

Mr. BURCH. I could not tell you. I think he graduated in the law school here.

Mr. GRAFF. How long ago?

Mr. BURCH. I am unable to tell you.

Mr. GRAFF. Just a few years ago.

Mr. BURCH. Yes.

Mr. GRAFF. How old a man is he?

Mr. BURCH. He is about 30 years old.

The CHAIRMAN. The Committee heretofore has claimed that the law work should be done by the law department of the Government—in other words, the Department of Justice.

Mr. GRAFF. Have they not a law officer detailed from the Attorney-General's Office for that Department?

The CHAIRMAN. I claim there should be one—that this man should be detailed from the Department of Justice.

Mr. BURCH. If you gentlemen will secure one for us, we have no objection where he comes from, but we certainly need one.

Mr. SCOTT. Has there been a demand on the Department of Justice for one?

Mr. BURCH. I do not think there has; because of the fact that we are unable to get a decision in six months.

Mr. GRAFF. How was this man appointed? Under the Civil Service?

Mr. BURCH. Yes; under the Civil Service.

Mr. GRAFF. How long has he been in the Department?

Mr. BURCH. About two years. He was transferred from the Treasury Department.

The CHAIRMAN. What was he doing in the Treasury Department?

Mr. BURCH. I think he was an auditor.

Mr. GRAFF. He has never been engaged in the practice of law?

Mr. BURCH. Not to my knowledge, except at the present time—in the last year. I guess you were not in the room when I read what he had accomplished last year. Shall I read it again?

Mr. GRAFF. No. I will read the hearing after we get through.

Mr. LEVER. His proposition is to facilitate the work of the Department?

Mr. BURCH. Yes. It is an aid in being present at all times; it would be impossible unless they detailed a man and sent him down there, to do the work properly. As you know, contracts have to be attended to, and attended to expeditiously; and there are a great many questions of law coming up in our Department now.

The CHAIRMAN. We do not disagree on that point, as to who should do the work; but I claim the work comes under the Department of Justice. This law clerk's decisions will have no binding force on anybody. If a legal question came up, the Secretary of Agriculture would not be safe in following his decision, while the decision through the Department of Justice, of the Attorney-General would convict.

Mr. BURCH. These trials and arrests throughout the country are carried out through the Department of Justice; but that is not the extent of his work. That is only a small part of it.

The CHAIRMAN. I do not dispute his work; that I agree to; there is probably a lot of work for him to do there.

The next change is "one telegraph and telephone operator (additional) submitted at fourteen hundred dollars." Tell us about that.

Mr. BURCH. We have two switch boards and two instruments—telegraph instruments—and we found it was impossible to get connected on the switch boards to expedite business, and we had to have an assistant in that office, especially. Of course there must be one present every minute of the time.

The CHAIRMAN. For how many hours of the day?

Mr. BURCH. The whole day.

The CHAIRMAN. Eight hours?

Mr. BURCH. Yes, indeed; just as long as the Department is open—seven hours.

The CHAIRMAN. When does the Department open?

Mr. BURCH. At 9 o'clock.

The CHAIRMAN. And closes at 4.30?

Mr. BURCH. 4.30.

The CHAIRMAN. The hours of the telegraph and telephone operator would be just the same as the clerk?

Mr. BURCH. They are supposed to be there really before the office opens—ten or fifteen minutes.

The CHAIRMAN. Are they there?

Mr. BURCH. Yes, they are; I can say they are; and frequently they have to stay half an hour longer—stay as long as the Secretary stays.

Mr. SCOTT. I notice that the telegraph and telephone operator you have now is rated at $1,200. Why is it necessary to have two hundred dollars more?

The CHAIRMAN. That is to raise that person, and give the other twelve hundred dollars.

Mr. BURCH. That is the point exactly. That lady has been there a great many years. She is an expert—probably a very few others, if any, in Washington have——

The CHAIRMAN. Do you know anything about the wages paid by telephone and telegraph companies?

Mr. BURCH. It is more than she gets. In all the Departments you will find——

The CHAIRMAN. I am comparing them with outside work.

Mr. BURCH. I know nothing about the outside work. I was saying that she is an expert and can telegraph with one hand and give you connections with the other. A person that can do that is pretty good, and she is capable of doing it; and she is worth the money, as we think.

The CHAIRMAN. You submit three clerks in class 3; "increase of one submitted." That is the $1,600 clerk?

Mr. BURCH. There is one file clerk, and another in the appointment clerk's office, and the other I want to provide for should be in my office. Those are the three. Now, I have one detailed and carried by the Bureau of Plant Industry.

The CHAIRMAN. What is the need of that additional clerk?

Mr. BURCH. As I said, for my office. I have one who is paid from the Bureau of Plant Industry, and we think he ought to belong to the Secretary's office; that is all.

The CHAIRMAN. He is now paid on the Bureau of Plant Industry roll?

Mr. BURCH. Yes; Plant Industry.

The CHAIRMAN. From the lump sum?

Mr. BURCH. I do not know what fund he is paid from. They carry him, at least.

The CHAIRMAN. Does he get $1,600 where he is?

Mr. BURCH. $1,600; yes, sir.

The CHAIRMAN. If we transfer him to you we should deduct it from the Plant Industry?

Mr. BURCH. That is for the committee. We want to arrange the rolls, Mr. Chairman, as they properly should be.

Mr. GRAFF. That is the way it ought to be, too.

Mr. BURCH. I took him in the office when I was appointed chief clerk. He was in the Bureau of Animal Industry and transferred. They were carrying then some ten thousand dollars that the Secretary ought to have actually carried on his rolls. He was transferred to the Plant Industry because of the fact that they carried much less. They relieved one bureau and put it onto another that was carrying less people.

Mr. GRAFF. This is not a position that can be shifted around; it is a regular man that you have all the time?

Mr. BURCH. Oh, yes; he has been in the Department a good many years.

The CHAIRMAN. He is not on the statutory roll?

Mr. BURCH. No, sir.

The CHAIRMAN. The next increase is ''One lieutenant of the watch."

Mr. BURCH. Lieutenant of the watch.

The CHAIRMAN. That is a new——

Mr. BURCH. We have now a captain of the watch, and his duties are such that it is impossible for him to look after the watchmen as they properly should be. For instance, we have some eight or ten buildings spread around in various parts of the city, and we have two night watchmen at each place, and my idea was to have the lieutenant of the watch perform duty during the day as a day watchman and at night—every night—visit all these points and see that every man was performing his duty; once every night at different hours, at no stated time at all, to go around and examine thoroughly and see that everybody was on his post; and to perform other duties necessary to be looked after by the captain of the watch.

The CHAIRMAN. Where is that watchman provided for—that captain of the watch?

Mr. LEVER. "One engineer, who shall be the captain of the watch"—just above there.

The CHAIRMAN. Who is the captain of the watch?

Mr. BURCH. Captain Harvey. He has been there a great many years as captain of the watch and as engineer.

Mr. GRAFF. Is he now employed in the daytime?

Mr. BURCH. All the time there, and frequently has to come at night and look after the fires and one thing and another, and it is more work than he ought to be required to perform.

Mr. GRAFF. You need the captain of the watch to work in the daytime and the lieutenant to work at night?

Mr. BURCH. I want him to work in the daytime, too; he will be on the ground in the daytime as watchman, and at night to visit the different buildings to see that the duties are performed and the watchmen at their posts.

Mr. GRAFF. What would the lieutenant do?

Mr. BURCH. That is what I am saying—the lieutenant of the watch that we ask for now. Those are the duties I want him to perform.

Mr. GRAFF. What does the captain of the watch do in the daytime?

Mr. BURCH. He does various things. And he has charge, of course, of the engines; he is captain of the watch and chief engineer; and he has charge of the different laboratories and the laborers that are required to move furniture and do various kinds of work; to see that the buildings are kept in repair; and when there is a call for an engineer or a plumber, to go and investigate and have the work performed under his direction.

Mr. SCOTT. In this connection you ask for two additional watchmen; what conditions have arisen that have made these two necessary?

The CHAIRMAN. Do not let us skip the engineers.

Mr. SCOTT. I was connecting this with the watchmen. He was speaking of the lieutenant of the watch.

Mr. BURCH. I do not know that there are any; only are employing three laborers as watchmen and we should not do it.

The CHAIRMAN. You know it is impossible to control these watchmen when laborers are doing clerks' work and messengers are driving the Secretary's carriage; I wanted to change that, but it was said it would not look well on the bill to have a "driver to the Secretary." "Two messengers at $720"—I think one of them is the driver of the carriage.

Mr BURCH. I think not.

The CHAIRMAN. Who are the drivers?

Mr. BURCH. I am not familiar——

The CHAIRMAN. They come under these messengers?

Mr. BURCH. They are in the Secretary's office, and I never investigated that.

The CHAIRMAN. They come under messengers, do they not? They are charged as messengers on the bill?

Mr. BURCH. I do not know; I am not positive about that.

Mr. BOWIE. Can I go back just a minute? I want to ask a question about that solicitor. Do you expect, if this recommendation should be adopted by the committee, that the present solicitor who is doing this work that you refer to should be appointed to this statutory place?

Mr. BURCH. Yes.

Mr. BOWIE. How old a man is he?

Mr. BURCH. About 30 years old.

Mr. BOWIE. I misunderstood you; I thought you said 20 years old awhile ago?

Mr. BURCH. Thirty or 32.

Mr. BOWIE. Did he ever practice law?

Mr. BURCH. I could not tell you. He came to us from the Treasury Department.

Mr. BOWIE. You do not know what experience he has had in the courts as a practicing lawyer?

Mr. BURCH. No, sir; I do not.

The CHAIRMAN. What is his name?

Mr. BURCH. McCabe.

The CHAIRMAN. Where is he from?

Mr. BURCH. From Ogden, Utah.

Mr. BOWIE. Is it customary to have the principal law advisers of these Departments certified by the Civil Service Commission?

Mr. BURCH. I could not tell you; I think not.

Mr. BOWIE. You said this one had been certified.

Mr. BURCH. Yes; he held a former position. He was an auditor, you know, in the Treasury Department, and transferred to our Department. He is in the classified service.

Mr. BOWIE. I have always imagined that a man competent to advise a great Department in the expenditure of several millions of dollars is a man who should have shown his ability in something besides standing a civil-service examination.

Mr. BURCH. I do not know anything about his ability beyond what he has accomplished.

Mr. BOWIE. But he draws contracts.

Mr. BURCH. So far as conducting cases is concerned, that would come under the Attorney-General's Office if there was a prosecution.

Mr. BOWIE. I do not see, after all, that he does much more than gather evidence; he has not the power to try cases.

Mr. BURCH. He does not try a case at all; he only assists; gathers the evidence, and makes briefs and prepares the cases for the Attorney-General, as in all instances where he has secured convictions for violation of law, quarantine laws, and——

Mr. BURLESON. The contracts the Department enters into from time to time could be drawn by the head of the division, could they not?

Mr. BURCH. They are not lawyers; I do not think any of them could draw them properly. They may be wise in their line of work and are, I think, but——

The CHAIRMAN. We have covered the lieutenant of the watch. Now this "assistant engineer."

Mr. BURCH. To have charge of the different engines—there are three or four—and to assist the engineer, as I said before, in that line of work—to go with the plumber, to determine what is necessary to be done in that work there.

The CHAIRMAN. I thought nearly all of those Bureaus in rented buildings have engineers and pay for them.

Mr. BURCH. None of them have, over in that part of the town.

The CHAIRMAN. They have firemen?

Mr. BURCH. Yes, sir; firemen.

The CHAIRMAN. There are no engines in those rented buildings?

Mr. BURCH. No; except what we have put in. The chemical laboratory has an engine; the Bureau of Plant Industry has an engine, and the Bureau of Animal Industry has an engine. All those have engines.

The CHAIRMAN. What kind of engines are they—steam engines or vapor engines?

Mr. BURCH. Steam engines, all of them.

The CHAIRMAN. They have engineers to run them?

Mr. BURCH. They do not have an engineer, they have a fireman——

The CHAIRMAN. He is called a fireman; but he must be, practically, an engineer?

Mr. BURCH. He has got to understand it, and he is under the instruction of the engineer; and that is what we want the assistant engineer for, to visit these places and instruct these men.

The CHAIRMAN. Have not these men been running these engines for years?

Mr. BURCH. Some of them have, and some of them have not.

The CHAIRMAN. Who has been running them if they have not been running them?

Mr. BURCH. They have been changed, you know. They do not stay more than a year or two—some of them—and some stay longer, and then, recently, of course, some engines have been put in—the Plant Industry put in one recently. They heat all the buildings, you understand, and the laboratories.

The CHAIRMAN. The Bureau of Plant Industry, the Chemical Laboratory, and the Bureau of Animal Industry?

Mr. BURCH. Yes, sir.

The CHAIRMAN. One man runs each one of them?

Mr. BURCH. And one at the Museum; that is another.

The CHAIRMAN. They have been run heretofore by one man apiece, eight hours a day?

Mr. BURCH. Yes, sir.

The CHAIRMAN. Has there been any complaints about their not being in order, or anything of that sort, more than happens to any engine?

Mr. BURCH. We have to have them examined once a year by a District officer.

The CHAIRMAN. I suppose every engine, whether it is out of order or not, you have to submit to that?

Mr. BURCH. Of course; if there is anthing out of order, we have to call on the engineer to put it in order.

The CHAIRMAN. The next is "Electrician" on page 2. An increase of $100 is submitted in his salary. On what ground do you ask that?

Mr. BURCH. For the amount of work that is necessary to be done and the qualifications of the man—it requires a man skilled in that kind of work. He has been performing it in the last two years very satisfactorily, and last year we had a system put in for the Department alone which has 50 'phones on and the necessary lighting of all the buildings; and that is his principal work.

The CHAIRMAN. Now, as to your 11 night watchmen. Only a couple of years ago we rearranged all that watchman business so that it was satisfactory to everybody, I think, and, if my memory serves, it was arranged so that there was a full double watch—night and day watchmen—enough supplied for all purposes; now you ask an increase of two. Tell us what you want those two for?

Mr. BURCH. We have rented other buildings since you rearranged that, Mr. Chairman. There is the Chemical Laboratory that requires two watchmen; the Bureau of Animal Industry, two watchmen; the Vetetable Pathology, two; Botanical, two; and the Bureau of Soils have two provided for in their estimate; and the museum, stable, and Statistical Division buildings are all under one watchman or two watchmen, for the year. They look after the museum and the stables and the Statistical building. And the Bureau of Plant Industry, two; and the annex to Entomology; they have rented a building recently and have none; and then there are day watchmen, one on the grounds and one at the door of the main building.

The CHAIRMAN. The Bureau of Animal Industry has a watchman on their lump sum?

Mr. BURCH. They have two men acting as watchmen, but they are skilled laborers; they are not watchmen.

The CHAIRMAN. What is the difference?

Mr. BURCH. There is not much difference. We can use skilled labor for watchmen. And then, you see, we have now three laborers that are not properly employed, and they are acting as watchmen under the Civil Service, and we have none. Now, there are sixteen watchmen, and if you allow these men a month's leave it would take sixteen months; and we are asking for one extra watchman to take place of watchmen when on leave, so we will have a watchman without having to detail laborers to perform that duty. As it is now, we have to call on some of the bureaus to furnish a laborer to act as watchman when any of them take a leave of absence.

Mr. GRAFF. Government buildings are never insured, are they?

Mr. BURCH. Not to my knowledge.

Mr. GRAFF. It has been suggested that the number of watchmen, not only in the Agricultural Department, but in the other Departments, is much larger than the number employed by a private enterprise. Take a large lumber yard, or a great manufacturing establishment, and they have a good many less watchmen, and they have to cover in some cases a block. The watchmen report at a certain time at the office, where there is a machine apparatus with a clock attachment, where they have to report, showing not only at the office, but at other places in the building, that the watchman has been there at that particular time.

Mr. BURCH. That would work all right if we were in one building. We have that kind of record in the main building over at the Department.

Mr. GRAFF. Do you think it would take more than one man to go over that whole building at night?

Mr. BURCH. That is all we have there. But we have so many buildings, at so many different places. We have but one watchman in the main building.

The CHAIRMAN. With the half-hour additional work now required you will accomplish a good deal more, of course?

Mr. BURCH. We hope to; but that half-hour of work would not add at all to any of the requests that we have made for additional force, and would not apply in any way.

Mr. BOWIE. It does not add to it, but will it subtract from it?

Mr. BURCH. No, I do not think it would subtract in any way.

Mr. BOWIE. The statement has been made here, as to some of the bureaus and divisions, that they are already working more than half an hour and consequently it would not be any gain.

Mr. BURCH. That is true.

Mr. BOWIE. How is it with reference to the Department generally?

Mr. BURCH. You will find in every bureau men who will stay there as long as they can see to work.

Mr. BOWIE. Do you think, on the whole, there will be any gain from that half hour?

Mr. BURCH. Yes; in the clerical work, but not in the scientific, because those scientists will get there as quickly as they can get there in the morning, and will stay as long as they can see to work.

The CHAIRMAN. Does the committee wish to ask Mr. Burch any more questions? If not, we are much obliged to you.

**STATEMENT OF MR. E. S. HOLMES, ASSOCIATE STATISTICIAN OF THE BUREAU OF STATISTICS OF THE DEPARTMENT OF AGRICULTURE.**

The CHAIRMAN. You want a chief clerk?

Mr. HOLMES. That man has been acting as chief clerk for two or three years, and he is our financial man and looks after our appropriations, and sees if we are running ahead—he has been paid $1,800 a year. The reason that I recommended two thousand was that he is a good man, and that is the customary salary for that position. He is one of the best men we have.

The CHAIRMAN. "Four clerks of class 4," is the next. Last year you submitted 3.

Mr. HOLMES. You will notice we have reduced the lump appropriation accordingly there. No; that is one of the clerks from the "foreign markets" who has been added. The chief clerk is the only addition to that roll.

Mr. ADAMS. What compensation do the State agents get?

Mr. HOLMES. Well, from $300 to $800 a year. It depends on the size of the State and the amount of the work they have to do.

Mr. ADAMS. No one agent has more than one State in his territory, has he?

Mr. HOLMES. No, we have a special agent who this year has done the State agent's work on the Pacific coast for us, simply because we had no agents out there.

Mr. LEVER. What is the duty of that State agent?

The CHAIRMAN. There was no statutory roll in the division of foreign markets last year?

Mr. HOLMES. Yes, sir; there was a roll of $8,500 there for salaries, and I think $7,500 for supplies, etc.

In reply to Mr. Lever's question, I will say that the State agents maintain a corps of correspondents and report to us monthly.

Now, I think I am correct in the statement I have made that we have no other addition to the statutory roll. If we have, we have cut them off of the lump sum.

The CHAIRMAN. There was a statutory roll last year for "foreign markets"—1 chief of division, $2,500; 1 chief of division, $1,800; and 1 assistant at $1,600. Is that the man you transferred—1 assistant at $1,600?

Mr. HOLMES. No; it is that $1,800. That is class 4. The $2,500 we have named specifically there.

The CHAIRMAN. Now, you have added 4 clerks of class 4; you state that one of those was transferred from the——

Mr. HOLMES. That one is the assistant chief of the Division of Foreign Markets, 1 clerk of class 4, $1,800—that is the salary. You find he is not provided for there in any other way.

The CHAIRMAN. Oh, yes, sir; I see. Now, going on, you say "5 clerks, class 3;" that is an increase of 1?

Mr. HOLMES. That is also a foreign-market clerk; we simply put those foreign-market clerks on our roll in the proper place.

The CHAIRMAN. That is the $1,600 man?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. "Six clerks, class 2"—you have decreased that, have you not?

Mr. HOLMES. I do not think we have. I think we have left that roll just as it was last year with the exception of that chief clerk.

Mr. ADAMS. The chief clerk's salary is the only addition to the total?

Mr. BOWIE. That is right.

The CHAIRMAN. Did you have 6 clerks there last year?

Mr. HOLMES. I think so.

The CHAIRMAN. You had 4 last year, and estimate for 5 this year?

Mr. HOLMES. That is, foreign-markets clerk.

The CHAIRMAN. "Five clerks of class 2"—you estimate for 6?

Mr. HOLMES. This clerk for foreign markets, also.

The CHAIRMAN. "Ten clerks at $1,000 each;" now, you reduce that to 9 clerks in your estimates this year?

Mr. HOLMES. No, sir; you have it here "ten."

The CHAIRMAN. I beg your pardon; I am wrong there. "Eight clerks of class 1;" you have got 9 now. That is a transfer, too?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. Then you have 10 clerks at $1,000, the same as last year?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. And 4 clerks at $840?

Mr. HOLMES. I think that is all, sir.

The CHAIRMAN. That is the same as last year?

Mr. HOLMES. Yes, sir.

Mr. BOWIE. I was going to ask him what this increase in the lump sum——

The CHAIRMAN. We are going to reach that; but I will first ask if anybody wishes to ask anything further in regard to the salaries?

Now, coming to the lump-sum roll, we notice, the first thing, the monthly crop reports, issued on the 10th day of each month. What is that?

Mr. HOLMES. It was formerly the custom to issue all crop reports on the 10th of each month, but on account of making some additions to our cotton correspondence it became necessary to have separate dates, so we decided to issue the cotton report on the 3d of each month and the regular grain report on the 10th. We have been doing that for two years or more.

Mr. BOWIE. It does not really involve any additional work or expense?

Mr. HOLMES. Oh, no, sir.

Mr. CHAIRMAN. Coming down to the question of your increase, why have you found that increase necessary?

Mr. HOLMES. We have asked for $22,800. The first item is for a particular man we have in mind, at a salary of $2,800. He is now receiving from another branch of the Government about $10,000 a year. He was assistant director of the Philippine census. He is a man we have had in our office, and he is thoroughly familiar with our work, and we want him to take entire charge of our crop report, so the statistician may be relieved at the rush time of the month of a good deal of the detail. He is a man who thoroughly understands the business; he was formerly assistant statistician.

The CHAIRMAN. Why does he give up a $10,000 place?

Mr. HOLMES. It will terminate shortly. His present appointment will terminate shortly, as soon as he has completed that work.

The CHAIRMAN. Who paid him that $10,000?

Mr. HOLMES. It was paid by the Phillipine government through the Bureau of Insular Affairs. This gentleman is Mr. Victor H. Olmstead. He was formerly our assistant statistician.

Mr. BOWIE. How much of this increase is due to a transfer from some other bureau?

Mr. HOLMES. Not a bit. This is all due to additional business.

Mr. BOWIE. Additional work?

Mr. HOLMES. Every cent of it is additional work—an additional amount.

Mr. BURLESON. The purpose of creating this place for Mr. Olmstead is to relieve Mr. Hyde of the details of the work in the monthly compilation of statistics?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. How did you arrive at that sum of $2,800?

Mr. HOLMES. I asked the Secretary what was the most he would pay him. He has been offered $3,000 I know, and we fixed on $2,800, and asked him if he would take that if he could get it, and he said he would.

The CHAIRMAN. Why would he take $2,800 under the Government if he was offered $3,000 elsewhere?

Mr. HOLMES. You undoubtedly know that the speculative element of this country—the cotton speculators and the grain speculators—are always looking for good men to make crop reports for them, and they are continually after our men and offering higher salaries than they get. I received two offers myself this year at larger salaries than I get.

The CHAIRMAN. In all frankness, why did you refuse it—unless it is a private reason?

Mr. HOLMES. I was offered a considerable increase on my salary about three years ago; I stipulated for a year contract, and the gentleman who made me the offer did not want to do it, and while we were dickering—before we came together—he failed. There is always an element of uncertainty in going with a speculative house, and that is one reason.

The CHAIRMAN. Your argument, then, is really, broadly, that a man ought to work a little less for the Government than for an outsider?

Mr. HOLMES. I think so; particularly in statistical work. Most men who are interested in statistics want to make a reputation for themselves.

Mr. ADAMS. I do not think Government salaries are as high in a higher class of work.

Mr. HOLMES (continuing). And they can make it to better advantage under the Government. A young man can afford to work for the Government along work of this kind or along scientific lines, because he has a chance to publish his original ideas at different times. He gets before the public and makes a reputation.

The CHAIRMAN. Is he publishing the bulletins under his own name?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. What I want to bring out is why, when the Gov-

ernment salaries are lower than those paid by individuals, the Government clerks very seldom leave?

Mr. HOLMES. The Government salaries for the routine clerks are probably higher than paid by outside people, but for higher clerks they are not nearly so high.

The CHAIRMAN. For a few experts, I agree with you; I think that is true. That is $2,800 for Mr. Olmstead; now, go on with your items.

Mr. HOLMES. The $20,000 in addition to that is all for field work. We want more men. We want to pay them $7 a day salary apiece and their expenses—approximately $3,000 a year.

The CHAIRMAN. How much do you calculate $7 a day would amount to?

Mr. HOLMES. About $2,000—about $2,100.

The CHAIRMAN. Do you pay them for every day of the year except Sundays?

Mr. HOLMES. When they work. It will amount to about $2,000 apiece. The reason we ask for these men is this—for instance, we want to have another grain man. We have the grain States of Illinois, Iowa, Missouri, Kansas, and Nebraska covered by one man—one field man. Now they are the great surplus corn and wheat States, and we should have another man in there undoubtedly. In fact, we have two men covering those States I have named, and Ohio, Michigan, Virginia, West Virginia, and Kentucky. We would like to have three and divide that group of States into three territories instead of two. We need a man there and need him badly.

Mr. ADAMS. Your sources of information, as I understand it, are State agents, and through them they obtain the reports of their correspondents in the various counties. In addition to that, I understand that is duplicated by the agents who report directly to the Department.

Mr. HOLMES. By two sets of agents who report direct.

Mr. ADAMS. In addition to that you have these men in the field who make personal inspection of certain belts of territory?

Mr. HOLMES. When we hear of a severe storm or frost we send a man right in there. With unusual conditions is when we use them most; and we want them the worst.

Mr. ADAMS. These various reports must to a certain extent be contradictory; then what sort of weight do you give to the reports of these inspectors who are experts and specialists and go over the ground?

Mr. HOLMES. It would surprise you to know how nearly they came together in ordinary weather. In fact, it is seldom there is a difference of one point, or 1 per cent, in the reports of all classes of correspondence. But suppose after our correspondent has mailed his report there should come a severe drought or frost, or any weather detrimental to the crops, we get our field men in there to supplement the report of our correspondent.

Mr. ADAMS. That very often happens?

Mr. HOLMES. It happens every month. That is one of the men we want, and we need another man for cotton and rice, in the cotton States. This summer I was forced to put in almost all of my field time. One man was all we had, and we had sufficient appropriation to appoint another man for forty days only. I had to keep most of those men in Texas about all the time, and one of the men—one of our oldest men—I would let make flying trips to the other States.

Mr. BURLESON. The reason you kept him in Texas was because Texas produces the stuff?

Mr. HOLMES. Yes; and because we had so much trouble in Texas. We should have another cotton man there, as I have said, a man for cotton and rice. Now, we have a rice report practically ready to publish. We are ready to make a report on rice, the same as we do on other crops. But we can not do that unless we send a man down there who is thoroughly posted, and to verify and to substantiate our original figures. You see, we have nothing to start on. That is our great trouble in adding new crops to our list, and the rice people all through that section have been after us for the last two years to do it.

Mr. LEVER. What section is that? Texas, too?

Mr. HOLMES. Texas; yes, sir; and a few other States. And we also have the necessity for a tobacco man in the field. Now, they are the four men we want, and they will take, approximately, $20,000 for salaries and expenses.

Mr. BOWIE. What proportion do the expenses bear to the salaries?

Mr. HOLMES. Larger than the salaries.

Mr. BOWIE. That makes up your $20,000?

Mr. HOLMES. That makes up the $22,000.

The CHAIRMAN. How does your rice man operate? What would be his real work? What would he do actually, after he gets down there?

Mr. HOLMES. I am not a rice man.

The CHAIRMAN. Take a tobacco man, or a corn man—any man you please.

Mr. HOLMES. He would go to the great rice houses, the rice dealers, and he would ascertain the consumption of rice, and he would then ascertain from the railroads the receipts and shipments of rice. He would besiege anybody who had any information on the subject, and either confirm or disprove the figures we have ready for him now.

The CHAIRMAN. Would he get the information daily or at the end of the rice season?

Mr. HOLMES. In the first place, he would get right to work now and finish up as quickly as he could on last year's crop, make an estimate of that, and after that he would report rice just as we do grain and cotton, and we would use him for rice part of the time and for cotton part of the time during the cotton season. He is really more of a cotton man than he is a rice man.

The CHAIRMAN. It is an estimate, after all?

Mr. HOLMES. We want him to supplement our reports on cotton and rice.

The CHAIRMAN. Why do you want them supplemented? It is simply another estimate.

Mr. HOLMES. Yes; but it is the best estimate we get at the time there is anything that affects the crop. Our work in grain and cotton with the men we have had has been so very successful—our field work—that we feel that that should be increased even at the expense of something else.

The CHAIRMAN. In grain and cotton, how much discrepancy has there been between the final reports of these men and the statistics gathered before the report? Have they simply confirmed it?

Mr. HOLMES. If they do not confirm it, they give us their reasons

and their reasons have to be good. As a matter of fact, their reasons always are good.

The CHAIRMAN. Practically, why not do away with the other people and take their report?

Mr. HOLMES. Then we would have to have too many men and it would cost too much money. We can only afford to send those men in the places where there is some offset to the crop—something the matter with the crop detrimentally or something that helps the crops. We can only send them where there is an unusual condition existing.

The CHAIRMAN. I do not see how these specialists can be used every day in the year?

Mr. HOLMES. Because there is always something unusual existing.

The CHAIRMAN. But the cotton crop or the rice crop—some years it is hardly in the ground before——

Mr. HOLMES. We would use them more for cotton than we would for rice.

The CHAIRMAN. For a certain number of months there is no cotton in the ground. That comes under your regular crops; you are getting the acreage while it is growing, and after a certain point you get the condition.

Mr. HOLMES. We report the condition every month.

The CHAIRMAN. After it has started to grow?

Mr. HOLMES. Yes, sir. It requires a good deal of explanation; but we have on our cotton list every cotton mill in the South. We have a great deal of trouble getting reports from them at different times. During the off seasons we send these men to the secretaries or presidents of these mills and insist on their giving those reports.

The CHAIRMAN. Suppose they refuse?

Mr. HOLMES. We can talk them into it. We always have been able to. The most of them do not refuse; they simply neglect to do it; they are slow in sending them in. This year I had to send thirty-five or forty telegrams to owners of cotton mills to get their final reports.

Mr. SCOTT. What I wanted to inquire about was this: As I understand it you have a State agent in every State who gathers from his correspondents throughout the State the reports upon the condition of the crops every month.

Mr. HOLMES. Yes, sir.

Mr. SCOTT. In the event of a late frost, such as you suggest, or any extraordinary condition which might affect the crop, why can not this State agent ask his reporters?

Mr. HOLMES. Because it is too late; he does not have time, usually.

Mr. SCOTT. I do not know why they could not send in a report and get in as quickly as a special agent could travel from Washington.

Mr. HOLMES. He does not travel from Washington. He is located in a certain territory and covers that territory, unless we order him out of it. We are in constant communication with him and know where he is every minute. We say, "There has been a frost in such and such a country; go down there and see how it has affected the crop." These men are experts. They can go into a wheat field and probably tell you better than a wheat farmer how much damage has been done, what the yield is going to be, if the conditions are to be maintained as they are when they go into the field.

Mr. GRAFF. This operates as the opinion of another man, as a check upon the judgment of these other men. You have some men doing this work?

Mr. HOLMES. Yes, sir; but we have not a sufficient number.

The CHAIRMAN. You will admit now that the whole thing after all is an estimate?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. My point is, gentlemen, whether or not it is a function of the Government to give estimates on anything?

Mr. HOLMES. We have been doing it for a great number of years.

Mr. BOWIE. It may be a proper subject for discussion after we come to the bill; but I believe that this Bureau of the Government that is under consideration has saved the cotton farmers of the South $500,000,000 at least, in the last five years, by putting out their reports. These speculators have estimated their crops from half a million to a million in excess every year, until the Department of Agriculture took hold of it, and began to tell the truth about it.

Mr. SCOTT. Undoubtedly, if any estimate is to be made at all, it out to be made as accurately as is possible.

Mr. BURLESON. And from an impartial source.

Mr. HOLMES. Suppose we did not make estimates. You would have a man on the "bull" side of the market making any estimate he pleased, giving it out and probably forcing the market up; and next day a man on the other side would come out with an estimate of a great big crop, and it would go down. That is what it did.

The CHAIRMAN. It is paternalism, the Government going in to guard all of these things.

Mr. HOLMES. We are supposed to be in the estimating business for the purpose of letting everyone in on the same basis; that is, we let the farmer in and the mill owner in just as quickly as the member of the board of trade or the chamber of commerce.

Mr. BURLESON. As a matter of fact, it is for the protection of the producer and the consumer of cotton?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. How long have these statistics been going on in cotton?

Mr. HOLMES. Thirty or forty years.

The CHAIRMAN. Going on before the war?

Mr. HOLMES. No; not before the war.

The CHAIRMAN. I do not believe you gentlemen in the South contend that you are any more prosperous now than they were then in the cotton-raising States.

Mr. BOWIE. We get more truthful statements than we used to get. I think it is due to perfection of the system of crop reporting that has gone on.

Mr. HOLMES. If we are going to do it at all we should do it properly.

The CHAIRMAN. In that I agree with you perfectly.

Mr. BOWIE. There has been a tendency to accuracy all the time.

The CHAIRMAN. There has been a question in my mind all the time whether it is the Government's function to furnish guesses. The guesses are founded on pretty accurate information; I can see that; but it is very doubtful if it is a Government function.

Mr. ADAMS. It is a Government function, under the Constitution,

to provide for the general welfare. Of course, that is a pretty broad phrase. I suppose it is expected of us that we should interpret it reasonably.

The CHAIRMAN. Let me ask you one question, Mr. Holmes; do you think that your work has improved under bureau formation?

Mr. HOLMES. Yes; it has given us a more elastic organization.

The CHAIRMAN. How do you mean, by elastic?

Mr. HOLMES. It has given us a chance to do a good many things that we could not do. We have had to go through a lot of red tape to get some supplies that we wanted in a hurry, and various other things; now we can decide on things ourselves.

The CHAIRMAN. Who did you go to before to decide these things?

Mr. HOLMES. To whatever executive branch of the Department it came under. In the supply division the supply man would carry our requisitions around in his pocket for a month before we got them.

The CHAIRMAN. Do you mean that?

Mr. HOLMES. Well, that is a pretty strong statement, of course.

Mr. BOWIE. More or less?

Mr. HOLMES. Yes, sir; but the organization is very much better.

The CHAIRMAN. Whose fault was that that those requisitions were not honored promptly?

Mr. HOLMES. Probably the fault of the supply man. When one division of the Department has to transact business through another there is always a delay; there is no doubt about that.

The CHAIRMAN. Coming to your field work and gathering of statistics, that is a small detail?

Mr. HOLMES. I do not think our bureau organization has helped us at all there. We could have had that under a division. The bureau organization merely is a more elastic organization, giving more power to the chief of the bureau than he has under a division.

Mr. BOWIE. And usually an increase of salary?

Mr. HOLMES. We only got a small increase last year. I think you gave us $15,000 increase last year, and we had to have a part of that made immediately available. We had already used some of it before the year——

The CHAIRMAN. I will say to the members of the committee that we did not pass upon this question at all. There was another consideration, the proposition to transfer the statistical work to the new Census Bureau. The Secretary of Agriculture was very much opposed to that on the ground that it was purely statistical work affecting the agricultural interests of the country and ought to be kept in the Agricultural Department, and we passed it over entirely, and when it got over to the Senate the Secretary appeared before the Senate committee personally or by letter and urged that this division be made a bureau, and they inserted it in the bill. Am I right, Mr. Holmes?

Mr. HOLMES. I think that is right.

The CHAIRMAN. That is the way it was changed from a division to a bureau.

Mr. GRAFF. It was done in the Senate?

The CHAIRMAN. It was done in the Senate last year, with an increase of $15,000.

The CHAIRMAN. What did you do with that $15,000?

Mr. HOLMES. Principally for field men, for salaries and expenses.

We appointed, I think, one additional expert in the office, and I think that is about all.

The CHAIRMAN. What will be your limit for field men; how much further do you want to go with field men?

Mr. HOLMES. I think we will have the country pretty well covered if we ask for those four men.

The CHAIRMAN. You would not want to agree not to ask for any more next year?

Mr. HOLMES. I would; yes, sir. I would be very well satisfied. During the season when we do not have to report on cotton crops, if we have no use for the cotton men going around to see our milling people, we might use them in the wheat country.

The CHAIRMAN. Can not you use your wheat men in the rice country?

Mr. HOLMES. Our wheat men start to report the wheat before they do cotton. We start reporting wheat the 1st of March.

The CHAIRMAN. How about rice?

Mr. HOLMES. I know very little about rice—and I am not prepared to say much about it. That is what we want the rice man for.

Mr. HAUGEN. It seems to me the statement you made a few moments ago is an extraordinary one, that the supply division held requisitions for a month.

Mr. HOLMES. I would not like to have that taken down. That was a very broad statement; but we have had requisitions held a few days.

Mr. HAUGEN. Can not that be remedied by putting in an efficient man and pay attention to business in that department?

Mr. HOLMES. They have got a good man there; every one knows that if you transact business through another division you will lose time.

Mr. HAUGEN. You are conducting this business in the same building, are you not?

Mr. HOLMES. No; we are in a separate building.

Mr. HAUGEN. What is the distance between the buildings?

Mr. HOLMES. A hundred yards. Where anything has to go through an extra set of hands, you lose the time.

Mr. HAUGEN. Certainly some time will be lost, but nothing like a month or twenty-four hours.

The CHAIRMAN. You said that, as far as the field work is concerned, there is no practical benefit from it?

Mr. HOLMES. It is merely in the executive work of the office.

The CHAIRMAN. Tell me, Mr. Holmes, when would you send your rice men to work?

Mr. HOLMES. Immediately.

The CHAIRMAN. At what period of the year?

Mr. HOLMES. For a starter, I would send him to work the minute I would get him.

The CHAIRMAN. What would he do if you sent him to work to-morrow? Tell the committee what he would do.

Mr. HOLMES. He would get right down into the rice country.

The CHAIRMAN. It is practically all harvested?

Mr. HOLMES. What we want him for now is to get us on the right track to make our first estimate on rice crop of last year. It is very essential that we should make that an accurate report.

Mr. BURLESON. And ascertain the proper acreage next year?

Mr. HOLMES. And then ascertain the proper acreage for next year.

The CHAIRMAN. When is rice ripe?

Mr. HOLMES. I think Mr. Burleson knows a good deal more about that than I do.

Mr. BURLESON. They plant it in the spring.

The CHAIRMAN. What time in the spring?

Mr. HOLMES. I should say February and March.

Mr. BURLESON. At the same time they plant wheat.

The CHAIRMAN. You do not want him to do anything with past crops?

Mr. HOLMES. We want him to estimate on the crops of last year. We want him to verify the estimates we have in our office before we put them out, and then he will go on reporting the same as our other reporters do, using probably two-thirds of his time on cotton and one-third on rice. Rice is a small crop.

The CHAIRMAN. I want information as to what his actual work would be down there. Would he gather the acreage?

Mr. HOLMES. Yes, sir.

The CHAIRMAN. Don't you gather that now under your system?

Mr. HOLMES. We gather it just as we do cotton and wheat.

The CHAIRMAN. How could one man accomplish that; how could he get the acreage?

Mr. HOLMES. Experience has proven to us our field men can set us straight on acreage when our county and township and State correspondents are off. That is our weak point, our acreage—the weakest point in the system of estimating crops. The only way we can get at an estimate of acreage is on a percentage basis, and our county correspondents hesitate to put down an increase of 50 per cent in acreage, or in some cases it might be 100 per cent. We fell into an error some years ago out in Nebraska, which was not straightened out until I straightened it out.

I used to be the field man they had had there. They reported almost no winter wheat for the state of Nebraska—nearly all spring wheat. As a matter of fact, there had been a steady increase in the area of winter wheat in Nebraska; and almost a steady decrease of the area of spring wheat; they were planting winter and cutting out spring wheat because it was a better crop. I went out there and found out the condition of affairs and immediately sent word into the office, and the estimate was changed. We were the first people to discover that.

The CHAIRMAN. As I said a little while ago, why not do away with all these local men?

Mr. HOLMES. Our men would have too much work to do; we could not cover the country.

The CHAIRMAN. How many men would it take to cover the country if you have more reliance on your own men than on the local people?

Mr. HOLMES. You have misunderstood me there a little. I did not say we had more reliance on them than on our local people, except in some unusual condition which generally happens after our local reports are in, and those unusual conditions exist all the time.

Mr. BURLESON. How do you pay your local observers?

Mr. HOLMES. Do not pay them anything, except the State agents; we give them publications and seed.

Mr. HAUGEN. How much are you paying these State agents?

Mr. HOLMES. From $300 to $800 a year, depending on the size of the State.

Mr. HAUGEN. They are paid by the State also?

Mr. HOLMES. Oh, no. They are very independent from any State

organization. In most of the States they have State secretaries of agriculture, but they are not our employees.

Mr. HAUGEN. Does not Mr. Sage do your work for Des Moines?

Mr. HOLMES. Mr. Sage is our State man.

Mr. LEVER. Is there any tendency on the part of the county correspondents to underestimate the acreage of a crop?

Mr. HOLMES. Sometimes they underestimate and sometimes they overestimate.

Mr. LEVER. No tendency to underestimate?

Mr. HOLMES. No general tendency in any one direction.

Mr. BOWIE. Do you think the general tendency for each man is to do the best he can in making a candid report?

Mr. HOLMES. I think they do. I think they are all perfectly honest.

The CHAIRMAN. If they are, is it simply a matter of judgment?

Mr. GRAFF. You do not think there is a tendency for your local crop of reporters to underestimate?

Mr. HOLMES. There may be a tendency among a certain number of them to do that, but there is just such a tendency on the part of a lot of other correspondents to overestimate.

Mr. BURLESON. As a matter of fact, now, do not your local reporters feel a pride in their estimates and try to make them as accurate as possible?

Mr. HOLMES. They try to make them as accurate as possible. As a matter of fact we get reports on cotton not only from the producer, but from the manufacturer also; from the miller; from the ginner, and the railroads.

Mr. HAUGEN. Is it possible that these local reporters have a pride in their business, and not discover the difference between spring wheat and winter wheat, as you discovered in Nebraska?

Mr. HOLMES. Acreage is a very weak point in all systems of estimating crops. They would report a decrease of 2 per cent, when it ought to have been 25.

Mr. HAUGEN. There could not have been very much pride in those reports with that discrepancy.

The CHAIRMAN. It was more a knowledge of arithmetic in that case, I reckon.

Mr. HOLMES. They decrease those areas almost unconsciously; and they put in winter wheat in the place of spring wheat, and forget all about it; forget to report it, perhaps.

The CHAIRMAN. Is there anything further of which you desire to speak?

Mr. HOLMES. Not that I desire to speak of; no.

Thereupon the committee adjourned until 2 o'clock p. m.

AFTER RECESS.

The committee met, Hon. E. Stevens Henry (acting chairman) in the chair.

Mr. Overton W. Price, Assistant Forester of the Bureau of Forestry of the Agricultural Department, appeared before the committee.

## STATEMENT OF MR. OVERTON W. PRICE.

Mr. HENRY (acting chairman). The committee will come to order, and we will hear Mr. Price.

Mr. PRICE. Mr. Chairman, the marked characteristic of the Bureau

of Forestry during the present year is its increased application to Government work. Within the past three years the amount of the bureau's appropriation spent in public work has risen from about 7 to 30 per cent. The amount spent in work for private owners has decreased from 21 to approximately 13 per cent. Not only is the Bureau spending a larger part of its appropriation on public work each year, but public work is given its best men and first place throughout in its plans.

The public work now in the hands of the Bureau comprises the making of practically all recommendations for new forest reserves and for changes in the boundaries of existing reserves. Since it took up this line of work the Bureau has examined 91 separate areas proposed as forest reserves and as additions to existing reserves, with a total area of approximately 45,000,000 acres. In addition to its studies of proposed reserves and of reserve boundaries, the Bureau makes recommendations for grazing regulations governing the forest reserves, makes detailed working plans for reserve management, and makes studies of Indian reservations, all under the request of the Secretary of the Interior. A large and increasing part of our appropriation is spent in this way.

The cooperation of the Bureau with States is becoming an exceedingly important feature of its work. It is now cooperating with California in a study of State forest problems under an appropriation of $15,000 by the State. It is conducting in New Hampshire, under an appropriation of $5,000 by the State, a systematic study of the State forests.

To sum up, the work of the Bureau now falls under three main heads:

1. Work upon Government lands and in State cooperation.

2. Studies of independent forest problems whose scope renders it impossible that they be taken up by the private owner but whose solution is of urgent importance to the private owner and to the public owner as well. Among these are studies of tupentine orcharding, timber tests, studies of forest fires with a view to their prevention and control, studies of the uses, possibilities, and best management for commercial trees, and, among the most important, studies in wood preservation. In the latter line of work, the Bureau is cooperating with several of the great railroads to find the best methods for the preservation of railroad ties.

3. The preparation of working plans and of planting plans in cooperation with the private owner. I want to make it very clear here that the Bureau is not competing with the private forester in this work, because the private forester does not yet exist. As soon as he appears the Bureau will step out of his way. Nor is the Bureau making the entirely futile attempt to handle all the private work in the United States, but merely to institute upon carefully selected tracts, characteristic of wide areas, the successful application of practical forestry.

The results of the work of the Bureau in cooperation with private owners upon their lands is shown more than in any other way in the strong and growing influence which forestry has upon the lumber industry to-day. At the last convention of the National Lumber Manufacturers' Association, held in Washington, more attention was given to forestry than to any other subject. The convention expressed itself in favor of the perpetuation of the forest by wise use, and gave evidence of its good will by visiting the Bureau of Forestry in a body.

And, more than this, its attitude has taken form in the express desire upon the part of several of its members to put practical forestry into effect upon their own lands under recommendations of the Bureau.

These three great lines of work—work upon public lands, studies of independent problems, and work in cooperation with private owners—are all three greatly in arrears. The total appropriation of the Bureau for the present year could be expended upon any one of them and there would still be urgent work left to do. If the Bureau could have put 100 men instead of 30 men upon its studies of proposed reserves, during the past season, the result would have been that a correspondingly larger portion of the rapidly disappearing vacant public lands would have been reserved for their best use.

In its studies of independent forest problems, the work of the Bureau has been fruitful so far as it has gone, but its amount is pitifully small compared with the urgent work there is to do. And I want above all to make it clear that these studies of forest problems are not merely academic or scientific, they are aimed at the best solution of urgent practical problems and are taken up only upon the basis of an actual and widespread need.

I realize fully that, seen only in the light of the rapid growth of the Bureau from a small beginning, the request for an increased appropriation for the coming year may appear questionable. But seen in the light of the work that is still to be done, the question before the Bureau is, how it may handle work already far beyond its resources. The fact that this committee has encouraged Government work in forestry by increased appropriations in the past has given an impetus not only to the Government forest work. It has been the direct and pervading influence in arousing interest in forestry and in instituting work in forestry throughout the country. The fact that States are taking up forestry, that great lumber companies are taking up forestry, and that the general tendency throughout the country is toward the preservation of the forests by wise use rather than toward its destruction by careless use, is due above all to the forest work of the Government. If that work receives a check then the national forest movement will receive a corresponding check, because the national forest movement can not yet stand alone. It requires support and in many cases it requires the active cooperation of the Government.

We are confronted in the United States by forest problems more urgent and more far-reaching than those which confront any other country. We are far behind other countries, and far behind our need, in the solution of national forest problems. So far we have made no more than a good start, and it is in my judgment of vital importance to the forest interests of the Government and of the private owner that that start be maintained, because this country has before it to-day not the consideration of forest questions in the abstract, but the direct question of how it may save the forests before they are destroyed.

Mr. SCOTT. I should like to call your attention to a statement made earlier in your remarks to the effect that you are doing a smaller percentage of private work.

Mr. PRICE. Yes, sir.

Mr. SCOTT. Less now than formerly?

Mr. PRICE. Yes, sir.

Mr. SCOTT. Does that mean a smaller actual amount of work?

Mr. PRICE. It means a smaller actual amount.

Mr. SCOTT. Why is that so? Have you conducted the work to such an extent that the people can now carry it on by themselves?

Mr. PRICE. It has come about for these reasons: The demand is growing all the time, both for working plans and for planting plans. But we have felt that our best effort should be given to the Government work, whose claims have been very great in the last few years. We felt, too, that we must confine our private work to carefully selected areas and avoid even the appearance of an attempt to handle all the private work in the country.

Mr. HENRY. Where have you been doing your work in the past year?

Mr. PRICE. Forest reserve studies have been the most important work that we have done in the past year.

Mr. HENRY. You have done some private work?

Mr. PRICE. Yes, sir.

Mr. HENRY. As I remember, last year you gave an interesting statement of the work in eastern Texas.

Mr. PRICE. That work is being continued this year. It comprises the preparation of a working plan for the lands of the Houston Oil Company and the Kirby Lumber Company. The owners are now employing a forester as the result of our recommendations.

Mr. HENRY. They approved of the work.

Mr. PRICE. Even before it was entirely finished; yes, sir.

Mr. HENRY. Have you done work of that description in the northwestern forests?

Mr. PRICE. No, sir; although we have several applications for assistance from that region. The only work in the far Northwest this year has been in the study of reserve boundaries.

Mr. HENRY. There has been none in Washington or California?

Mr. PRICE. In California we have made a study—a cooperative study—under an appropriation of $15,000 by the State. The specific purpose of it is to solve practical problems in order to suggest sound State forest policy.

Mr. SCOTT. You have not responded to all the calls that you have had from private owners?

Mr. PRICE. Not one-fifth of them, I should say, although I have not the figures with me.

The CHAIRMAN. Have you been called upon to investigate the forests of Alaska?

Mr. PRICE. We had a man in Alaska last summer.

Mr. HENRY. What do you know about those forests?

Mr. PRICE. He came back with recommendations regarding forest reserves in Alaska based upon a three months' study. He is a man who has spent several seasons in Alaska and is thoroughly acquainted with its needs.

Mr. HENRY. That is in southeastern Alaska?

Mr. PRICE. Yes, sir.

Mr. BROOKS. What are you doing toward the preservation of railroad ties and the growing of ties in connection with railroads?

Mr. PRICE. We have applications from five railroad companies for aid in determining how railroad ties may best be preserved, and how a permanent supply may be obtained. The work is just beginning, but it looks now as if it might reasonably lead to the application of forestry by the railroad companies to their own lands.

Mr. BROOKS. As a practical matter for them?

Mr. PRICE. Yes, sir. The New York Central Railroad is now considering, under our recommendations, the purchase of forest lands in the Adirondacks for the production of hard-wood ties.

Mr. LAMB. What have you done with the cypress, and can you treat the soft pine in order to make it hard enough to hold the spike?

Mr. PRICE. We are making experiments with that.

Mr. LAMB. What was the plan of the Pennsylvania Railroad?

Mr. PRICE. The plan of the Pennsylvania road is to determine, with our help, if by entering into cooperation with private owners along their lines they could get a permanent supply of ties, or whether they had best buy the land outright for the production of ties.

Mr. LAMB. If they will buy the land and let it stand there nature will bring the ties?

Mr. PRICE. Yes; but a great deal quicker under careful management.

Mr. SCOTT. Have you made any progress in the search for a preservative that would extend the life of a tie?

Mr. PRICE. Yes; the Santa Fe Railroad and several others are now treating with preservatives a portion of the ties they use. The result is in every case greatly to lengthen the life of the ties in the track.

Mr. SCOTT. To what extent does this preservative protract the life of a tie; can you make any estimate of that?

Mr. PRICE. Yes, sir. For example, the life of the untreated loblolly pine tie in southeastern Texas, where a tie rots quicker than anywhere else in the United States on account of the unfavorable conditions of drainage and climate, is about a year. If the loblolly pine tie is treated with chloride of zinc, its life will be extended to three or four years. For instance, to give you an idea of the wonderful effect of preservative treatment, I have seen sections of creosoted beech ties which have been in use thirty years in the French Eastern Railway and are practically as good as when they were laid.

Mr. SCOTT. Do you mean to say that they have been using this preservative for thirty years?

Mr. PRICE. Yes, sir; the creosoting process was known and used thirty years ago.

Mr. SCOTT. They have not found anything better than that?

Mr. PRICE. There are many processes; which is the best still waits for proof based upon experiment and study.

Mr. SCOTT. It would seem that problem was pretty nearly solved, if thirty years ago a preservative was found that would preserve a tie in that way.

Mr. LAMB. It is solved in regard to the pine?

Mr. PRICE. The results for beech can not be applied to pine. Beech would not rot so quickly under any conditions.

Mr. LAMB. Beech is very hard?

Mr. PRICE. Yes, sir.

Mr. BROOKS. Some of the roads are taking steps toward the replanting of adjacent areas?

Mr. PRICE. They are considering it.

Mr. BROOKS. How about the consolidated roads of New England?

Mr. PRICE. The advisability of commercial tree planting is being carefully studied in New England.

Mr. BROOKS. That is in connection with your Bureau?

Mr. PRICE. Yes, sir.

Mr BOWIE. What is the cost of the treatment on a tie that would increase the life of a tie three or four years?

Mr. PRICE. That I could give you only roughly. Some species are harder to impregnate than others. Probably 15 or 20 cents a tie.

Mr. BOWIE. That is a good deal less than the first cost of the tie?

Mr. PRICE. Yes, sir.

Mr. BOWIE. And it makes one tie equal to three or four?

Mr. PRICE. Three or four. And then it also does away with the expense incident to changing ties in the track.

Mr. BOWIE. A large part of the expense?

Mr. PRICE. Yes, sir.

Mr. BOWIE. Why is not that of sufficient importance to justify the railroads in doing that work themselves? Why does the Government have to do that?

Mr. PRICE. Because it hastens matters. The railroads probably would come to preserving ties when the urgent necessity drove them to it, but not until then. If we can lead them to do it sooner we will save the forests that much more. It all goes back to the question of forest preservation. The longer the ties last the longer the forests will last.

Mr. BOWIE. I can understand why it takes a good deal of time to explain to a man who owns 640 or 160 acres of land the necessity for this, and how it takes time to scatter that information among several million farmers, but it seems to me that a self-evident proposition of that sort ought to be acted upon by the railroad managements in a great deal less time.

Mr. PRICE. They have not gone into it simply because neither the need nor the way had been brought home to them.

Mr. BOWIE. Has the Southern Railroad taken it up?

Mr. PRICE. It is the Santa Fe road I have spoken of.

Mr. BOWIE. That is the Western?

Mr. PRICE. In the Southwest.

Mr. BOWIE. Has the Louisville and Nashville, or the Southern Railroad?

Mr. PRICE. No, sir; but I believe the Southern Road is considering it.

Mr. BOWIE. Has the matter been presented to them?

Mr. PRICE. It has, I believe, been discussed between the Southern Railroad and our representatives. Of course the problem is not so serious for them as it is for the western roads, since they run through a forested country.

Mr. BOWIE. It is merely a question of economy?

Mr. PRICE. Yes, and not nearly so urgent for them as it is for the roads in the West, where timber is scarce.

Mr. LAMB. Have we not got large quantities of hard wood in our colonial possessions?

Mr. PRICE. As I understand from Mr. Pinchot and Captain Ahern the difficulty of getting that out is great.

Mr. BOWIE. They have no roads there?

Mr. PRICE. No, sir; and logging operations are difficult.

Mr. LAMB. I thought that they had a lot of hard woods over there.

Mr. HENRY. Have you one of your experts in Porto Rico?

Mr. PRICE. We had a man there this summer making an investiga-

tion of the proposed reserve. His report will soon go to the Secretary of the Interior.

Mr. HENRY. There is a large forest there?

Mr. PRICE. Yes, sir; and forests of high local value.

Mr. GRAFF. Why could not this system of preserving woods be extended to building materials?

Mr. PRICE. It could in a great many cases.

Mr. GRAFF. That is especially to that portion of the wood of a building that is exposed?

Mr. PRICE. That is exposed to the weather?

Mr. GRAFF. That is exposed to the weather.

Mr. PRICE. Yes, sir.

Mr. BOWIE. What is the treatment that is given these woods? Unless it is a secret, or something of that kind, we would like to have that information.

Mr. PRICE. No, sir; it is not. Sometimes it is done through impregnation under pressure, and sometimes by boiling in a vat for a certain time.

Mr. BOWIE. What is the material that they boil it in and impregnate it with? That is what I want to get at.

Mr. PRICE. There are several chemical solutions; sulphate of copper and zinc chloride are the most common.

Mr. BOWIE. Does the tie have to be submerged in it?

Mr. PRICE. Yes, sir.

Mr. BOWIE. How long does it have to stay there?

Mr. PRICE. Of course it depends upon the heat to which it is subjected; probably ten to twenty minutes.

Mr. BOWIE. You pitch it in?

Mr. PRICE. Yes, sir; it is passed into the impregnating tank and out again.

Mr. BOWIE. What does it cost to establish a system for that work, a plant of that sort, at some place where the railroads have headquarters for ties?

Mr. PRICE. Of course that would depend on the number of ties to be treated, but a good plant would cost about $15,000.

Mr. BOWIE. It would probably cost that much?

Mr. PRICE. Yes; probably that much to put in a plant which would be worth while.

Mr. BOWIE. And the treating can be done at an expense of 15 or 20 cents a tie.

Mr. PRICE. Fifteen or 20 cents a tie, approximately.

Mr. BOWIE. It would seem as though they would adopt that pretty quickly if they were convinced of it?

Mr. PRICE. Yes, sir; they will.

Mr. HENRY. Take a hard-wood tie, a chestnut tie, that does not cost over 40 or 50 cents; would it pay to treat those ties?

Mr. PRICE. Yes; particularly if the timber was naturally short lived.

Mr. HENRY. I say chestnut.

Mr. PRICE. Yes, sir; I should think it would by all means. It would prolong its life two or three times.

Mr. HENRY. Most of the Eastern roads use chestnut timber?

Mr. PRICE. Yes, sir; to some extent.

Mr. SCOTT. The first change that I notice in the wording of your bill is on page 15, where you insert new words, "Including the erec-

tion of the necessary buildings," in connection with the investigation and planting of native and foreign species, suitable trees for the treeless regions.

Mr. PRICE. Yes, sir.

Mr. SCOTT. What is the need of those buildings?

Mr. PRICE. We consider them necessary for the tree-planting work.

Mr. SCOTT. You mean on the reservations?

Mr. PRICE. Yes, sir. We need permanent buildings upon those national reserves on which the Bureau of Forestry is planting trees. Since the propagation of the tree seedlings and the setting out of the forest plantations will continue for several years, and since after the plantations are completed their care will necessitate the continual presence of agents of the Bureau of Forestry upon the ground, the erection of permanent buildings for the housing of seeds and tools, of wagons and teams, and as quarters for the agents of the Bureau in the work is necessary to its best execution.

Mr. SCOTT. Have you any estimates as to the cost of these buildings?

Mr. PRICE. It will be probably slight for the coming year; not more, I should say, than $5,000, if so much.

The CHAIRMAN. I notice your wording is otherwise the same as last year.

Mr. PRICE. Yes, sir.

The CHAIRMAN. What is this last sentence in italics on page 15: "Of which sum not to exceed fifteen thousand five hundred dollars may be used for rent," etc.; that increases the same item of last year?

Mr. PRICE. Yes, sir; that increases the item of last year.

Mr. HENRY. That is for rent in Washington?

Mr. PRICE. Yes, sir; rent in the Atlantic Building, where we are already very much crowded.

Mr. SCOTT. Do you expect to get more room or pay more than you do for what you have?

Mr. PRICE. To get more room. We have a lease with them that covers the whole building, if we should need it, on the same terms.

Mr. SCOTT. How do you expect to spend this $100,000 increase that you ask for?

Mr. PRICE. That will be spent in continuing the three main lines of work—the work upon the reserves and, in cooperation with the States, the investigation of urgent forest problems, and the giving of assistance under cooperation with the private owner. The reserve work will take the larger part of it, and more than has been taken this year. We feel very strongly that the sooner we complete the examinations of proposed forest reserves the better it will be. The land is being taken up very fast, and if we do not get it now we will never get it.

Mr. BROOKS. So far as that particular branch of the work is concerned, it is at a crisis?

Mr. PRICE. That is our feeling.

Mr. HENRY. How many States have made appropriations to participate in your work, and how much have they appropriated?

Mr. PRICE. California has appropriated $15,000 and New Hampshire $5,000. The specific purpose of the work in New Hampshire was to report upon the proposed White Mountain forest reserve. The field work is completed.

Mr. SCOTT. Most of this amount then will be spent for salaries for additional employees and for field expenses?

Mr. PRICE. Yes, sir. I am glad to say that our office expenses have decreased steadily. The office is costing proportionately less now than it did three years ago, and it is costing less each year.

Mr. SCOTT. Why is that so?

Mr. PRICE. Because our work is more and more in the field.

Mr. SCOTT. Will the difference in the working hours in the departments make any difference in your office force and enable you to get along with fewer men?

Mr. PRICE. No, sir; I think we are already as far along the line of economy as we can go with safety. We have a comparatively small office force at present, and with the exception of the necessary clerks and stenographers and of the computing clerks, who are working out the results of the data obtained in the field, we have no permanent office force.

Mr. SCOTT. What have you published this year?

Mr. PRICE. Two bulletins have already been published: One A Working Plan for Forest Lands in Hampton and Beaufort Counties, South Carolina; the other, The Diminished Flow of Rock River in Wisconsin and Illinois, and Its Relation to the Surrounding Forests. It is expected that 19 additional bulletins will be published or submitted for publication before the end of the present fiscal year. (See list attached.)

ALREADY PUBLISHED.

A Working Plan for Forest Lands in Hampton and Beaufort Counties, South Carolina.
The Diminished Flow of Rock River in Wisconsin and Illinois, and Its Relation to the Surrounding Forests.

TO BE PUBLISHED OR IN HANDS OF PRINTER BEFORE JUNE 30, 1904.

The Planting of White Pine in New England.
The Basket Willow.
The Forests of Texas.
The Red Fir.
Adirondack Fires in 1903.
The Forests of the Hawaiian Islands.
Forest Planting in Western Kansas.
Forest Planting in Oklahoma and Adjacent Regions.
The Reproduction of White Pine on Farm Lands in New England.
The Maple Sugar Industry.
Factors Determining the Destruction of Coniferous Forests in the Northwest.
Silvicultural Characteristics of Long-Leaf Pine.
The Relation of Forest Cover to Run-off in the San Bernardino Mountains.
Studies of the Production of Tannin by Eastern Tan Barks.
A Comparative Study of American and European Methods of Turpentine Orcharding.
Timber for Telegraph and Telephone Poles.
Report on the Condition of Treated Timbers Laid in Texas, February, 1902.
Part II of A Primer of Forestry.
Part II of The Woodsman's Handbook.

Mr. BROOKS. Is there a demand for the Woodsman's Handbook?

Mr. PRICE. Yes, sir.

Mr. LAMB. They are asking me for it down my way all the time.

Mr. PRICE. Yes, sir; it has been received in a very gratifying way.

Mr. SCOTT. In the matter of emergency you spoke of, I hardly understand why it happens that unless you get this work done right away you will never be able to do it.

Mr. PRICE. We will be able to do it, true enough, later on, but it seems to me that now is the time to do it, because if it is not done now,

harm will be done which later effort can never repair. The products of lumbering are increasing instead of decreasing, and in other ways also the demands upon our forests are growing.

Mr. BROOKS. One reason, I think, why there is more or less of a crisis now is that there is more of a race now between the locators of the forest lands and the forest-reserve people. In a good many places where there should be a forest reserve created it will not be possible in a few years, because any addition to the reserve will have to be impracticable in shape. That is true in the Rocky Mountains, and all over.

Mr. SCOTT. Is it not true also that after the President has issued his proclamation setting aside the forest reserve it is no longer open to settlers?

Mr. PRICE. That is true; but the point is, that if a blanket proclamation were made setting aside all public lands a feeling would be engendered which would be very inimical to the best interests of the forest reserves.

Mr. SCOTT. The point that I want to get at is this: I have understood that you have no authority to go onto any territory with a view to conducting your examinations unless it had already been set aside by the President's proclamation as a forest reserve.

Mr. PRICE. No, sir; our examinations have been mainly on lands that have not been withdrawn from entry. The withdrawal has been the result of our recommendation, and generally has not preceded it. We are determining what public lands are suitable for forest reserves.

Mr. SCOTT. And you do not know where the best places are?

Mr. PRICE. To know definitely requires an examination on the ground. It is very urgent work, by reason of the rapidity with which the public lands are being taken up.

Mr. BROOKS. There are now nine proposed additions in Colorado?

Mr. PRICE. I think so.

Mr. BROOKS. Now, in three of those instances the fact that there has been a kind of blanket order, such as you have spoken of, has aroused the most bitter hostility, and I have been deluged with letters and so has the Department. Now, in order to have the administration of a forest reserve successful, the excess in the withdrawals should be cut out as quickly as possible. In one instance, by the accident of the situation, the town of Salida was included in a forest reserve, and they had mass meetings, and it aroused the greatest public indignation.

Mr. SCOTT. To what extent will it enable you, if you are given this, to complete these surveys?

Mr. PRICE. I think it would enable us to go a long way toward that in the coming year. The actual completion of the work is some distance off. We have to be content with reserving smaller and smaller areas, and, instead of several hundred thousand acres, the time is near when we will be glad to get a reserve of several thousand acres. This is work which brings in very large returns upon the investment. It costs only the living and traveling expenses and the salaries of trained men. In return it yields forest reserves for the nation.

Mr. SCOTT. When you were before us last year you spoke of the difficulty of obtaining trained foresters.

Mr. PRICE. Yes, sir.

Mr. ADAMS. Has that been overcome to the extent that you can find men enough to put in the field?

Mr. PRICE. Yes, sir; that difficulty is largely disappearing. The Yale Forest School, for example, has a graduating class of 30 men. The University of Michigan will turn out several more. A forest school is beginning at Harvard also.

Mr. SCOTT. How much training do you have to give these men after they graduate from the university schools before you send them into the field?

Mr. PRICE. In many cases we have had a chance to judge of these men by their employment as student assistants. As a matter of fact, very few men come to us on whom we have not already got a very good line in this way.

Mr. SCOTT. What do you have to pay these men?

Mr. PRICE. The examination for field assistant is an exceedingly rigid one. Those who pass it get $1,000 a year and expenses.

Mr. BROOKS. What do the student assistants get?

Mr. PRICE. $25 a month and expenses.

Mr. BOWIE. What do the expenses amount to—more or less than their salaries?

Mr. PRICE. That varies a good deal. The expenses of a party in permanent camp average per month about $10 a man, while on the reserve boundary work, where a man often requires a pack train of four or five animals, and a packer, it will run up as high as $10 a day, and averages not less than $5 or $6 a day.

Mr. SCOTT. Your appropriation has been increasing at about the rate of $100,000 a year?

Mr. PRICE. I realize that.

Mr. BOWIE. What was the increase in appropriation last year?

Mr. PRICE. From $291,000 to $350,000.

Mr. SCOTT. I think the committee will be interested in knowing, if you can state in regard to that, how many years you will continue to go on increasing and come in with a request for a $100,000 increase?

Mr. PRICE. It certainly will not go on much longer at the present rate. But the fact that impresses us most strongly in the Bureau at present is that we have never had the resources to satisfy the urgent requests for assistance which we receive.

The CHAIRMAN. Where do they come from?

Mr. PRICE. From the Government, more and more, and from the people.

Mr. BOWIE. What do you mean by the demands coming from the Government?

Mr. PRICE. I mean the demand for examination of reserve boundaries, all of which we are making.

Mr. BOWIE. For reserve boundaries?

Mr. PRICE. Yes sir.

Mr. BOWIE. On the Government lands out in the West?

Mr. PRICE. The examination of areas proposed as forest reserves, or the examination of existing forest reserves upon which there has arisen the question of change of boundaries, work upon which we employed thirty men this last summer.

Mr. BOWIE. Is that surveying work?

Mr. PRICE. It is in no sense surveying work. They make no surveys. They go over public lands in order to determine which are suitable for forest reserves. They consider the value of the lands in regulating stream flow, for grazing and for other uses; and they rec-

commend, as a result of this study, those lands for forest reserves which, so reserved, will be of greater benefit to the people than if unreserved.

Mr. BOWIE. Where are these forest-reserve lands, mainly?

Mr. PRICE. They are in the Middle West and on the Pacific coast.

Mr. BOWIE. Could you give me an estimation of the number and the amount?

Mr. PRICE. It is about 63,000,000 acres at present.

Mr. BOWIE. Has the Government any forest reserve in the Blue Ridge range of mountains?

Mr. PRICE. No, sir; none. There is the proposed forest reserve in the Southern Appalachians.

The CHAIRMAN. That is not included?

Mr. PRICE. No, sir.

Mr. HENRY. You do include the national parks?

Mr. PRICE. No, sir; only the reserves.

Mr. SCOTT. There is a forestry division in the Interior Department?

Mr. PRICE. Yes, sir.

Mr. SCOTT. And the proposition is now pending to transfer that to your Bureau?

Mr. PRICE. Yes, sir.

Mr. SCOTT. If that were done would the added work which is transferred to your Bureau absorb any considerable portion of that $100,000?

Mr. PRICE. No, sir; that is making no allowance for reserve work; I mean for reserve work that is now handled in the division of forestry in the Land Office.

Mr. SCOTT. What is that division doing?

Mr. PRICE. It is expending, I think, $350,000 a year in the administration of the forest reserves. It is conducting no studies in any way; it is simply administering the reserves and employing the rangers and supervisors.

Mr. BROOKS. It is attending to the police protection?

Mr. PRICE. It is charged with that duty.

Mr. SCOTT. If the reserves were transferred to your Bureau they would have to carry the appropriations along with them?

Mr. PRICE. Yes, sir; they certainly would.

Mr. SCOTT. You think that the work of that Department would dovetail into your work so as to make a smaller expenditure by the combination?

Mr. PRICE. I do not, because they are are two distinct lines of work. One is a question of the actual administration of the national forest reserves; the other is the study of forest problems which they present and which are presented elsewhere. The expenses of the two had, it seems to me, better be kept entirely separate.

Mr. SCOTT. If they are separate problems and ought to be kept entirely distinct, is it not better that the division should remain where it is?

Mr. PRICE. No, sir; because in both cases the problem is one of practical forestry. Practical forestry, in my judgment, is necessary both to the best administration of the reserves and to the best solution of problems there and elsewhere. But I do not think they should be handled from the same fund. In India, for example, where there is an excellent forest service dealing with forest problems not unlike ours, there is one head—one inspector-general of forests—but the expenses of forest administration are defrayed from a separate fund.

Mr. SCOTT. Do you think that the work you are now doing could be better done if you had the administrative work also?

Mr. PRICE. Yes, sir; because we would know at all times just what the problems were; we could solve them as they came up, and practical forestry would govern the work throughout.

Mr. BOWIE. You recommend, then, the transfer of the Bureau of Forestry in the Interior Department to your Bureau in the Agricultural Department?

Mr. PRICE. Yes, sir.

Mr. BOWIE. And the consolidation of jurisdiction?

Mr. PRICE. Yes, sir.

Mr. BOWIE. Would that operate to produce a greater economy or not?

Mr. PRICE. That is strongly my opinion, as regards effort.

Mr. SCOTT. You have just answered my question, as I understood you, that it would not involve any economy?

Mr. PRICE. You mean that it would cost less to administer the reserves than now?

Mr. SCOTT. Yes.

Mr. PRICE. No, sir; I do not think so.

Mr. ADAMS. You mean economy of effort?

Mr. PRICE. Yes; economy of effort. I do not think that we are spending enough money now on the forest reserves. Their protection is not sufficient to keep fires off. The reserves are not as well administered as a good many private holdings.

Mr. SCOTT. It is practically impossible to prevent fires by any practical administration?

Mr. PRICE. Oh, no.

Mr. SCOTT. You would have to have an army brigade to do it?

Mr. PRICE. Not in order to prevent fires; an army can not put a fire out, when it is once well started, but it is comparatively easy for one man to stop it, if he sees it soon enough.

Mr. BOWIE. What is the destruction, annually, from fires?

Mr. PRICE. The destruction in the United States amounted to $10,000,000 last year. It has been so estimated.

Mr. BOWIE. How much is spent by the Government on that?

Mr. PRICE. I do not know what the amount is. That would be a part of the cost of administration, because the rangers are supposed to put the fires out. It would be hard to differentiate that from the total amount expended in reserve administration.

Mr. BOWIE. Do they have horses?

Mr. PRICE. They have horses. They are expected to provide their horses themselves, but in order to make their beats they should have horses.

Mr. BOWIE. Where does this $300,000 go; how many employees have you?

Mr. PRICE. In the Bureau of Forestry?

Mr. BOWIE. Yes.

Mr. PRICE. Three hundred and twenty, during the past field season.

Mr. BOWIE. Three hundred and twenty?

Mr. PRICE. Three hundred and twenty last summer. The number is now 258 employees.

Mr. BROOKS. Have you any specific instance showing what one or two men can do in regard to putting out fires?

Mr. PRICE. Speaking of my own personal knowledge, a fire could be stopped by a very few men, before it had gotten headway.

Mr. BROOKS. My recollection is that Mr. Gardner, when he was in Colorado—Mr. Gardner of your Bureau——

Mr. PRICE. Yes, sir.

Mr. BROOKS (continuing). He met there the most intelligent forester in the State, General Palmer, and he has told me, repeatedly, that when they were building a road on the Rio Grande, at that time he and his associates acquired a tract of 40,000 acres on the divide, and he incorporated a little land company and he put that tract in charge of one man after the forest was cut off of it, and in about thirty years there has come up as good a growth of the long-leafed pine, and it is very nearly ready to cut now; and in that time he has never had a destructive forest fire in that tract, although the Government land on all sides has been burned off.

The CHAIRMAN. How does he keep the fire off?

Mr. BROOKS. That particular line is fenced, and he keeps a man on there.

Mr. SCOTT. What I had in mind is this: All through this vast Rocky Mountain region there are innumerable trails, and hunting parties and touring parties are traversing these trails every day in every direction, and the fire which any one of these parties makes to cook its coffee might start a forest fire, and it certainly would require an army of men to patrol that region so as to keep an eye on all those parties.

Mr. BROOKS. I do not think it would require so many men. A man goes on a reserve and he builds a camp fire, as you say, and the forest ranger follows him up and finds him, and says: "When you leave there I want you to put that fire out;" and he says: "All right, I will do it;" but the next morning he takes no precaution whatever, and there is no penalty and there is no way of enforcing that.

Mr. BOWIE. Why do we not get a statute on that, then?

Mr. BROOKS. I think it is very important, to increase the scope of the power of the rangers and to increase their numbers.

Mr. SCOTT. The rangers should have power to follow that man up; but I have been spending much time in Colorado and I never have seen any forest ranger there, and I have seen several destructive fires.

Mr. BROOKS. You have been in the Pikes Peak Reserve?

Mr. SCOTT. No, sir; I have been in the country.

Mr. BROOKS. There is no reserve there?

Mr. SCOTT. No, sir.

Mr. BROOKS. On the Pikes Peak Reserve there are three rangers to cover all that whole country.

Mr. BROOKS. Unless there is a rigid system of arrest you can not accomplish anything.

Mr. SCOTT. The system we have is inadequate and must remain inadequate unless the number of rangers is increased.

Mr. BROOKS. Or their power is increased. Of course this tract of General Palmer's that you speak of is in private ownership, and he can enforce his regulations and he has the civil power back of him. The proper control of the reservations by the forest rangers if they are given an increase of power is very feasible and practicable, and that man has been able to do there what a forest ranger could not do.

Mr. SCOTT. Is that not a very small tract?

Mr. BROOKS. No, sir; it is 40,000 acres.

Mr. SCOTT. That is fenced, though, is it not?

Mr. BROOKS. I do not think the fencing cuts any figure.

Mr. PRICE. I think a great deal can be done by raising the standard and increasing the power of the rangers, rather than by increasing the number of rangers. There are places where it would be advisable to put on more rangers only during the fire season. The effective protection of the reserves from fire is practicable without enormous expense; but the details need working out on the ground.

Mr. SCOTT. You spoke in your preliminary remarks about the studies of forest fires.

Mr. PRICE. Yes. The purpose of those studies has been to ascertain the effect of fire on the forest, the causes of fires, and the best methods of prevention. The result of that work will be published this year, and I believe it will be of practical value. That is the purpose of it. For instance, there has been a study made of forest fires in the Adirondacks, the only comprehensive study of the terrible fire that raged there last spring. A representative of the Bureau will appear before the State senate committee of New York on next Tuesday in order to testify along the lines of that report, and in order to suggest a forest policy for the State to the committee.

Mr. HAUGEN. What can you tell us about the forests of Alaska?

Mr. PRICE. I wish I had Mr. Langille here, who made that examination.

Mr. HAUGEN. You have a general idea of the results?

Mr. PRICE. Yes, sir. Mr. Langille had a very interesting trip and drew the boundaries for the proposed reserves he was sent to examine. He reports that there are dense forests, but the area of merchantable forest is decidedly small.

Mr. SCOTT. Owing to the difficulties of transportation?

Mr. PRICE. Yes. And because the trees are exceedingly scrubby and short. For instance, the red fir, which is of such immense size in Washington, in Alaska is a comparatively small tree, and a very branchy one.

Mr. HENRY. It is rather worthless, then?

Mr. PRICE. Yes, sir; except as a forest cover for the mountains.

Mr. BOWIE. I want you to please explain what you mean by investigating the causes of fires? Do you not know in advance, without investigation, what causes a fire?

Mr. PRICE. We do not always know, locally. Fires may be caused in a good many ways, and the cause frequently indicates the best method of prevention.

Mr. BOWIE. What causes have you found out that you did not know of before you began to investigate?

Mr. PRICE. None that we did not know existed, but through knowledge of local causes we have found the best ways of preventing the fires.

Mr. LAMB. It is a sort of detective work?

Mr. PRICE. No, sir; not exactly that, but a close study on the ground.

Mr. BOWIE. What do you mean by determining the effect; what is left unburnt?

Mr. PRICE. Yes, sir; what the effect is on the forest. For example, the fire does not kill the mature long-leaf pine, while it practically destroys a spruce forest in the Adirondacks, so that the question of

how serious the results are is exceedingly important to determine. The effect of fires silisculturally is also of vital importance very often. For fires do not only influence existing forests; they are an important factor in determining the composition of the forests of the future.

Mr. HAUGEN. What are you doing in northern Minnesota?

Mr. PRICE. There we are putting into effect the provisions of the so-called Morris bill, so far as they relate to the Bureau of Forestry. The bill provides that the regulations of the forester shall be put into effect in the cutting of 95 per cent of the timber on those lands which will constitute the Minnesota National Forest Reserve. As you will remember, the Morris bill provides that 231,400 acres of the Chippewa Indian lands be set aside as a national forest reserve; that 95 per cent of the timber be sold, and the rest be reserved.

Mr. HAUGEN. Only 5 per cent of it?

Mr. PRICE. Yes, sir; but since it can be reserved as we indicate, although it seems very little, I think it will be enough to leave sufficient trees standing after the lumbering is done to serve as a basis for a future crop. There was a great deal of anxiety among some of the lumber men when they saw the regulations. It was said by a great many, "these provisions will cause the price offered for the pine"—the fact that the tops have to be burned and the lumbering done carefully—"to be very low." But as a matter of fact more money has been offered for that pine than for pine to be lumbered without restrictions.

Mr. HAUGEN. The market price of lumber was higher?

Mr. PRICE. No, sir; there was only three weeks between the two sales.

Mr. HAUGEN. What is the condition in northern Michigan?

Mr. PRICE. The condition is generally bad. Lumbered lands are practically a waste in many cases.

Mr. BROOKS. And are we doing anything to reforest these areas?

Mr. PRICE. Yes, sir; we are in communication with private owners in establishing forest plantations in this State and in the Middle West.

Mr. HAUGEN. With what success?

Mr. PRICE. With excellent success.

Mr. HAUGEN. What is your opinion now as to the supply of lumber in this region, Michigan, Minnesota, and Wisconsin?

Mr. PRICE. I think it is nearly gone.

Mr. HAUGEN. Very nearly gone?

Mr. PRICE. As a factor in the lumber supply. Mr. Gannett in his report on lumbering, which came out in the census, showed the gradual change in the geographical distribution of lumbering, and how it has moved southward and westward as the result of waning supplies in the North.

Mr. ADAMS. You mean the pine lumber supply?

Mr. PRICE. No, sir; the entire lumber supply. He gave for the past ten years the percentage of the total lumber supply yielded from each of the great forest regions, and showed that it is increasing steadily in the Pacific and Southern States.

Mr. HAUGEN. What suggestion have you to make as to the supply of lumber in the Northwest, in those States, Minnesota, and Dakota, and so on?

Mr. PRICE. If they protect the cut-over lands from fire, they will

get the forest back, but they will get it back very slowly, because vast areas have already been burned over repeatedly for many years.

Mr. BOWIE. The growth is very slow there?

Mr. PRICE. Yes, sir; not so rapid as in more favorable localities.

Mr. HAUGEN. How long will it take a tree to grow large enough to cut it into lumber?

Mr. PRICE. Second growth large enough for pulp, say thirty to forty years; for lumber nearly twice as long.

Mr. HAUGEN. How large a tree will you get in thirty years?

Mr. PRICE. Six to eight inches at the most. That would be rapid growth.

Mr. HAUGEN. The tree would not be large enough for lumber?

Mr. PRICE. No, sir; unless smaller sizes were used than are used now.

Mr. HAUGEN. It would take at least fifty years for lumber?

Mr. PRICE. Yes, sir; at least fifty years.

Mr. BOWIE. Would it pay to grow it?

Mr. PRICE. In many cases. It would not generally pay the lumberman unless there were the basis for a second crop on the ground. Practical forestry for the lumberman does not require him to plant trees in order that his grandchildren may get the benefit of them. As a matter of fact, if in cutting off the first crop he would protect the trees which are slightly below the size of those he cuts, for instance, if he is cutting 10-inch trees, if he would leave the 7, 8, and 9 inch trees and take care not to injure them, it would generally not be long before he would have a second crop. But if he cuts carelessly he damages these small trees so greatly that their future value is practically destroyed. If land is lumbered carefully and protected from fire, it will yield in most cases a second crop of sufficient value to return a good interest on the value of the land, sometimes as high as 6 per cent.

Mr. HAUGEN. Under present conditions, how long will it take to exhaust the timber?

Mr. PRICE. Under the present conditions, how long would it take to exhaust the timber in this region that you have been speaking of?

Mr. HAUGEN. Yes.

Mr. PRICE. That is a question which it is exceedingly difficult to answer, because of the character of the sources of our information. All that we have to go on are estimates of the crudest sort.

Mr. HAUGEN. Yes, I understand; but I wanted information on the subject.

Mr. ADAMS. It is estimated that the timber of Wisconsin will be exhausted in twenty-five years, anyway, and possibly sooner.

Mr. PRICE. I think that is a safe estimate.

Mr. HAUGEN. Would not that apply to Minnesota and Michigan also? It is already exhausted in Michigan.

Mr. PRICE. Practically so, except the little remaining in the far north.

Mr. HAUGEN. What suggestions have you for supplying the Northwest with lumber in the future?

Mr. PRICE. It will inevitably have to tide over its bad time by getting timber elsewhere. No method known will enable them to get a supply in time from its own lands.

Mr. BOWIE. To keep up with the home consumption?

Mr. PRICE. Yes, sir.

Mr. LAMB. They will get it from the South.

Mr. PRICE. Yes, sir; from the South and the Pacific coast.

Mr. BOWIE. Where is the bulk of the timber supply in the country now?

Mr. PRICE. On the Pacific coast, in Oregon and Washington and California.

Mr. HAUGEN. Is its quality that of the hard pine?

Mr. PRICE. I think the red fir is intrinsically as good a timber, but it is not adapted to the same local uses.

Mr. HAUGEN. Red fir? Is that the Oregon pine?

Mr. PRICE. Oregon pine it is called.

Mr. HAUGEN. There is considerable pine shipped to our country, but I am told that it is less resistant than the soft pine.

Mr. PRICE. I think it will not be as good a quality as the native white pine for home use.

Mr. HAUGEN. And it is very expensive.

Mr. PRICE. Very expensive on account of the long transport.

Mr. ADAMS. It is heavier and has more sap.

Mr. PRICE. It has more sap; yes, sir.

Mr. BOWIE. Were you speaking of the western pine?

Mr. PRICE. I was speaking of the Oregon pine.

Mr. BOWIE. What about the supply of long-leaf pine in the South?

Mr. PRICE. The estimate is that the long-leaf pine will be exhausted in ten or fifteen years.

Mr. BOWIE. Have they made any practical experiments in forestry among the yellow-pine owners in the South?

Mr. PRICE. Yes, sir.

Mr. BOWIE. What States have most of the yellow pine supply, and where are these experiments going on?

Mr. PRICE. The most of the yellow-pine supply at present and the centers of lumbering operations are in Georgia and Florida and southeastern Texas. We are in cooperation with private owners in Arkansas, Texas, Alabama, and South Carolina, and we have work ahead in several other Southern States.

Mr. BOWIE. Where are you in Alabama?

Mr. PRICE. In northern Alabama.

Mr. LAMB. You call Virginia nearly exhausted?

Mr. PRICE. Yes, sir; practically exhausted.

Mr. LAMB. It grows up there every fifteen years, and they saw it again?

Mr. PRICE. Yes, sir; it comes up fast for firewood, but the lumber is gone.

Mr. LAMB. It does. There is land there now that I cut the big timber off of twenty years ago, on which there is already another forest.

Mr. BOWIE. How long does it take the long leaf pine to reproduce itself?

Mr. PRICE. It takes a long time; at least seventy to eighty years to reach timber size.

Mr. HAUGEN. What can you tell us about fence posts, and such things?

Mr. PRICE. What species do you mean? Are you not growing catalpa for that purpose?

Mr. HAUGEN. It grows small and freezes out the first two or three years.

Mr. PRICE. How about black locust?

Mr. HAUGEN. I do not know much about that. What would you recommend in our locality?

Mr. PRICE. I would rather leave that recommendation to Mr. Hall, who has charge of our tree planting. I will ask him to write you along those lines just what he would recommend.

Mr. HAUGEN. I wish you would. Does red cedar make a good fence post?

Mr. PRICE. An admirable post. It is of very slow growth. It makes a post practically as good as locust.

Mr. HAUGEN. Practically as good as oak?

Mr. PRICE. As locust, practically as long lived.

Mr. HAUGEN. How long lived is the red cedar?

Mr. PRICE. I would say twenty or twenty-five years in the ground.

Mr. HAUGEN. A good bur oak will last that long?

Mr. PRICE. Yes, sir.

Mr. HAUGEN. There is not much difference then between that and a good bur oak post?

Mr. PRICE. No, sir.

Mr. BOWIE. On that question that I was asking you, earlier in your statement, about the ties for railroad purposes, say on the line of the Southern Railway from Virginia to Mississippi, through the States of North and South Carolina and Georgia, Alabama, and Mississippi and Tennessee, in the Southern States, what kind of ties do they use there and what is the life of those ties?

Mr. PRICE. That could be answered better by the man who is investigating along the very lines of your inquiry, but as I know it, most of the timber they use is oak and pine.

Mr. BOWIE. What is the life of those ties?

Mr. PRICE. Of the oak, five or six years, and the pine not so long.

Mr. BOWIE. Suppose they chemically treated it with this solution that you are speaking of?

Mr. PRICE. Yes.

Mr. BOWIE. What addition would that make to its life?

Mr. PRICE. It would double it.

Mr. BOWIE. It would double the life of an oak tie?

Mr. PRICE. Yes, sir; and it might extend its life even longer.

Mr. BOWIE. What about the life of the pine tie?

Mr. PRICE. It would have quite the same effect.

Mr. BOWIE. What is the life of a pine tie as compared with the life of an oak tie?

Mr. PRICE. It is shorter; two or three years shorter.

Mr. BOWIE. What ties had you reference to when you said that they rotted in about a year?

Mr. PRICE. Those were loblolly pine ties in southeastern Texas, where the conditions are very unfavorable for timber.

Mr. BOWIE. These ties that you were just talking about live longer?

Mr. PRICE. Yes, sir; because the climate and the soil is better for timber in the ground.

Mr. BOWIE. Have you ever discussed that tie-preserving solution with the Louisville and Nashville Railroad people?

Mr. PRICE. I do not know whether it has been taken up by them or not. I will find out whether they have considered it. I hope so.

Mr. BOWIE. Have you any bulletins on that subject?

Mr. PRICE. Yes, sir; we have.
Mr. BOWIE. On preserving ties?
Mr. PRICE. We have a couple of very good bulletins.
Mr. BOWIE. I wish you would send me one or two.
Mr. PRICE. I will be delighted to do so at once.
The CHAIRMAN. Are there any further questions?
Mr. BOWIE. I have finished. He has told me what I wanted to know.

Thereupon, at 3.02 o'clock p. m., the committee adjourned.

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COMMITTEE ON AGRICULTURE,
*January 16, 1904—2 o'clock p. m.*

Hon. James W. Wadsworth, chairman.

## STATEMENT OF HON. JAMES WILSON, SECRETARY OF AGRICULTURE.

The CHAIRMAN. As we announced yesterday, the Secretary of Agriculture is before us for the purpose of giving us a résumé of the work of his Department, and any other information he sees fit to give. Mr. Secretary, we have had a very interesting time hearing your subordinates. I think the committee will join me in saying that you have a bright set of men over in the Department.

Now, Mr. Secretary, please proceed, and we will ask you questions as you go along.

Secretary WILSON. Mr. Chairman and gentlemen of the committee, I take it for granted that the hearings that you have had have brought out the details of the work of the Department along the several lines in which it is being prosecuted, so I will speak briefly about the general policies of the Department under your charge and direction here, such matters as the several bureau chiefs and scientists might not have to consider in their more limited spheres.

The remark that the chairman has just made furnishes a suggestion with regard to the Department. We have a fine lot of scientists. The world has not, I think, as many scientists along the several lines; no one country begins to have such an organization as we have.

When I came down here first, with President McKinley, in 1897, I had in my mind the wisdom of helping the experimental stations to strengthen themselves with regard to their scientists—I knew they were weak—and to help them with regard to their work in the several lines in which they ought to engage. And, looking the Department over, I discovered that the first thing necessary was well-equipped scientists, educated men, who could take hold of such work as the people in the various localities of the United States and various States and Territories needed to have done. To that end we have been encouraging young men of character and education, such as we could get at agricultural colleges preferably, to come to the Department and specialize. I brought it to the attention of the committee in those days, and got a word or two put in the law giving me authority to do it. It has turned out well.

We have brought into the Department altogether 496 young men, up to the time I wrote my last report, who have been studying any special line of work the people of our country want done. I am more

impressed than ever with the value of that work when I consider what other countries say to us. Last week the British ambassador came and asked me if I could give him a man to send to Bermuda. They are destroying their soil over there in the growing of onions, lily bulbs, etc. I had to tell him we had such men, but while we had been trying to educate up to our own necessities, we had not enough to really do our own work in the Department and throughout the several States in the country. The minister from Cuba came and preferred the same request, and I had to give him the same answer. They want a subtropical botanist.

We have such a man, but we need him in connection with our own work. The Secretary of War for nearly a year has wanted to find a first-class man trained particularly to go out to the Philippines and take charge of the work there under the Commission; but I have not been able to find a man that I wanted to recommend, and that can be spared, in the United States. The people in South Africa, in North Africa, and in Egypt, and throughout the world, you might say, are wanting men that we have been training. And some young fellows do go. Seven years ago, when this matter came under my attention, there were very serious losses in the Department of its strongest men. They were not getting as much pay as men of like intelligence were getting in other parts of the Government and in the States and other countries, and so we lost heavily of that class of men. Since that time there has been a little increase in their salaries.

We paid in those days some $1,600 and $1,800 for our very best pathologists. That was all we were paying, and it was an easy matter for other people to take them away from us. We have lifted that up several hundred dollars and we are holding our men better now. The Department was never as strong to do work as it is now. It does not make much difference what emergency comes to the Department, we are ready now to attack it at once. We are organized. The work done in the New England States in regard to the foot-and-mouth disease is an illustration; the work we must begin to do, and do at once, in South Dakota and Montana with regard to cattle scab, we are organized and ready to do and will do. It will take vigorous work for some time to clear out those States and prevent the diseases from spreading over the country.

As to this boll-weevil emergency that has come upon us, we are ready; we have the men. We have the men to put at the head of all the several movements along those lines to help the southern people to meet this emergency down there. We are equipped to do that kind of work, and I think I can congratulate the committee on that one result. We are paying them a little more money. We are not losing them as we did. They are encouraged to go on with their several lines of investigation.

In continuing for a moment with regard to our educational work, I want to call your attention to what we are doing in several States. It has been the theory of the Committee on Agriculture of the House that we should cooperate with the States, and we are doing a good deal of that; in fact, we are doing a great deal of it.

We are not only doing that, but we are helping institutions of education throughout the country. Seven years ago there was not a lecture delivered anywhere in the United States on meteorology. We have furnished the services of 14 gentlemen to lecture in universities

and colleges in the States along those lines, for the purpose of having, eventually, scholars in the land along those lines. There is only one thoroughly organized meteorological bureau in the world, and that is ours. We have jurisdiction over sufficient territory. We are telling the steamboats that start for Great Britain and the continent of Europe every morning what kind of weather they will likely have for the first three days of the voyage; and we are telling the ships that start from Europe to come here what they are likely to meet coming over; and no other country presumes anything of the kind. We are reaching out on the Pacific—that great ocean is to be an American lake sometime; it is to be our lake; we are going to dominate it.

We have just succeeded in establishing wireless telegraphy between San Francisco and the Farallone Islands successfully. As the committee knows, we have been pushing this along our own lines of investigation; taking out patents ourselves, and keeping the matter independent of the Marconi or any other system. It has certain limitations up to date, but we know as much as other people know about it. I gave instructions to Mr. Moore lately to bring those 14 gentlemen—they are observers in certain localities who incidentally lecture to these colleges and universities (Yale was the last institution that applied for one)—into a summer school in Washington and strengthen their lectures, so that when they go out to entertain classes they can do it with effect, to the end that some of those students in meteorology will find their way in here and enable us to do better work some day.

Along the line of soil physics, we are helping to establish that study in two institutions to begin with; one is in the State of New York, at the Cornell institution, and the other is in Kentucky, at Lexington. I have never had any mercy on institutions that take money from the Federal Government and do not use it for the purpose for which Congress appropriated it, and I have laid the lash unsparingly on any Cornell man I have ever met, no matter where or when. They were better endowed than any institution in the land and should be doing the best work of any institution in the land, yet never did anything. They have disgusted the State of New York to such an extent that, in despair, it had to go and establish an experimental station under its own auspices at Geneva.

But they heard from the people down here, and they now propose to establish a college of agriculture. We sent a man down to start them in soil physics. I inquired how he was getting along, and found that he got 75 students within a few days, and had to shut the door. That is all any one man can teach, and I think it is rather more. Now, we will let that man get those people well started along, and then will bring him back, or they will have to pay his salary. We are doing the same thing in Kentucky. They see the point of teaching something about the soil on which we walk and from which the producer draws the food that sustains the world. We are doing work along these lines in a good many places.

I think the Bureau of Plant Industry has cooperation with over forty State institutions. The result of all this will be that they will get their heads turned in the right direction; they will see the necessity of doing this kind of work; they will train up men along those lines. The day will come, I hope, when the Department of Agriculture will not be under the necessity of teaching as much as it teaches now. We are really a post-graduate institution for the agricultural colleges and

experimental stations and giving opportunity to men who could not complete their studies in any other direction; and, speaking on general principles (and I should withhold nothing from this committee), there is a little feeling that the Department is getting to have a good deal to say in the several States and Territories, and that it would probably be a little more agreeable to them if we would just turn the money over to them and not bother them with our opinions about things.

I think that that idea is growing a little here and there. There was a little of it seen last winter at the meeting of the agricultural experiment stations and colleges. Some one said there was no difficulty at all; but some of our scientists, in going to some of the States, had not taken their hats off or made due deference to the people of the agricultural colleges and experimental stations. Some of our young people may be often a little bit bumptious. I think I detect the fact that they recognize the valuable work that is being done by this Department here. The cooperation is quite cordial, however, and we are having cooperation in as many lines as possible, to the end, of course, that there will be better work done in all those institutions, by their own people, than they are doing now. We are trying to be helpful to all of them, and in a great many directions.

We are trying to encourage them to start in the teaching of things that must be taught to a young farmer if he is to become a strong man, with the view, of course, of withdrawing that kind of help as soon as we get them to take vigorous hold of the work. That is the object of our teaching cooperation in these several States that is going on at the present time.

With regard to our outside work, we have not done much of that. There is authority in the law to send men abroad and get information, etc., but we do not do very much of that. We do keep one man in London all the time in charge of our live stock, to look after them and see to it that they get fair play, and see to it that charges are not made of disease when disease does not exist, and so forth; and we are trying to reach out along this line and get information from the several nations of Europe with regard to their productions that come into competition in the markets of the world with our productions.

That line of work, however, we will gradually turn over to the new Department of Commerce and Labor; that belongs to them. You gentlemen will find in your document room, I think—at least, if you do not find them there, you will find them in our document room—some reports from Argentina. There is an interesting question before us now with regard to the supply of meat to the world's market. The Argentine people are our principal competitors, and I thought it wise to get facts regarding the development of their live-stock industries and their capacity to ship grass cattle across the Atlantic in either live or in chilled condition. And so we have something along that line. And still, speaking with regard to getting information from abroad, we expect to learn from the several countries, and from all of them as soon as possible, what their staple crops are. We receive that monthly from some of them now. Mr. Hyde went over to organize that work, and, unfortunately, the poor man took sick and has not returned yet. But he is succeeding along several of those lines.

Now, take up the bureaus one after another——

Mr. GRAFF. Right there, Mr. Secretary, I wanted to allude to the

cooperation of the experiment stations with the Department of Agriculture here. The sense of the committee last year was that since these were Federal funds that went to the experiment stations, they were in effect appropriations for the national work done by the Department of Agriculture; and they were very insistent that these appropriations to the different experiment stations should be under the supervision of the Department of Agriculture and under the supervision, therefore, of the Secretary of Agriculture.

Secretary WILSON. We are gradually reaching out our authority further and further every year along those lines.

Mr. GRAFF. It seems to me they ought to be sensible enough to see that that is the theory upon which they get this money.

Secretary WILSON. The primal theory under which they get this money, in their mind, is that it is given to the States.

Mr. GRAFF. That is not the way the committee regard it.

Secretary WILSON. I am aware what the mind of the committee is, and have been gradually extending our authority along those lines. That is, we are getting cooperation more and more from those people, and they are listening more and more to our suggestions and the arrangement of the disposition of the moneys that they get to handle.

Mr. GRAFF. The minute it would become generally understood that these State experiment stations consider themselves independent of the Department of Agriculture, that minute there would arise a move to discontinue these appropriations, on the theory that we have no particular right to contribute money to State institutions.

Secretary WILSON. That is precisely the theory they have—that the money has been given to them.

Mr. GRAFF. If they do not look out they will succeed in depriving themselves of this aid.

The CHAIRMAN. Most of the committee, I think, are familiar with section 3, chapter 314, of the laws of 1887, under which this money was given to the experiment stations, and to show the intent and purpose of Congress in giving this aid to the experiment stations, let me read the language:

> That in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigation of experiments.

Now mark this language:

> to indicate, from time to time, such lines of inquiry as to him shall seem important; and, in general, to furnish such advice and assistance as will best promote the purposes of this act.

There could not be anything plainer. The Secretary has absolute power to indicate from time to time such lines of inquiry as to him shall seem most important.

Mr. GRAFF. I think it is a good thing that this should go into the record, so that these stations may know.

Mr. HENRY. Has not Doctor True been devoting his efforts in that direction?

Secretary WILSON. We are working along that direction gradually. They had the idea that the money went to them as States?

The CHAIRMAN. And they could do as they pleased with it?

Secretary WILSON. That they could take up such experimentation as they pleased. That has been their idea.

Mr. BURLESON. As a matter of fact there should be the most cordial cooperation between the Department of Agriculture and the experiment station.

Mr. GRAFF. But the Agricultural Department ought to dominate.

Mr. BURLESON. Because it would result often in great saving. If they had a corps of scientists who are experts along certain lines and an investigation was ordered from here along that line it would be much more economical to employ their assistants than to employ new men.

Secretary WILSON. Yes; we have not just exactly gone the length of telling them what to do.

The CHAIRMAN. I think the greatest result that will come from cooperation, Mr. Secretary, will be the avoidance of duplication.

Secretary WILSON. That is one of the potent reasons why there should be an understanding as to what a station is going to do, so that no one station would duplicate the work of another that is being done along identically the same lines. But we think we are making progress along that line, and we think the stations are doing better and better work gradually.

I wish the colleges were doing as well. The colleges we have little to do with; they are doing better than they have been, but the disposition to educate lawyers and doctors and dentists and preachers and typewriters still prevails in the land a little more than it should. That money goes from Washington to these institutions to educate the farmer and mechanic—that is the intention of it—and because, as a general thing, there is no fee charged, people who want a cheap education are apt to sneak in and then start off in some other direction when they get through. But they take up the room and absorb the funds.

I remember being at Berkeley, Cal., when President McKinley was there last—I think that was three years ago now—and I saw a class of 150 graduate; but Berkeley gets $75,000 a year from Washington. There was not a farmer in the lot, not one. I made a good deal ado about it. I talked freely to the newspaper men; and I think they are beginning to do a little better out there. They did what you people in New York did. They appropriated $60,000 to begin a farm down at Santa Barbara—they lost hope of anything being done at Berkeley—and they are turning their attention toward something of this kind now, and progress is being made along those lines. With regard to cooperation, there is quite an important movement in the mountain States.

Those people would like to know, through experimentation in growing forage crops and in feeding, how to finish their stock for the market; and I would like very much to engage in a feeding experiment of that kind; would like to encourage them; would like to send a scientist there to discuss methods with them, and pay a little money to those that keep the records, so that we could get them for publication, and all that. It is a matter in which the whole mountain country is interested. They can grow things out there; and now, since we have taken hold, I have gotten grasses and grain and legumes for them from all parts of the world; and we are studying their condition with regard to production. This question becomes more and more pressing with them, and I think they are going to send a committee to see me and to see you gentlemen. I shall ask you to give them a hearing if they

come. It is a most important thing. Take, for example, the small horse of the mountain States out there.

He is first class, with splendid legs and great courage, but is not big enough for a cavalry horse, and if they have forage to carry on the growth of the colts the first and second winter and make them three or four hundredweight heavier, they might supply the armies of Europe with their mounts. The mountain States have not studied those questions sufficiently. We are getting crops for them that they never grew before; we are hunting the world all over to find them such things; and I can help them along those lines if you give us generous amounts in the Bureau of Animal Industry.

The CHAIRMAN. Would not that come under the Bureau of Plant Industry.

Secretary WILSON. The Bureau of Plant Industry is at work, you know, establishing the plants. The question now is the feeding in actual experimentations.

The CHAIRMAN. Those experiments ought to be made through the experiment stations.

Secretary WILSON. Surely; but they would like to have us cooperate with them.

The CHAIRMAN. It is the same cooperation you give the others?

Secretary WILSON. Yes; and I can help them through Doctor Salmon's bureau. We can do that.

There is another matter I want to call your attention to—I am speaking mostly to-day of the policy of the Department—if you notice, the American people have never produced a breed of animals, except they have transformed a running horse into a trotting horse; and they have produced a large hog. There may be a breed of chickens that we have established somewhere in the United States, but, if you think a moment, we import the heavy horse and the light horse for Florida, for Virginia, for Iowa, and Minnesota, and we keep them pure.

We import the heavy shorthorn and the little Jersey for the North and the South and for the East and the West, and take good care to keep them pure. We import sheep from the fine-wool Spanish Merino to the great big Leicester and keep them pure; and keep them in the North and keep them in the South. Those animals are the product of intelligent breeding from the localities from which they were produced. The shorthorn comes from the heavy soils and pastures of Great Britain; the Holstein comes from the soft grasses of Holland; the Jersey comes from the dry grasses and the scant grasses of the Channel Islands. So it is all along the line. Breeders have produced both animals that we keep pure. They have produced them for the surroundings of the localities in which they were produced.

We do not do anything of the kind. Now, the high-selling horse in the British market, they say, is the Irish hunter. An Englishman wants to follow the hounds and he will pay almost any price; he will pay £500 for a first-class hunter that will take the hedges and ditches as he comes to them. Where do they get them? When Professor Curtis, of the Iowa Agricultural College, was going to Europe for some purpose, I said to him, "I want you to find out for me while you are there how they breed the hunting horse over, or where they get him if they don't breed him; and where they get the big horse."

When he came back he informed me along these lines; a man goes to Chicago and he sees 10,000 horses pass through the market; he picks

out 30 or 40, buys them, and takes them over to Ireland. They are trained there and sold to the English gentlemen as Irish hunters. They are American horses, every one of them. Lipton, this man of whom you have heard so much, had a factory in Chicago, in which he worked up all the light, thin hogs, and sold them to the British for Irish bacon. We have lost the name both in regard to the hog and the horse. Now, our people don't know; I have not met a man in my lifetime who could tell me how to produce that hunting horse, or how to most economically produce the heavy, high-stepping carriage horse; and, going beyond that, how to produce the animal that is wanted for this locality or that—way down South, or way North, or way West, or way East.

Those pedigreed animals we import from foreign countries, from the produce of their pastures. Our pastures vary just as they vary abroad, but we have not set about the systematic breeding of domestic animals for use on our farms in the several localities of the United States. And I think it would be wise for the Department of Agriculture to cooperate with a little at three or four experiment stations along those lines; set out and see if we can not produce the horse the European hunters want. We can produce a horse cheaper here than they can anywhere else in the world, because we have the cheapest grain and the cheapest grass and the most intelligence in our people. Our people are about all horsemen.

But it has not occurred to any of our people who have plenty of means to experiment along those lines so that they can tell us how to breed those horses. I confess I have some idea of how to produce the several breeds, but I do not know enough about it so as to authoritatively speak to the American people and tell them how they should produce a hunter. We have got blood down in the South, and splendid horsemen——

Mr. LAMB. Do you not find the finest hunting horse almost in the world in Virginia now?

Secretary WILSON. You find the foundation for them, without question. But you must have the hunting horse that will take the ditch with ease. He must have good blood, but when he carries that 16-stone Englishman on his back he must have more strength and size than a thoroughbred horse has got, and the question is where to bring in and how much to bring in, with the colt blood, to get size and strength.

Mr. LAMB. I would like to show you some of them down there.

Secretary WILSON. Probably we can find a few; a man can go South and buy one; if he wanted a thousand I do not know where he would find them.

Mr. LAMB. The trouble is there; they raise them for their own use.

Secretary WILSON. We get some of them in the North. I would like to be empowered by the committee by sufficient appropriation to the Bureau of Animal Industry to begin a series of experimentations along that line, both with regard to horses, cattle, and sheep; I think we have solved the hog question pretty well.

The CHAIRMAN. You are doing some of that work at the Iowa station?

Secretary WILSON. A little of it, along the sheep lines; and we will have opinions in regard to the most profitable sheep.

The CHAIRMAN. You are doing some of it along cattle lines, too?

Secretary WILSON. The college is doing that itself. We are not helping them any in the cattle line.

The CHAIRMAN. They are doing it; I do not know whether you are helping them or not.

Secretary WILSON. Yes; the Chicago live-stock people are helping them do something along cattle lines; that is true. But the horse has not been touched.

Mr. BURLESON. As a matter of fact, the horses used in the East and North for polo ponies are bred in Texas.

Secretary WILSON. That is the kind of horse that is wanted, and he is a high-selling horse.

The CHAIRMAN. He is too small for anything except polo; he is too small for a cavalry horse.

Secretary WILSON. But, mind you, the proper wintering of the colt the first and second winters would put the weight on him. He has got the feet and legs and courage now; he has all those.

Now, then, we come to plant industry. I suppose you have had detailed information with regard to our sugar work. I went out and spent a week with the Michigan people, and talked in their barns and sheds with them and found out where the sticking place is. Some years ago we grew 29,000 tons of sugar. This year we will have something like 260,000 tons of beet sugar. Michigan, for example, is growing all the sugar she needs for herself. That has been accomplished there. I find a difficulty exists with regard to raising enough of tons to the acre.

I went out there to study facts and ascertained exactly where the sticking place was. We can beat the Europeans; we can beat the cane-sugar people because the by-product of sugar beet feeds domestic animals. But they do not know how to raise tonnage. Of course we will meet that in our annual report; will have a chapter covering that particular thing. Last week we went particularly into the consumption of pulp, and now they are drying the pulp, making a merchantable commodity and sending it all over the world.

The CHAIRMAN. Is that worth being done under a special appropriation for sugar or under the Bureau of Plant Industry?

Secretary WILSON. For investigation with regard to what the sugar factories are doing for the last seven years we have had an appropriation of $5,000.

The CHAIRMAN. This work is being done under that?

Secretary WILSON. Yes, under that particular one. Singularly enough, when you have built up a bureau to do a certain thing, you come to the place where that line of work done by that bureau does not meet the requirements; and I will give you an illustration right now. We went into the Connecticut valley with some Sumatra tobacco seed and showed the people there how to grow that wrapper tobacco. We found the proper soil there. There has not been any difficulty in getting the thing set well on its feet, but a peculiar condition of affairs now presents itself. The seed comes from Sumatra, but the people in Sumatra who grow that seed do not know anything about the plant; and we find we have three or four or five kinds of tobacco.

The Bureau of Soils has done its work there; we must send men up there from the Bureau of Plant Industry to make a selection of plants that produce the highest selling tobacco, and preserve the seed from

then, and exclude the others. Now, an interesting fact comes to my attention with regard to our work in the Southern States.

Mr. HENRY. Right there; the Connecticut experimental station, under Doctor Jenkins's supervision, has been conducting experiments during the last year right along in that direction and he has made some——

Secretary WILSON. We kept a man under Galloway's supervision there last summer, and we will keep him there next summer, and we will probably settle it.

I sent two scientists to Cuba. I said to them, "Go and find out where they grow that fine aromatic tobacco; study the conditions under which they do it; ascertain the intelligence they bring to bear on that matter; bring back some of the soil with you, and find out what per cent of the leaf they get is first-rate aromatic leaf." They did. We analyzed the soil, and the problem was to find that soil somewhere under the American flag. They found it in South Carolina, Alabama, and Texas. We have been growing that fine tobacco, and we find now, say, 30 per cent of that fine aromatic leaf growing there from seed brought from Cuba. Probably there will be 40 or 50 per cent of it when the ripening process is completed that is not the kind of tobacco we want; and, harking back to Cuba, we find they do not get more than 40 or 50 per cent of aromatic tobacco in the Veult Abajo District, which is famous throughout the world.

The question comes as to what is the matter with the Cuban. He don't know anything about the plant. He plants a tobacco plant; it grows up and he cuts it off and makes tobacco out of that. It grows up again; he cuts it off again and makes tobacco out of it. That is the second crop. It grows up again, and he saves the weakly suckers for seed, and it is injuring his plant. They have no plant physiologists. The Cuban minister and Cuban people know that. Minister Queseda has been to see me, to get a man to go down and superintend that kind of work for them. I think we are far advanced in this, but not quite far enough to do that yet.

Now then, Mr. Chairman, the soil men have done their part in producing that fine aromatic filler tobacco that makes the Havana cigar. I must turn to Mr. Galloway now, and bring in that Bureau, and have them take hold of these tobaccos that are growing now in these three southern states, tag the plants and save the seed from them, and get rid of that 50 per cent of tobacco, which is really good tobacco, but not the finest; and eventually we will have a uniform crop, not only of Sumatra, but also of the fine Cuban leaf. This is an illustration of the unity of the Department of Agriculture. We have not anything there that we do not need.

The time comes when one bureau has to help another, and that is where a Secretary is required to be not only as harmless as a dove, but as wise as a serpent, sometimes, in order to get that beautiful, fraternal harmony that might not voluntarily come if he did not happen to be around sometimes. We have a very harmonious Department, however, and things are going along, but it comes to the time when one bureau chief who has 200 men under him finds there is work to do that he can not do—somebody else must take hold and do it.

Mr. SCOTT. Mr. Secretary, reverting a moment to the beet-sugar question, I would like to inquire whether the industry has advanced

during the past year in the same ratio in which it was growing formerly, or whether there has been the check that was anticipated?

Secretary WILSON. There was a little check, but it increased probably this last year 40,000 tons. It has a healthy growth now. You can see the value of the Department work there.

There is a strip of country along the Gulf coast 50 miles wide and 700 miles long. Seven years ago we produced 25 per cent of our rice, now we are producing the equivalent of all the rice we consume. We do import some varieties, because the Chinaman is a queer proposition; he will not eat any rice but the kind that grows in the neighborhood of where he was born. The California Chinaman, heretofore, would not eat American rice, and imported it; but we found that out, and they will eat American rice unbeknown to themselves some of these days. That is becoming an enormous industry down there.

We found a queer condition of affairs in New Orleans. One set of men were swearing at the Cuban bill for its possible injury to the Cuban crop, and another set were going to send a committee to Washington to insist on its passage in order to give them a market for their rice. So we have a big income now. We are saving a heap of money to the United States along rice lines. The rice work is substantially finished. If they want help there, as they will by and by when an insect will get there, we will have to send an entomologist or, if a plant disease, we will have to send a plant pathologist. But the work is finished there and out of the way.

Searching the world for crops necessary and desirable for the several localities in the United States has resulted in finding many things that grow in localities where nothing grew before. There were 10,000 bushels of macaroni wheat grown this year. I was out in that Utah Valley this summer. I learned there they had planted this Durham wheat—hard wheat. It grows in northern Algeria and in northern Russia on the Volga in 10 inches of rainfall, and it was grown in the Utah Valley on stretches that could not be irrigated, and they got as high as 9 bushels to the acre. The legislature of Utah appropriated as high as $30,000 to take not only that wheat but other things we are introducing there and get them started all over the State of Utah for the benefit of the people. They put $30,000 in it at once.

Mr. HENRY. Has there been any difficulty in finding a market for that macaroni wheat?

Secretary WILSON. There was a difficulty with the millers. Twenty-five or thirty years ago, when we got the first hard wheats from Russia into the Northwest, the millers objected because the mills would not grind them without remodeling. However, they finally remodeled the mills. Now those wheats are the most popular wheats and they do not want to get anything else.

Mr. HENRY. Are the macaroni wheats bringing the price——

Secretary WILSON. They are intrinsically worth the price; and if for the time they do not happen in the various localities to get what it is worth it will be only a short time until they will get it, because there is more muscle-forming material in the macaroni wheat than in the bread wheats, and the bread they get is more sweet and nutritious. Next year it will go on the desert from western Texas to Arizona and North Dakota, and it will continue its way westward. There is scarcely any part of the desert but that has 10 inches of rainfall.

Mr. HENRY. Have we been able to export that wheat to Italy?

Secretary WILSON. When we began to hunt a market for it I went to Secretary Hay and had him telegraph to every American representative abroad to find markets for it. They are finding markets. We are exporting it. We do not hesitate a moment when anything of that kind can be done to help the American farmer. I assure you of that.

Mr. GRAFF. What is the average crop of it?

Secretary WILSON. The average crop of wheat that is grown in the United States, of the bread variety, runs from 13 to 15 bushels. The average crop of this would be twice that.

Mr. HAUGEN. Does it make as good flour?

Secretary WILSON. Better flour. There is more muscle-forming material in it—more protein. The development of it has been fast; a year ago there were 2,000,000 bushels of it; this year there will probably be 10,000,000 bushels; next year there will probably be 25,000,000 bushels; two years more there will probably be 100,000,000 bushels of it grown—where nothing grew before.

Mr. HENRY. And where the ordinary variety of wheat could not be grown?

Secretary WILSON. Where nothing else would grow. Those people who live in northern Russia, on the Volga, and have been there for hundreds of years, and those people who have lived in northern Algeria for centuries, have found out what that wheat would do, and we are stepping in and reaping the result of their investigation; that is all. And not only with wheat, but with oats.

Mr. BROOKS. Macaroni wheat is pretty generally known through that semiarid region, is it not?

Secretary WILSON. Yes, they know all about it.

Mr. GRAFF. How long ago did you first take it up?

Secretary WILSON. When I first came to the Department. We are not only sending wheat, but oats; and we are sending grasses, etc. Then we go into other fields. In some localities in the United States they require something that we can not find anywhere else in the world. We go and create varieties. I can illustrate that by work that we have done for Florida. I presume Doctor Galloway told you about it. They lost their whole crop by frost four or five years ago. We will find a variety of tree that will stand that frost. We got a Japanese orange of the genus trefoliata.

We are waiting now for some results. We have got some new varieties now that are planted, but none of them are sweet enough. We may have to put a bigger per cent of the Florida orange into the hybrid than we want, but, if we get just one orange sweet enough, we will extend that all over the State of Florida.

The CHAIRMAN. Will the seed from that orange be prepotent?

Secretary WILSON. If it has the seed.

The CHAIRMAN. In half-breed animals there is sometimes a lack of prepotency. What has been your experience in that line in regard to seed?

Secretary WILSON. If they have a few seed we could carry them on, but we might have to graft them or bud them, you know. We are never positive about the truth of a plant that comes from a seed of that kind, because they have to be pollenized, and you are never sure as to where the pollen comes from. If we get one of them we will

extend that one, as they did with the navel orange in California. All the navel oranges in California came from the one tree that we have up here in the Agricultural Department garden now.

We are having some success in hybridizing those grains, grasses, and legumes, for several localities. This leguminous question is a mighty interesting one. The only way we know that nitrogen comes out of the atmosphere is by the operation on the root of leguminous plants of little colonies of bacteria.

We know the nitrate beds of the world are limited. Suppose we get into a war, where are we going to get nitrates? This question of leguminous plants is a mighty interesting one. Away back in other periods of the world's history the great nitrate beds were formed down there in South America—the only ones the world knows of up to this time. We could not get along without the leguminous plant in our systems of agriculture. We can keep up the soil in the North by growing clover; the South is doing a good deal toward it by use of the cowpea, and they are beginning to learn, both North and South, of the great value of alfalfa. It is the most valuable and economic plant of which we have any knowledge.

We are encouraging the growth of that. We have a very interesting question now with regard to all parts of the United States, as far as the growth of forage plants is concerned. We have very much to learn everywhere along those lines. We are trying to make ourselves useful. I had a talk with Mr. Spillman, our specialist, along that line this morning, and I gave him instruction looking toward the preparation of a bulletin on forage plants for the East, for the Northwest, for the South, and for the Pacific coast, because successful agriculture depends on forage plants, if you grow cultivated crops at all. Where a man can pasture all the time, the land keeps up—that is, most lands do; but where you cultivate, the very moment you plough land you have begun the process of destruction in that soil, and the more you cultivate that land without filling the soil up again with organic matter that comes from the roots of plants the more valueless you are making that soil every year.

That has gone on in parts of the United States to an alarming extent; and one of the things we will do now in the Southern States in the boll-weevil investigation will be to provide object lessons all over those States with regard to the building up of the soil again through reintroduction of the organic matter that has been oxidized and burnt out by continual cultivation for a century.

With regard to forestry investigation, you find a pretty heavy estimate there. We have chopped down our woods, Mr. Chairman; there are but few left. Our great woods will be gone before we can reproduce them. We have been at work trying to build up a bureau of forestry consisting of young gentlemen of education and character.

And, incidentally, I might make that remark with regard to the personnel of this Department all along the line. We are getting young men of education and character. We are insisting in most cases of those experts that they be college graduates, and we have a large number of them now studying forestry. If you take up this question of furnishing moisture to growing plants—and plants will not grow without it—you come to the original proposition that the forest was the great reserve for water—the great reservoir. Our work along forestry lines is to restore the hills to conditions to admit the moisture

and hold it. You have appropriated extensively to build dams to hold water, but our proposition antedates the dam.

The mountain should hold the water. If you take the woods away from the mountain the water never gets into it and the capacity of the mountain to hold water is destroyed—you can not get the water in there. If you have woods over a mountain they admit the water; the ferns, the mosses, etc., hold the rains until they percolate into the hills, and then they keep coming all the summer in rills and springs, and so forth, and you can get the use of them. Now, we are studying these matters all along the line. We are studying the forest reserve—some seventy millions of acres. There is a proposition pending, I believe, in Congress in regard to the question of turning the scientific study of those reserves over to my Department. I do not meddle with legislation. You never found me here lobbying.

But there are no scientific foresters in the Interior Department. They do not pretend to be. It is an awkward thing to carry on the scientific study of forests that are altogether under the jurisdiction of another department. However, we do the best that can be done. The Secretary of the Interior and I agree that the Department of Agriculture would more economically and effectively study the problems if we controlled the whole situation. But that is a matter for you to determine.

Mr. BOWIE. You would recommend, Mr. Secretary, that the forestry department in the Department of the Interior be transferred, and that also is recommended by the Secretary of the Interior?

Secretary WILSON. Yes; that ought to be done; it will be done some day, without question.

Mr. BROOKS. Would there be economy if they were consolidated?

Secretary WILSON. Yes; there would be economy.

The CHAIRMAN. There is some gentleman in the House opposing that bill on the ground that there would be a larger expenditure. I wish you would say something for the record here that I may quote to Mr. Cannon and Mr. Hemenway.

Secretary WILSON. There is certain work to do in the study of forestry. There are 500 rangers taking care of those forests. We have nothing to do with them. We do not grasp at added authority for our Department but, if we are studying, through these 200 educated foresters in our Department, those forest reserves, we can tell how many men we need and how many we can dispense with, and the character of the men we should have, much better than some other department that is not studying our problems at all.

Mr. BOWIE. And has not the scientific experts that you have?

Secretary WILSON. And does not pretend to have the scientific experts that we have.

Mr. BROOKS. Might not a part of the work which the Interior Department rangers are now doing be done by the same men who are carrying on the scientific investigations in your Department?

Secretary WILSON. There will be a great saving in supervision; there is no question about that. This only comes up incidentally; I am not lobbying here for that.

The CHAIRMAN. If I may say, I think the bill is going to pass, without doubt; and the little opposition left is on the ground only that it will materially increase the expense of the management of these forest reserves.

Secretary WILSON. It will lessen it very materially. It will add to our agricultural work. It will be for this committee to determine, when you consider the added officials that would come over to the Department of Agriculture in that transfer, where these economies would come in, and you could readily see it.

Mr. BOWIE. Would it disturb your line of thought for me to ask you, in this connection, what particular additional work is desired that will call for an extra $100,000 of appropriation for the Bureau of Forestry? It is $350,000 now, and it is proposed to raise it to $450,000.

Secretary WILSON. Every week or so there are additions made to the forest reserves of the country. There are 70,000,000 of acres now, or such a matter, and——

Mr. BOWIE. The extent is increasing?

Secretary WILSON. The problems of that forestry investigation are growing. We are studying the harvesting of woods, we are studying the planting of woods, we are studying the strength of wood, we are studying the enemies of wood—all along those lines. We have hardly got to the point where the work is quite complete in its magnitude.

Mr. BOWIE. You think the continued efficiency depends on an increased appropriation, to some extent?

Secretary WILSON. I tell you what I do when I go to make estimates. I send for each man who is to spend the money and talk the matter all over with him. For a good many of those bureaus that have been created in the last six or seven years, we are not asking heavy increases. This is the heaviest one, because our forests are almost gone, gentlemen.

The CHAIRMAN. It is a new subject in the United States.

Secretary WILSON. It is a new thing. We can see the end out there, and I have thought it wise in that case to recommend to you this heavy appropriation for this year in order to enable us to do enough of work along those lines. Private corporations come to us and pay all the expenses of our men if we will only give them working plans. West Point Academy came to us the other day; they did not know what to do with their woods. We sent a man there to show them working plans. Private individuals, corporations, who own thousands of acres, come to us and say, "We will pay all the expenses now if you will only tell us what to do;" and we send scientists and tell them what to do. The question of rehabilitating the United States with trees and what kind of trees in the several localities are the great questions, gentlemen. Of course, if there should be no additional appropriation we would go on with the force we have and do the best we could.

Mr. BROOKS. If there were no increase, the number of men you have now would have to be spread over a wider area, would there not?

Secretary WILSON. Yes; and the area of the United States is growing steadily.

Mr. BROOKS. In one State I know of they are now contemplating adding nine forest reserves—more than double what we now have.

Secretary WILSON. They make forest reserves and call on the Department to see where we advise bringing them in.

Mr. RODEY. I am glad of that, because in our section they have been taking in all the pasture land we have got.

Secretary WILSON. I think there should be animals pasturing in the

forests; it should be regulated; the trees should not be eaten by animals, and quite often, if you pasture a forest, you will prevent a fire. It requires intelligent supervision and control. I would have people living in the forests, sufficient to get workmen——

Mr. RODEY. On the contrary, they drive the people who are there out; give them script and on that account take a great deal of value out of the country.

Secretary WILSON. I think there are probably two sides of that question. They are pretty sharp fellows who live out in that country. They are not so far behind but that they will catch up.

A word with regard to chemistry——

Mr. RODEY. I would like to put in the record there, because I have to write a good deal about it to the President and the Secretary, that we think down in our country the forest reserves are created without proper investigation before they are created—they are done in a night without notice to the people, and the first thing you know you are surrounded with forest reserves. If they were created carefully and properly there would be no objection anywhere.

Secretary WILSON. There has to be a forest reserve in your Territory or your Territory will not amount to a row of pins after the forests are all out.

Mr. RODEY. We do not object to that, but we do not like to have the pasture lands in forest reserves——

Secretary WILSON. I think the Government intends to do wise things and kindly things by our Western people.

Mr. RODEY. I believe in a general way that is the idea, of course.

Secretary WILSON. Referring to chemistry—we got authority last year to look into the importations of foods that might be misbranded or might be poisoned, and we have really sent back a great deal of stuff that had acids in it that were deleterious to the health of our people. It is working smoothly. The merchants generally say they were not aware of the condition. I think that is true. I do not think the American merchant, as a general proposition, wants to poison his customers, and I think we will do a great deal less of it by and by.

We have done work along sirup lines. The people along the Gulf Coast have been producing one hundred and sixty-five millions of gallons of cane sirup every year, and they have been at work for nearly a century, and they needed help along the lines of a uniform color, the prevention of sugaring, and the prevention of souring; and we are at work to show them how to do that, and we are succeeding. We are showing them how to cultivate and get better results, and that money given has, I think, been expended with discretion. We will solve that thing in a few years, so it will not be necessary to continue.

The CHAIRMAN. Doctor Wiley told us that two or three of the problems were already solved; that the main question now was the uniformity of color.

Secretary WILSON. Yes; the trouble has been, if you ordered a dozen barrels of sirup from one of those good people down there they were colored differently and look differently and the consistency was different; some of it might solve and some of it might not. I think it is the finest sirup in the world which those people make.

Now, with regard to the Soils Division. I suppose you have had Mr. Whitney here. They are in great demand. The people are calling upon us to give them information regarding the different kinds

of soils in the different States in the Union. I think we were in 34 States last year. They are pushing matters with a good deal of vigor, and certainly to the satisfaction of the people in that Bureau. The tobacco work of that department I have said something about incidentally. It is succeeding.

I spent a while in Tennessee, myself, looking into the tobacco conditions there, other than Sumatra and Habana tobacco, and I found the people needed help down in that country with those tobaccos, and we are beginning object lessons to help people out along those lines. They have been reducing the fertility of the soil by improper methods of cultivation, and are not getting as good tobacco or as good yields of it as they did in an earlier day. And we are going to help them out of that difficulty.

In regard to statistics. You have heard a great deal about leaks in our statistical work—charges made by people who probably may have happened to be on the wrong side of the market. I am going to do this next spring when we begin—in the course of two or three months we will begin our monthly reports again—I shall invite the chairman to appoint a committee to come down and look at our work; see how it is done, and know all about it.

A hundred thousand dollars to-day, wisely and judiciously expended, will procure for a private firm accurate information with regard to every crop in America—pretty accurate information—but the private person does not publish that. He keeps that to himself; he paid his money for it and it is his.

Mr. BURLESON. He probably publishes some other information in order that he may profit by it.

Secretary WILSON. Surely. My idea in regard to the intention of Congress is that we shall get an accurate condition of each crop and tell everybody at the same hour. Take cotton, for illustration. In the last two or three years we have come very close to it. How we shall come out next year I do not know, but I am tolerably well satisfied we have not put it far out of the way. And it will be a satisfaction to us if a subcommittee of this committee would know exactly how we do our work, and we would be ready for any suggestions you might make. We think it is about an impossibility for any leaking to take place at the present time.

Mr. BURLESON. As a matter of fact, have you not invited these gentlemen in the cities to point out if there were any defects?

Secretary WILSON. I went further than that. I told men of the Cotton Exchange in New York to send a particular man and I would appoint him in that very Bureau and let him learn the whole business. They sent us a man, and I appointed him; but he had not the capacity to comprehend it. It is no small matter. This is the most carefully thought out statistical work that is done anywhere. There are 250,000 people reporting to us—a large volume of intelligent gentlemen that get no pay and feel proud of the fact that they work for the Governmen without pay; and I would not have them paid, for fear they would have competition for the small pittance we might give them, from fellows that would want to be on that job for the money there was in it.

Mr. HAUGEN. It was stated by your statistician that the reports sent in by your local men were not altogether reliable.

Mr. BOWIE. I think the gentleman misunderstood him.

Secretary WILSON. He might have said something to the effect that

we have seven or eight sources of getting cotton reports. If you go to one class of men they may lean a little one way from what a different class of men would lean. We get reports from those classes year after year, and when we come to make up our estimate for a given year we look over all the reports of all those people and find where the conservative estimates come from and where the sanguine estimates come from, and give weight accordingly.

Mr. HAUGEN. I would state to Mr. Bowie that this did not have reference to the reports on cotton; it had reference to the wheat crop in Kansas, or some other western State. He said the local reporters had not discovered the fact that the plantings had been changed from spring to fall wheat.

Mr. BURLESON. With reference to the acreage.

Mr. BOWIE. I misunderstand your remark to the Secretary; but what I really understood the gentleman to state was that there was a remarkable degree of accuracy, but that oftentimes the information that was given out periodically by these regular reporters was not always accurate because of changed conditions by reason of a severe drought or a severe frost, or something of that sort, rendering it necessary to get special reports; that these special reports, of course, sometimes on account of those conditions, make it necessary to modify the others. But he testified to the remarkable accuracy in the main of the reports.

Secretary WILSON. Yes; but as I stated, if you go to a certain class of people you will get a more conservative report on any given crop than you will from some other class; but if you have this every year you will by and by find which bridge carried you over. Next May we will know all about the movement, and know what the commercial crop was, and by looking back through several sources of information find out which was——

Mr. BOWIE. Which was sanguine?

Secretary WILSON. Precisely. Any of you gentlemen are welcome to come down on the day we get our reports out, and we will let you in and lock the door and you will see every step that is taken until it is finished and then we will let you out.

A word with regard to irrigation. A movement has been taken by Congress in regard to damming up the waters in the uplands for the purpose of using it where there is not enough of rainfall. I sent a man to Europe last summer to look over the irrigation systems where they have rainfall, and pretty heavy rainfall. The people of Italy dam up their mountain streams and hold the water until dry times come and then use the water; and by that means they have maximum crops every year. The use of water is a question that is new; irrigation is not new. People in bygone centuries used it extensively; but there is nothing on record to show us they understood the effect of a given amount of water on a given crop. We have found, as far as we have gone, they use far too much water for the benefit of the crop, and we propose to study the use of water, and its use with regard to the several crops.

You want a crop of oats, for example, and 500 pounds of water must go through the plant, if I remember correctly, to produce 1 pound of dry matter. If you put in 1,000 pounds of water you are wasting half of it. If you want a crop of wheat, less will do. Much depends on the soil. We will study the soil also of those countries.

I am well satisfied the day is coming when the people of the mountain countries of the United States will build tens of thousands of dams and hold up these waters that are now going away in spring freshets. They will either do it through State expenditure or private effort, and hold up those waters in order to put them on lands when the dry time comes. The difference quite often between a maximum and a minimum crop is getting water at the right time.

I was astonished this year, in looking over the sugar crop of Louisiana and Texas, that it is a light crop because of drouth, and there is the great Mississippi River, 90 feet deep, lying 40 or 50 feet above the level of the country. If they had only tapped that river and brought the water out they would have had a maximum crop. They will do that some day. We have plenty of rainfall in the country to give us much better crops than we are getting now. One of the lessons the Department of Agriculture is trying to teach to every one, and it is one of the most necessary, is the conservation of moisture in the soil and the proper methods of cultivation by which moisture is taken care of. I stopped off in Nebraska last summer and spent one day in a new locality where they had built dams and were growing beets.

I went into the field and tried to pull up a beet, but could not—the ground was all solid around it. The superintendent of the beet factory was there, a man who had devoted his whole life to that business. I said to him, "When did you cultivate that field?" He said, "We have not cultivated it since we irrigated it." I said, "You irrigated it and didn't cultivate it, and now you have gotten the field the same as brick. Did not your beets stop growing just then?" "Yes; they stopped growing just then." I said, "If you had not wet it at all and had kept your cultivator going you would have had a much better beet crop, and that water might have gone somewhere else." That is one of the most interesting problems in America to-day. The people of the United States who grow sugar beets are growing 9.6 tons to the acre.

If they will increase the tonnage up to 15 tons to an acre, you can repeal your protective-tariff laws; the sugar-beet men will not need them. But that one thing has to be impressed all over the United States, and you would think it so simple a proposition that any farmer would understand it; and yet very few farmers do understand it—the conservation of moisture in the soil by cultivation and the necessity for adding moisture to the soil in irrigation countries. That problem we are studying. It is one that is going to be of very great practical value, not only to the people who irrigate, but to the people who live in the rainfall countries and depend on the rain as it comes to the soil.

We have not made, Mr. Chairman, estimates for much increase along salary lines; not much this year. There have been a few that we thought wise to make. The man who writes the weekly report of the Weather Bureau, Mr. Berry, is doing a pretty high class of work. I wish you would look into it and remember him. I think Mr. Moore has only three or four. I wish you would give it careful consideration. Mr. Berry, I think, deserves a little more than he is getting. That weekly report is a valuable report. He writes it with ability, and he is getting a small salary. I think I have kept you long enough and have said all I care to. If you think of any questions to ask about the general policy of the Department, I would be glad to discuss them.

Mr. BURLESON. I would like to divert your attention to the fact,

Mr. Secretary, of this appropriation with reference to the amount of money to be expended for boll-weevil investigation. Do you think there will be any necessity for more money before that appropiation has lapsed?

Secretary WILSON. When will it lapse?

Mr. BURLESON. In July, 1905; a year from next July.

Secretary WILSON. I think not. I think that ought to be enough money. If there should be any necessity for more, we will tell you a year from now; but I think there will be enough there to do anything we are able to do. But we are going to do it at once. I will send a man down there to work at once along those lines, to do everything that can be done to help the people out of that emergency.

Mr. RODEY. Is there anything being done to find uses for plants that grow in the West, and all over the nation, that are now practically wild?

Secretary WILSON. We train the wild plants and obtain uses for those that exist in large quantities. We are making a careful study of the poisonous plants and the medicinal plants.

Mr. RODEY. It came out here the other day that there were a few cactuses down in Texas and Arizona for which some use is being found. What has been done along that line?

Secretary WILSON. You can make very valuable fiber from most of those kinds; nearly all of them have a valuable fiber.

Mr. RODEY. They said something about cattle feeding.

Secretary WILSON. Well, that has been considered. There have not been many cattle fed, I think, along that line. But this is being done: We are hunting the desert countries in other lands where they grow things they might introduce down there. I think they have found a cactus without spines on it, and we are cultivating and introducing a sagebush from Australia that the cattle winter on in that country. Yes; we are studying those propositions.

Mr. BOWIE. Mr. Secretary, I want to ask you one question. It has been claimed that the experts of the Department of Agriculture are so enthusiastic that they are really ahead of the needs of the country. I would like to know whether, if all of their suggestions were adopted, we would not have such a superfluity of crops it would rather react by reason of overproduction? I would like to know if it is not true that it is necessary for the Department of Agriculture, or the experts of the Department, to keep ahead of the country in order to keep the country from getting behind the growing demand of the world?

Secretary WILSON. If we do not keep ahead and think out these things for the people it would never be done. This country has run for a century without any of this kind of work being done; and if there had been a Department of Agriculture a century ago, with as many educated men as we have now, the United States would have been a much more powerful and wealthy country to-day. I do not think we are quite up with the necessities of the times.

Mr. BOWIE. You do not think the agricultural production of the United States is equal to the demands upon it from the world?

Secretary WILSON. Now, in regard to the industries of the United States, we have been growing as a manufacturing country because the farmer furnished cheap food for the workingman, and we have been prospering as a nation because within the last fourteen years some three billion and nine hundred millions of dollars balance of trade

have been put to the credit of the United States by the farmer after paying the adverse balance against the United States on account of other trade.

Mr. LAMB. Mr. Secretary, you saw what Mr. Chamberlain said about that a day or two ago. We have been building up our manufactures.

Secretary WILSON. Manufactures are growing in the United States, and the farmer wants to have them grow in order to furnish a market for his products; and the American farmer always has the manufacturer in mind. At the same time, the manufacturer has not come to the place where he can sell enough to equal the manufactures we buy. We buy more than we sell, and the farmer makes up the difference and puts some three or four or five millions of dollars to the credit of the country every year in addition. The work of this committee—the work of this Department—is what is helping to do it. I want to see every mortal thing that is produced or can be produced on American soil produced here—that we want to use. We have been paying a hundred million dollars a year, and more every year, for the winds and waters that blow and flow over the country, that are changed by foreigners into sugar.

Why should we pay that $100,000,000? Have we not got winds and waters enough at home? Why should we not do that? We sell every year, on an average, $850,000,000 worth from our fields; but we buy from foreign fields something like half that amount all the time. Well, now, of that half, part of it can be grown in the United States—say the half of that half. A fourth of all we import can be grown in the United States. I am speaking of things in the fields—sugar and a great many other things that we are buying; those things can be produced here, and it is the aim of this committee, I hope, and of this Department of Agriculture, I know, to encourage the production of all those things we are paying that $200,000,000 for. Now, the $200,000,000 worth that we can not produce in the United States, such as coffee, and rubber, and spices, and things of that kind, can be produced in these new island groups of ours.

Mr. LAMB. People can not sell everything and buy nothing, though, can they? Of course I do not wish to get into an economic discussion.

Secretary WILSON. We own the territory and we can produce everything we want under the American flag. Of course our ladies want to buy feathers, and diamonds, and laces, and all that, from foreign countries, but there is no reason why these things should not be made here some day.

The CHAIRMAN. Including diamonds, I suppose?

Secretary WILSON. Including diamonds.

Mr. SCOTT. I would like you to say a word or two about the work of the Biological Survey. I think some of us got the impression from the hearings we have had hitherto that the work of that Survey, in so far as it did any good at all, was better done by the Bureau of Soils and other bureaus. I would like to have your opinion on that.

Secretary WILSON. The division in our Department that comes nearest to being purely scientific is that very one.

The CHAIRMAN. It has the least commercial touch?

Secretary WILSON. The least commercial touch to it. And yet the scientific facts brought out by that division have a value. They are studying the meridians, say, along which they find certain plants

growing, the conditions under which they find them, beginning at the South and running way up to the North.

At certain elevations they find certain plants, certain birds, and certain animals, flora, and fauna, and where they find the one they know they are apt to find the same thing under the same conditions farther north or farther south. They study the bird to ascertain which one is injurious to the farmer and which one is beneficial. They study the animal for the same purpose. They are, I think, men who have a value of their own. I would not like to see them turned loose from the Department. They have brought to our attention some plants, etc., that can be made valuable. There is no scientific division in the Department to whom we would more readily turn for exact technical information with regard to plants and animals than we would to Doctor Merriams division.

Mr. SCOTT. I can readily understand, of course, the value of their work in the matter of determining what birds and animals are helpful or hurtful to fruit and crops of various kinds; but it rather occurred to me that they were not spending money wisely in mapping the country as to the arrangement of various crops. The gentleman who appeared before us stated he might find one soil in Florida and might find precisely similar soil in Montana; and the function of his Bureau was to teach the Montana farmer that he can not grow on his soil what would grow in Florida, although the soil was precisely similar. The Montana farmer would probably know that.

Secretary WILSON. You notice they have in charge the execution of the game laws.

Mr. SCOTT. That is all right; we have no criticism to make on that, but whatever money they spend in this other matter—speaking for myself; I do not assume to speak for the committee; whatever money they spend in this other direction seems disadvantageously spent as far as the results obtained are concerned.

The CHAIRMAN. The result they get at too slowly?

Secretary WILSON. There is probably less money value in their report at the end of the year than there is in other bureaus, but at the same time they do study effectively some of those propositions; and I think it would be wise to continue the work along those lines.

By the by, there is one thing I had pretty nearly forgotten; I hope you will make bureaus of these scientific divisions that have not been bureauized.

The CHAIRMAN. How much better results are you getting from the Statistical Division owing to the fact that that had been made a bureau?

Secretary WILSON. To begin with, the heads deserve the money

The CHAIRMAN. Is that really the main point?

Secretary WILSON. That is one point; but they have more freedom in organization in the bureau condition than they have in a division.

Mr. SCOTT. Can you explain how that comes about?

Secretary WILSON. Well, in the bureau organization, if you will take Doctor Galloway for example; he has his pomologist, his botanist, his pathologist, and physiologist, and so forth, all along these lines. There is a distinct class of men, each working under his own name; and there is rather more dignity to a bureau.

The CHAIRMAN. That Bureau is more homogeneous?

Secretary WILSON. Oh, surely; it must be homogeneous.

The CHAIRMAN. The Bureau of Statistics stands by itself; apply your remarks to that; why do you get better results from that as a bureau than as a division?

Secretary WILSON. A year ago when I asked Congress to make the statistical division a bureau, I found from experience it had been running down from the fact that it had been training men who were getting low salaries, and after they became valuable other institutions wanted them and took them away, and the Bureau had severely sufferred. I wanted more compensation for the men who deserved more compensation in that division. It could not be very well done in a division in order to keep it in line with other divisions of the Government. The Government of the United States is doing its work through bureaus. It created them. The new Bureau of Commerce and Labor started out with a succession of bureaus. It got four or five from the older departments, and it created one in manufactures and one in corporations, and so forth. Now, then, the men at the head of those bureaus are not a bit abler men, better educated in their line, than the scientists of the Bureau of Statistics in their line; but a bureau officer gets a certain salary, and a division officer gets a certain salary.

Mr. BURLESON. As a matter of fact, it was in the nature of a promotion for this man who had rendered efficient service?

Secretary WILSON. Undoubtedly; it was a promotion for him, and I make no bones in saying I want to promote Doctor Howard. He has not his equal on earth as an entomologist. I am going to start him next week in charge of at least half of that work down in the Southern States in regard to the boll weevil, and he ought to have the small amount that is given to our bureau officers—$3,500. You notice the facility and ease with which Congress creates bureaus and gives them $5,000 or $6,000, and the man that works under them often gets $3,000 or $4,000.

I tell you, the men who work under you gentlemen are as great scientists as you will find in the world in their lines; and when a man has been as long in that Department as Doctor Howard has, he deserves that $3,500. And take Doctor Marlatt, who went to the Orient and brough back the lady-bird to attack the San Jose scale. That class of men deserve a little more money. We are not asking it but for one man at present; but if we are going to hold those strong men, they will have to get, eventually, some increase. We are holding our scientists now better than we did seven years ago, because you have been giving them more money. Otherwise we would have been down at the low level that we were seven years ago. There is no use in hesitating about speaking my mind on that question.

I want those men to get more money because they are earning more. I am not asking it for anybody but the heads of the proposed bureaus. Our bureau chiefs are the most poorly paid of any in the United States Government. All of the new bureaus under the new Secretary of Commerce and Labor get their $5,000 every one of them. We have been content with $3,500. I think the Senate put in $4,000 once for Doctor Galloway; he gets $4,000. Doctor Salmon, who has no equal in his line in the world, whose investigations led up to the ascertainment of the source from which malaria and yellow fever come, is getting $4,500.

Some of his very best men have gone into the War Department, and are getting $5,000 with a prospect of a pension when they retire.

Now, I have asked one increase that I am anxious about. I would like to make Doctor Salmon's salary $5,000. And you, having Agriculture in your keeping and charge, and being responsible for it, I ask you to see to it that it is dignified by worthy men just as much as men who work for the other Departments of the Government, and who are not mealy-mouthed about asking for big salaries.

Mr. HAUGEN. Does this promotion and increased salary carry anything else with it? I mean, horses and carriages?

Secretary WILSON. No.

Mr. HAUGEN. I read in the Post this morning that a great many carriages and horses are owned by the Government; it was estimated, I think, by a member of the House yesterday, that if they were strung out on a single line they would reach from the White House to the Capitol, a distance of a mile and a half. It seems that that estimate was too low, according to the views of the Post.

Secretary WILSON. I can tell you a Cabinet secret, Mr. Haugen.

Mr. HAUGEN. This has no reference to Cabinet officers; they are certainly entitled to carriages; but the impression is that the chief of every bureau and every division has a horse and a carriage, and a footman, or——

Secretary WILSON. The President asked each Cabinet officer individually whether he had increased the number of carriages or horses in his Department for his subordinates in the last seven years, and each one of them answered that they had not—had not increased them at all.

The CHAIRMAN. How many, as a matter of fact, have we in the Department of Agriculture?

Secretary WILSON. When I came there, there was a carriage for the Secretary, one for the Assistant Secretary, and one for the Chief of the Weather Bureau——

Mr. HAUGEN. There is no question raised as to the first two mentioned.

Secretary WILSON (continuing). And there are no more to-day.

Mr. HAUGEN. Why should one chief have a horse and carriage over another?

Secretary WILSON. I suppose it is because the Weather Bureau is so far over there by itself; I suppose, maybe, that is one reason why.

Mr. HENRY. But you have made no increase?

Secretary WILSON. No increase since I went into this Department.

The CHAIRMAN. There is a small increase asked for in the general expenses of the library—some $2,500. We have been increasing that every year a little more. Are they publishing more books all the time that you have to purchase?

Secretary WILSON. As our scientific departments grow, the demand for scientific literature grows steadily with it; that is all. We get a good deal by exchange; then we buy considerable. We have the finest agricultural scientific library in the world.

The CHAIRMAN. The best technical library in the world?

Secretary WILSON. There is no question about that, and that is not a very heavy increase—a couple of thousand a year.

The CHAIRMAN. It is not a heavy increase—it is a mere drop—but we have been increasing that every year for the purpose of books, and I was wondering myself whether they were absolutely publishing

so many more scientific agricultural books every year than they were formerly.

Secretary WILSON. For quite a while, if I remember, there was not any increase for that.

The CHAIRMAN. For the last three years we have increased it. It was increased $3,000, was it not, last year?

Secretary WILSON. The library needed that. There is a very careful little Vermont lady in charge. She is exceedingly efficient, and she is building up that library along scientific principles, and the scientists of the Department are greatly pleased with her work; and I hardly think we can deny them access to all that is published in their line that is worth having.

The CHAIRMAN. It has doubled since 1896.

Secretary WILSON. The whole Department has doubled since 1896.

The CHAIRMAN. The library has doubled since 1896.

Secretary WILSON. Exactly; the whole Department has.

The CHAIRMAN. More than doubled.

Secretary WILSON. It is interesting to state that you are giving as much money for agriculture as the income of Harvard, Yale, Columbia, Chicago, and Leland Stanford universities, all put together. Indirectly you are giving us $6,000,000 a year, and the world has no parallel to it; and we are doing the work that you know is doing. We sent out last year nearly 12,000,000 pieces of agricultural literature; and until the Department of Agriculture began building up this literature, there was no agricultural literature in the world.

I have works on agriculture 150 years old, and I can take one of them and compare it with the average country farm editorial, and they are about word for word now. But are we furnishing the people agricultural literature? See what the effect is in the great West. The Chicago Tribune, the Chicago Record-Herald and the Chicago Inter Ocean each find it necessary to put in a farm column every day. There is a demand for it all over that country.

Mr. GRAFF. The smaller papers are taking that up?

Secretary WILSON. Surely. I edited one of these myself for ten years before coming here.

The CHAIRMAN. Every newspaper circulating through the country has an agricultural column.

Secretary WILSON. They are getting it. The great Chicago dailies tell the tale; and some of their highest paid men are doing that kind of work.

The CHAIRMAN. How near are you through with the tea investigation?

Secretary WILSON. We are just setting out a big orchard in Texas. We have a lot of things to study along the tea line. I have seen a good many birthdays, but I expect to live to see the day when we will pick tea with a span of horses and a reaping machine, going down one side and coming up the other. You can not limit the ingenuity of the American people.

Mr. RODEY. Has it been determined that the possibilities will be equal to that?

The CHAIRMAN. Who ever thought we would cut wheat and bind it at the same time?

Secretary WILSON. That is an extreme statement, but it is not impossible. It is in the minds of a good many men now.

Mr. BURLESON. Nothing is impossible when you consider Yankee ingenuity.

Mr. GRAFF. There has been considerable discussion about a bulletin that was issued by Professor Whitney; none of the rest of the gentleman has the courage to ask you about it, but I presume to do so.

Secretary WILSON. From Liebig's day up to the present time the chemists have had the floor, and whatever was told us was told by those chemists all these years back. Now we have started in to study the soil for the first time in this Department; and Doctor Whitney finds certain indications. He can tell by putting an instrument in the soil the per cent of moisture there, and the per cent of salt in the moisture, and he thinks that by examining the salt content of the moisture he can tell the capacity of that soil to feed the plant; and the chemists do not believe a word of it. But let me tell you something about the limitations of the chemists. I wanted to have a tobacco leaf analyzed by a chemist, and I could not find anybody that could do it; could not tell me anything about it.

And I found a little German who told me that tobacco leaf had some ferments in it, the same as the milk of the dairy cow has, that ripens the cheese, and this next leaf had two of these ferments, the next one three, and another had four. That opened up a thought. The Japanese came and took him away, at $7,000 a year, and then we did not have a chemist. I sent over to Johns-Hopkins. There was a young man there from Iowa whom I used to know. He had graduated at the Ames Agricultural College, waited and got the master's degree, waited another and taught chemistry; then went to Johns-Hopkins University. I said to him, "Can you analyze the tobacco leaf?" He said, "I can not." I said, "What in the world have you been doing all these years in Johns-Hopkins and can not analyze tobacco?"

He said "They did not teach me plant pathology," but he added, "A new world has opened up to me." We got two doctors of chemistry. I sent for Doctor Wiley and Doctor Galloway and several chiefs, and I said "Gentlemen, we are up against it now. Here are a couple of doctors of chemistry; they are ready to study this problem. How are they to be taught?" "Well," the plant man said, "it is no use to teach them more chemistry; they have plenty of chemistry now. The trouble is, they do not know anything about the plant; they must go to work and study the physiology of it." They began to work at $60 a month, those doctors of chemistry, and they are studying and bringing about results, and by and by we expect to have chemists that can analyze a tobacco leaf, a cabbage leaf, and things of that kind.

Mr. GRAFF. Doctor Whitney attempts to lay down as an absolute fact conclusions that, if true, are certainly very startling.

Secretary WILSON. With regard to that, Mr. Graff, I say to Doctor Whitney, "I know a great many things you are doing; nearly everything you do is valuable to the Department; I do not know whether you are right or wrong on this proposition you lay down, but go to work and demonstrate it; take time, go to work with it;" and he has. I am going to give a man opportunity to prove whether he is wrong or whether he is right, and if he is wrong with regard to that one thing, then he is wrong, that's all.

Mr. GRAFF. I am glad to have the Secretary say that, because if it could be stated that the Department absolutely supported these alleged discoveries as being a truth which had been fixed, then the

investigation of soils and fertilization would be utterly futile; it would be useless.

Secretary WILSON. There is a certain per cent of truth in what Whitney has said; that I personally know of.

Mr. GRAFF. You permitted the use of the bulletin on the ground that it would stimulate investigation of the question?

Secretary WILSON. Precisely. I give him a free field. I am glad that the chemists have awakened to the necessity of agriculture along these lines; if we have put new life into them it will be valuable. We have not hardly an agricultural chemist in the world; it is a new science. When a man who makes his living by working the field comes to me with his troubles I yoke up a scientist with him. I want to find out what can be done to help that man, and we come right along against his propositions that have never been solved because scientists in the past have never proven anything. They have never applied themselves practically to help anybody; that is where the trouble has been.

Now, what can I do in this case? I have a faint knowledge of the direction in which every one of the three or four scientists of the Department are working—the objects for which they work; I have not a practical familiarity with it. The details of every scientist's work is something that is only comprehended by men in their own line. Whitney has challenged the chemists. If it comes to a head, I shall ask Mr. Whitney to appoint a man, and I shall ask the chairman of the chemistry organization to appoint a man, and we will have a third man appointed by those two, and we will let them go to work and find out whether Whitney is right or wrong in that particular line.

Mr. GRAFF. There was an article by a man by the name of Hilder, in California, who attacks the methods of the investigation.

Secretary WILSON. He is a fine, old-fashioned chemist.

Mr. GRAFF. I do not know anything about Hilder's scholarship.

Secretary WILSON. We are going to give our men an opportunity to see whether they are right or wrong. Whitney is going in so many ways that are valuable that we can afford to have him go wrong. Most of them never did anything for agriculture worth speaking about.

Mr. SCOTT. Do you not think, as a general proposition, that bulletins ought to be published only—or, at least, chiefly—along lines in which definite conclusions which are not disputed can be laid down? Does it not leave the farmer in a rather confused frame of mind to have a bulletin come out from the Department of Agriculture asserting one thing and find immediately that men working in similar scientific fields dispute it?

Secretary WILSON. Well, we published some seven hundred publications last year and there is only one of them disputed; and the farmer is not going to bother himself about that one, because that is a technical bulletin on chemistry. It is worth publishing to have them discuss it.

Mr. ADAMS. If I recollect right, the statement which excited criticism, and about which I have received one letter from the College of Minnesota, was to the effect that all soils contain enough plant food for unlimited crops.

Mr. GRAFF. Which would lead to the conclusion that there was no such thing as wearing out land.

Mr. ADAMS. There may be some qualification surrounding this statement.

Mr. GRAFF. There was another conclusion, and that was the fertilizat on of soil by manure or by the artificial fertilizers which are made contributed to the soil no lasting additional chemical content, and that it produced no permanent result in the growth of the immediate crop; that the utmost it would do, perhaps, was to stimulate the growth of the plant when it first began to germinate; and that is certainly contrary to the general view of the practical farmer.

Secretary WILSON. Yes; I have gone all over that with Doctor Whitney. The growth of crops by chemical or what are known as commercial fertilizers alone will eventually ruin any soil, because the organic matter is oxidized or burnt out of the soil and the soil becomes loose and subject to be carried away with the waters in the summer time and will not retain moisture.

Mr. LAMB. That is true; we all know that.

Secretary WILSON. Yes; there are limitations to all those statements. I do not pretend to conclude with regard to Doctor Whitney's Bulletin No. 22; but we will have it looked into by competent authority if it is thought best to do it. I have had it in my mind. Doctor Whitney is doing such good work that we can still find work for Doctor Whitney.

Mr. HENRY. The discussion of this Bulletin 22 will be productive of good results, whatever——

Secretary WILSON. I think so. You had a discussion of that at one time in regard to Doctor Salmon and his hog-cholera investigations by a man in Nebraska. Doctor Salmon is still here, and I do not know what has become of the man in Nebraska.

Mr. LAMB. That leads me to make a new inquiry of you, Mr. Secretary. I have received letters saying the Government is making serum to destroy blackleg, and trying to interfere with private enterprise. I would like to hear from you on that.

Secretary WILSON. Blackleg is a disease that affects young animals, mostly calves; sometimes yearlings, and, very rarely, 2 year olds. The people had great difficulty in getting serum that was powerful enough to treat it. We make it here for probably a tenth of a cent a dose; and we send out, say, a million and a half doses a year, free to the people, and the result is that wherever we send it blackleg is disappearing. We are pushing this work with the theory that if we can prevent black-leg it will die out.

It is the same with rabies. If you muzzle every dog in the District of Columbia and allow no other dog to come in rabies will not come in. You could not do that. The love for the pup is stronger than the love for man, woman, or child in the District of Columbia, and dogs can not be muzzled here. That is the theory on which we are trying to experiment with blackleg, and we are succeeding. The day should come when there will not be a particle of blackleg in the United States.

Mr. BURLESON. As I understand it, Mr. Secretary, these laboratories are maintained by the Bureau of Animal Industry and its manufacture costs a mere trifle.

Secretary WILSON. Yes. Of course we are interfering with the trade, and if we destroy blackleg in cattle we will destroy their trade in blackleg serum altogether. The economic question is whether we should maintain blackleg for the benefit of these manufacturers.

Mr. HAUGEN. Are you carrying on experiments with hog cholera?

Secretary WILSON. Yes. Doctor Salmon is quite hopeful of the experiments that are being carried on under his direction. We never stop anything we undertake. We stick right to it.

Mr. GRAFF. I notice here a reference in a press clipping which, perhaps, you had occasion to use.

Secretary WILSON. What is it?

Mr. GRAFF. A press clipping with reference to the efficiency of the Weather Bureau, and the report on it. I will hand it to you. I think perhaps it belongs to you.

Secretary WILSON (examining paper). It is none of my property.

Mr. BURLESON. I think Mr. Moore left it here the other day.

Secretary WILSON. Along that line let me say a word about the Weather Bureau, which I might otherwise have forgotten. That loss of life at Topeka should not have occurred last year if we had had observation of that river and reports; and I would certainly appropriate enough money so that the Kansas River and some others can be reported upon. There was no occasion for all that loss of life there. Wherever we reported on rivers in other parts of the country we notified people ahead and they either built their levees or got their property away and saved themselves. With regard to the river reports of the Weather Bureau, they are as near perfect as can be gotten. They ought to be extended somewhat. There was more loss at Kansas City last year from the overflow of the Kansas River than this Weather Bureau has cost since its first inauguration.

I do not think of anything else that I had in my mind to say, Mr. Chairman. I am very much obliged.

The CHAIRMAN. We are very much obliged to you.

Mr. HAUGEN. You were speaking about sugar; have any new factories been added during the last year?

Secretary WILSON. Yes; many added last year, but no new ones being built just now. There are 55 now in operation.

I am very much obliged, gentlemen.

Thereupon the committee adjourned.

WASHINGTON, D. C., *Wednesday, February 24, 1904.*

The committee met at 11 o'clock a. m., Hon. James W. Wadsworth in the chair.

The CHAIRMAN. Gentlemen, President Schurmann, of Cornell University, is here to-day and desires to make a statement to the committee somewhat in answer to the statement made by the Secretary of Agriculture when he appeared before us the other day in regard to the work done by Cornell University for the promotion of agriculture.

## STATEMENT OF J. G. SCHURMANN, PRESIDENT OF CORNELL UNIVERSITY.

Mr. Chairman and gentlemen of the committee, I am very much obliged to you for the opportunity of appearing before you, and I appear, as you, sir, have said, to correct certain errors which have crept, no doubt inadvertently, into the statement made before this committee by the Secretary of Agriculture on the 16th of January last, in your afternoon session. The paragraphs will be found on page 425 of your printed hearings, and as there are only five or six sentences which concern me I will take them up seriatim. The first two sentences are as follows:

> Along the line of soil physics we are helping to establish that study in two institutions to begin with; one is in the State of New York, at the Cornell institution, and the other is in Kentucky, at Lexington. I have never had any mercy on institutions that take money from the Federal Government and do not use it for the purpose for which Congress appropriated it, and I have laid the lash unsparingly on any Cornell man I have ever met, no matter where or when.

That statement seems to imply that there is a diversion on the part of Cornell University of Federal funds to objects other than those specified in the acts of Congress under which the funds are received. Now, Mr. Chairman, Cornell University has received from the United States, first of all, the Morrill land grant, the scrip granted under the act of 1862. She has received from that source $688,000. That scrip, you will remember, sir, in all States which had no Federal lands within their own borders, had, under the terms of the act donating it, to be sold immediately. These forced sales all over the country produced a glut in the market, and the price soon fell from the Government price of $1.25 per acre to $1, and then to 80 cents and to 70 cents, and finally to 50 cents and lower. The State of New York realized on the sale of its scrip $688,000. That is about the average that was received for the scrip by States not having public lands within their own borders.

Those States having public lands within their own borders were not required, as I have said, under the act of Congress of 1862, to sell their scrip immediately. In New York the sum I have mentioned, $688,000, was turned into the State treasury and a certificate of indebtedness issued to Cornell University, on which Cornell University receives annually 5 per cent interest, amounting to $34,000. Now, sir, the Federal act of 1862 provided that the moneys received from the sale of these lands should be used for the establishment of at least one college where the leading object, without excluding other studies, clas-

sical and scientific, and including military science and tactics, should be the teaching of sciences relating to agriculture and the mechanic arts. We have $34,000 annually from the Federal Treasury, which, by the terms of the act, is to be used, among other things, for the teaching of subjects related to agriculture and the mechanic arts, and which may be used for other scientific and classical studies. I affirm that the entire amount of $34,000 received from that source is used by Cornell University in the teaching of subjects related to the sciences of agriculture and mechanic arts.

Secondly. We receive, under the Morrill Act of 1890, $25,000 annually from the Federal Treasury. That is to be used, by the terms of the act, for instruction only in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life and to the facilities for such instruction. We divide that money between the several objects specified in the act of Congress itself, giving to agriculture $10,000, to mechanic arts $10,000, to the English language $1,000, and to the other objects mentioned in the act—namely, the mathematical, physical, natural, and economic sciences—$4,000. I affirm that this second appropriation, equally with the first, is used by Cornell University for the objects specified in the act. I have before me the report of the treasurer, which contains the budget for the current year, and the figures I have just given you, showing the distribution of the appropriation under the second Morrill Act, will be found in this report.

Thirdly. Cornell University receives from the United States $13,500 a year, under what is known as the Hatch Act, passed in 1887, for an agricultural experiment station. That money is used by Cornell University exclusively for the payment of investigators and the conduct of investigations and experiments, and I think if you will consult any body of scientific experts you will find that the agricultural investigations emanating from Cornell University are second to those from no agricultural experiment station in the United States. I hope, therefore, that I have demonstrated that when there is a suggestion, no doubt made inadvertently, in the statement before me, that Federal moneys have been diverted from the objects for which they were appropriated to objects other than those specified in the acts of Congress, the statement is without foundation.

The next sentence is as follows:

> They were better endowed than any institution in the land, and should be doing the best work of any institution in the land, yet never did anything.

That is a pretty hard saying. "They were better endowed." That means, of course, that the Federal endowment coming to Cornell University was larger than that given to any other institution in the United States. That is true, because the State of New York had the largest population, and the grant was in proportion to the number of Representatives. But, as I pointed out, New York's share amounts to only $688,000, on which we get $34,000 of interest. I think, though, that there is something else underlying that statement, and with the permission of the committee I will develop it a little.

It is often assumed that a larger portion of the endowment of Cornell University has in some way come from that Federal grant. And

even in our own State there are amiable and friendly critics who occasionally tell us that we have gotten all our money from the Federal Government. Now, the occasion of such a statement is this: The State of New York sold the land scrip that it received in 1862 at the figures that I mentioned. When it was more than half sold Mr. Ezra Cornell, then a State senator, who until middle life was a laborer getting a dollar or a dollar and a half a day and then grew rich and became immediately an earthly providence, desired to have the proceeds of the grant turned over to an agricultural institution—not to Cornell University because it was not then in existence, but to an agricultural institution at Ovid, where the State insane asylum now is.

But this scheme was defeated by the friends of the different colleges who wanted the money divided among their institutions. Mr. Cornell and his colleague, Andrew D. White, thought that was a plan to fritter away the money without doing any good. Whereupon Mr. Cornell said: "I will found a university at Ithaca with an endowment which I will present to it, provided you will turn the whole of that land scrip over to it for the purposes mentioned in the act of Congress." That was done. Later Mr. Cornell said to the State: "You are selling this scrip at 40 and 50 cents an acre, and I will buy it from you." The State could not sell it for more. There was a glut of land all over the country. He said: "I will hold it until prices go up, and I will pay the interest on my investment and protect the property from trespass and fire, and whatever profits I thus make from holding this land I will turn over as a gift to the new university under one condition—that such gift shall be recognized as the private gift of Ezra Cornell, and be free from all restrictions imposed by act of Congress on the moneys received from the sale of the scrip."

The State of New York accepted that offer. Mr. Cornell went on and carried that land out of his own pocket. After Mr. Cornell's death, the trustees of the university continued to carry the land for some years longer, and in the end a large profit was made out of it. At one time the whole of it was under contract of sale for a million dollars, but the would-be purchaser backed out. A larger sum was eventually made out of it. But the point that I wish you gentlemen to understand is that everything in the shape of profit that was made by Mr. Cornell, and after him by his successor, Henry W. Sage, and the trustees, by holding these western lands was, under the conditions of Mr. Cornell's contract, his private gift to the university, absolutely unrestricted by any conditions attaching to the donation by Congress of the public lands in 1862.

This is not a mere statement of mine. The courts have settled it. We received some years ago a gift, a legacy, of between $1,000,000 and $2,000,000. At that time the charter restricted the holdings of Cornell University. The friends of the testatrix attacked the will on the ground that Cornell University was incapacitated to receive the gift, as it already held property in excess of the limitations of its charter. Those limitations have since been removed, but of course that would not have any retroactive effect. Now, the university had absolutely no plea to make but one, and the lawyers, ingenious as these gentlemen always are, seized on this contention that Mr. Cornell's gift to the university was not a private gift, but was a part of the Federal land grant, and consequently that Cornell University did

not own that fund, but that, like the land-grant fund of $688,000, it was owned by the State of New York and held in trust for the university.

The matter went to the court of appeals in New York State, and that court decided against us, and then it went to the Supreme Court of the United States, and that court decided against us. That is, the Supreme Court of the United States has decided that the gift that Ezra Cornell made to the university of money which he had made in the way of profit on land scrip bought from the State of New York in the open market was his private gift and not the gift of the United States. I mention that lest the fact should afterwards come to your attention and you might think that when I said that the amount of money derived from the sale of land scrip in New York was $688,000 I was not telling the whole story. So that when it is said of Cornell that "they were better endowed than any institution in the land" it should also be added that the total amount derived from that endowment was $688,000, on which we receive $34,000 yearly in interest, which $34,000 we are spending solely for the objects specified in the act of Congress.

The whole sentence is as follows:

They were better endowed than any institution in the land and should be doing the best work of any institution in the land, yet never did anything.

Cornell University never did anything! Well, twenty years ago there were over 300 students in the university. To-day there are over 3,000. The faculty numbers 391 to-day. It numbers more than the entire student body did twenty years ago. You can imagine my feelings when I read that we ought to be doing something, but yet never have done anything. We have students at Cornell from practically every State and Territory in the Union and every continent on the globe. But suppose the meaning to be that in the way of agricultural teaching Cornell University is doing nothing. Can that charge be made good? Cornell University has a college of agriculture with a large faculty in which there are enrolled to-day 276 students. In 1901 we had 193 students. In 1903 we had 235. I have a table here showing the attendance for several years, and I will hand this to the stenographer and ask that it be made a part of my statement.

The paper referred to is as follows:

*Students in college of agriculture of Cornell University for the past five years.*

| | Regular. | Special. | Winter. | Total. |
|---|---|---|---|---|
| 1899–1900 | 41 | 47 | 83 | 171 |
| 1900–1901 | 48 | 51 | 94 | 193 |
| 1901–2 | 49 | 43 | 96 | 188 |
| 1902–3 | 60 | 54 | 121 | 235 |
| 1903–4 | 76 | 64 | 136 | 276 |

That does not include students of veterinary medicine, in which course we have 85. And, furthermore, while Cornell has 361 students in agriculture and veterinary medicine, it is, Mr. Chairman, giving instruction to thousands of persons in the State of New York. We conduct correspondence with farmers and farmers' sons and with farmers' wives and with teachers all over the State. We send them out lessons. These lessons are taken by them and studied, and their answers are sent back to Cornell. We examine the answers and then

send out a report. The secretary of the New York State Grange said yesterday at Albany at a hearing before the finance committee in my presence that this university extension work of the Cornell college of agriculture was of incalculable good to the farmers of the State, and because he and his friends appreciated it so much he was there to ask, on behalf of the grange of New York, that the State legislature should appropriate $250,000 for a hall of agriculture for Cornell University. Let me give you the figures as to the numbers we are carrying on this extension work. They are as follows:

| | |
|---|---|
| Farmers' reading course | 4,495 |
| Farmers wives' reading course | 5,028 |
| Junior naturalist clubs, 467; members | 15,159 |
| Junior gardeners | 18,455 |
| Teachers in home nature-study course | 1,200 |
| Total | 44,337 |

So that we give instruction to 44,337 persons throughout the State of New York, exclusive of the 276 students now in the agricultural college and 85 in the veterinary college, and all this instruction, whether given at the university or throughout the State, is absolutely free. We have never charged a cent at Cornell University for instruction in agriculture since the university was opened and we are not charging anything to-day.

Perhaps I might add for the information and for the interest of the New York gentlemen on the committee—I hope the others will excuse me for referring to a matter that is primarily of interest to our own State—that while we give free agricultural instruction to these students, we also give free instruction in all departments of the university to four students annually from every assembly district, 600 persons in all, so that Cornell is to-day giving free instruction to over 900 students at the university. Those 600 are selected from the inhabitants of each assembly district on competitive examinations held by the State superintendent of education, and I do not know who the winners are until they come to me and hand me their certificates of appointment. "Should be doing the best work of any institution in the land, yet never did anything." Now, I submit, Mr. Chairman, that we have done something; nay, that we have done good work.

I appeal to the number and quality of the experiments conducted by our Cornell investigators, and I appeal to the instruction given to the large number of students who have patronized our agricultural college in rebuttal of the statement made before you, and if further refutation is needed of that statement I will mention one other fact. Here is a report on our college of agriculture signed by the president of every agricultural society in the State of New York. It speaks for our State Dairymen's Association, our State Agricultural Society, our New York State Grange, our State Breeders' Association, our Western New York Horticultural Society, our State Fruit Growers' Association, our State Sheep Breeders' Association, our Shropshire Sheep Association, our State Association of Beekeepers' Societies, our State Poultry Society, our State Association of County Agricultural Societies, our Patrons of Industry, and others.

Here is a report indorsed by these agricultural societies in our State, commending the work we are doing in the Cornell College of Agriculture, and asking the State of New York to grant the college large

additional facilities for this beneficent work. If you want further demonstration of the fact that we are not doing anything, I could hand you a long list of our graduates and former students in agriculture who have become eminent as investigators in experiment stations, as teachers in agricultural colleges, as practical farmers, scattered not only over New York State, but over the entire country.

I was told a little while ago, when I had the honor of being presented to the members of your committee, that the gentleman from Wisconsin, Mr. Adams, is a practical farmer. Well, Mr. Adams will recall that the work of agricultural education has been inaugurated and successfully carried on in Wisconsin by a Cornell man; and when I made a trip last winter, going into ten or twelve States, visiting all of the foremost agricultural colleges of the country, with a view of possibly getting information that would lead to the improvement of our own work, the thing that surprised me most was the number of our own graduates that I met. At the agricultural college of Iowa, at Ames, I think there were 12 men on the staff who were graduates of Cornell. You will excuse me if I go into some detail in order to prove to you that Cornell, which has been so severely criticized here, has done work in agriculture of which we are justly proud.

Mr. BURLESON. Do you not think it is possible that the Secretary, when he used that expression "never did anything," meant along the line of soil physics?

President SCHURMANN. I should be glad if that were the meaning. And I think it is very likely that the statement went to the press without the Secretary reading it.

Mr. BURLESON. I heard the Secretary make that statement, and that was the impression it made on me—that he meant that to apply to what you had done along the line of soil physics.

Mr. BOWIE. It is possible that this did not convey the shade of meaning that he had in his mind.

A MEMBER. That might be disproved and utterly discredited, however, by the words which follow these.

They have disgusted the State of New York to such an extent that in despair it had to go and establish an experimental station under its own auspices at Geneva.

President SCHURMANN. I want to say that I am not in any way reflecting on the Secretary of Agriculture, and I am here simply to correct errors in your records. They may have been made through the fault of the stenographer.

The next sentence, to which reference has just been made, is as follows:

They have disgusted the State of New York to such an extent that in despair it had to establish an experimental station under its own auspices at Geneva.

That can be refuted, and fortunately for me, it can be refuted conclusively and briefly. Does it refer to the experimental-station work or does it refer to the teaching work? Let us assume, first, that it refers to the experimental work. Then the answer is that the statement therein contained can not be true, because the experiment station under the Hatch Act of 1887 was organized in Cornell University in 1888, and the State experiment station in Geneva was founded in 1880. It can not, therefore, refer to investigations. Can it, then, refer to teaching? Does it mean that Cornell disgusted the State by its teaching in agriculture, and therefore the State founded a better institution at

Geneva? It can not possibly refer to teaching, because, while Cornell has a school of agriculture in which it teaches, Geneva does no teaching, and it is simply an experimental station. Whichever horn of the dilemma is adopted, the statement can not stand the test of fact.

Mr. BOWIE. Now, as to the work you are doing at Cornell in the experimental station, what is the nature of that work?

President SCHURMANN. In the experimental station we have men engaged on each of the different subjects. We have, for instance, the horticultural side represented by Professor Bailey, who has just published his great encyclopedia of horticulture, and whose investigations have given him so high a standing both in this country and in Europe. Then, this year we have Doctor Hunt, whom we called from the directorship of the college in Ohio to our professorship of agronomy. This branch has to do with crops from the time the seed is sown until they are harvested. Then we have in Professor Wing a man who has long been making important investigations in animal husbandry and dairying. But Professor Pearson is now our specialist in dairy husbandry, and I expect great things from him. We have as colleague of Professor Bailey Professor Craig, who was formerly head horticulturist of the Dominion of Canada.

For botany in its application to agriculture we have Professor Atkinson, who has a high reputation as an investigator. In entomology we have Professors Comstock and Slingerland. It will be remembered by the chairman that when the pear psylla attacked our State a few years ago, Professor Slingerland was able to invent a spray that killed the insect, and a very distinguished gentleman from Niagara County told me that that discovery of Professor Slingerland's was worth a million dollars to his county alone. Then we have in chemistry, as applied to the soils, Professor Cavanaugh, who has been doing successful work for a number of years and is much in favor as an institute lecturer as well as an experimenter.

Mr. SCOTT. Does Cornell have any supervision over this station at Geneva?

President SCHURMANN. No; that station was established by the State of New York before the Federal Government had established this work at Cornell. It is absolutely under the control of the State.

Mr. SCOTT. What precaution is taken to prevent any duplication of work there?

President SCHURMANN. The common sense of the director and professors is a safeguard, and that I consider a sufficient safeguard in reference to all the experiment stations. And since the point is raised I will say something more. I do not set myself up as an authority on science, because I am not; but I know from my experience in dealing with scientific men that if you undertake, by a board or a secretary or any other civil official, to direct their work, you will take the life and the nerve out of it.

The scientist must be left absolutely free. He will blunder along through nine hundred and ninety-nine experiments and finally, on the one thousandth, he reaches something that may revolutionize an industry. Look at what Babcock did in Wisconsin. What matters some duplication? By the instructors and professors we have in Cornell there is a constant duplication of work, but it is all the better on that account.

Mr. ADAMS. Is it not true that the value of a great many experi-

ment is dependents on the fact that they are duplicated and reduplicated, and the original results are thus confirmed or disproved?

President SCHURMANN. Certainly it is. If any gentleman in this committee doubts that—this is not the question that I came here to argue, but you will excuse my digressing for a moment—if you have any thought of establishing a Congressional control or an administrative control of scientific men, I beg of you before doing so to read Darwin's Life and Letters and then try to imagine how that man could have done his work and revolutionized the thought of our time as he did if he had not been left absolutely free. And what is true of one scientist is true of all others. If the Government official knew enough to direct the scientist's work he could get on without him. Absolute freedom is the breath of life to science.

The next sentence is as follows:

> But they heard from the people down here and they now propose to establish a college of agriculture. We sent a man down to start them in soil physics.

Well, considering that we have had a department or college of agriculture ever since the university was started, and the head of it, Professor Roberts, retired last year on reaching the age limit, 70 years, and that he aroused more interest in agricultural education and the application of science to agriculture than anyone else ever did in New York. I naturally feel aggrieved for his sake, now that he is not here to speak for himself, to hear it said that we have just now established a college of agriculture. We have had a college with an excellent faculty. What we have done is to substitute one director for another. When Professor Roberts reached the age limit and went out we appointed another man in his place, Professor Bailey, as director of the college. And, of course, he has made certain changes. For instance, we have bought, since Professor Bailey became director of the college, three pieces of land, one a farm and the other two half farms.

We have bought 212 acres of land within the last year, on which we spent $18,500. Professor Bailey wanted other improvements, so that we have spent this year, over and above the money spent on the land, $8,000 or $10,000 more, to provide him with these extra facilities, than we have been in the habit of spending in the past or than we probably will spend in the future. I make this explanation to account, perhaps, for this statement that we have just established a college of agriculture. Perhaps, also, there is another explanation of it. The State of New York has done little for Cornell, nothing like what the Western States have done for similar institutions, and recently the State has appropriated $35,000 a year for the promotion of agricultural knowledge throughout the State. That may have suggested the statement that we were establishing a college of agriculture.

But the fact remains that we have had a college of agriculture for many years and that it has been attracting large numbers of students, and Director Bailey and I hope that if the present rate of increase is kept up for the next few years we may have a thousand students in agriculture. I do not think this is a dream, because we have a college of mechanic arts, and fifteen years ago we had only 100 or 200 students there, and this year we have 942 students in that college. Science is later in being applied to agriculture than it is in being applied to mechanic arts, but the day is coming—it is here—and this

generation is going to see a revolution in the matter of agricultural education. I look forward to the day when we shall have agriculture taught in the common schools of the State, and when, having gotten such work in the high schools, the pupils can then go forward to the agricultural college of Cornell University.

Mr. BOWIE. Legislation in Alabama has made it compulsory to teach certain branches of agriculture in all rural schools in every county of the State.

President SCHURMANN. Yes; and that may be done elsewhere, but the point is, gentlemen, that you must have the men. The men are everything. What we are aiming at in Cornell is to turn out men who are capable of teaching agriculture, and then to send them as missionaries all over the States.

The next sentence is as follows:

> We sent a man down to start them in soil physics. I inquired how he was getting along, and found that he got 75 students within a few days, and had to shut the door.

Now, that means this, that the Secretary of Agriculture was good enough to detail Mr. Bonsteel to Cornell to give instruction in soil physics. We had not the money to care for this subject, and the State of New York was not giving it to us, and it was exceedingly kind of the Secretary to send Mr. Bonsteel to us and I appreciate his action, and I wish here to express my gratitude for it, and I hope the committee will stand by him in this policy. It is only fair to say that Mr. Bonsteel, excellent teacher though he is, did not draw 75 students to Cornell. On the contrary, the students were all there, and what happened was this: We offered a number of elective courses and among these new studies was soil physics, and 75 students out of the 276 students in the college of agriculture elected this course.

Now, that was a very meritorious action on the part of the Secretary, and I should think it good policy to follow in the future, to detail experts on agricultural specialties to different colleges in the country. But my regret, and I regret it infinitely, is that such a meritoriout act should have been in any way coupled with such a statement as I have had to traverse here to day.

I thank you very much, Mr. Chairman and gentlemen, and unless some gentlemen of the committee have questions to ask me that is all I desire to say.

Mr. BROOKS. What is the total amount that Cornell University receives from the Government—$34,000, or is that from the land grant only?

President SCHURMANN. The $34,000 is the income from the land grant only. We then receive also, under the second Morrill Act, $25,000, making altogether $59,000 for the purposes of agriculture, the mechanic arts, and the sciences related thereto.

Mr. ADAMS. And military science?

President SCHURMANN. Yes; that is included in the act of 1862 also.

Mr. ADAMS. Besides the $15,000?

President SCHURMANN. You mean for an experiment station? It is $13,500 in our case. Let me repeat that, apart from this $13,500 for the experiment station, we receive $59,000 on behalf of agriculture, the mechanic arts, and the allied sciences. Let us make a very liberal assumption; let us assume that although the seven or eight subjects mentioned in the acts of Congress were in the minds of the legislators,

and, of course, they were when they passed the laws, they really meant to give agriculture half of the $59,000. We spend far more than that on agricultural education at Cornell.

The agricultural instruction that we offer costs nearer $140,000. That estimate takes in such departments as chemistry, botany, and all other sciences in which students in agriculture receive instruction. But if you exclude—though you should not—from your consideration all fundamental or allied sciences and take account only of agronomy, horticulture, animal industry, dairy husbandry, poultry culture, and similar divisions of technical agriculture, we are spending on instruction and facilities therefor more than $30,000—and that excluding the station money.

Mr. BROOKS. Spent by the university from its other funds?

President SCHURMANN. Spent by the university from all these funds, including the Federal fund. Let me repeat that. I say that if you exclude the Federal station money and take account of money spent on instruction in departments open only to agricultural students for subjects in technical agriculture, we are spending on them this year $30,290.

Mr. SCOTT. Then you figure that the remaining $29,000 of your Federal funds could be properly charged up to the other purposes in the act?

President SCHURMANN. Yes; to the other subjects mentioned in the acts of Congress, namely, mechanic arts and the physical and natural sciences. I would say also if you ask me what should be charged to the college of agriculture for the services rendered to it by departments like that of botany and chemistry and the like, the studies in which are taken by other students, that it would be three or four times that sum as a fair share.

Mr. SCOTT. How much land have you?

President SCHURMANN. Our total domain is 500 acres, and if we take out 150 acres of that for campus proper and 50 for playground, it leaves 300 acres.

Mr. SCOTT. What is the State doing?

President SCHURMANN. It has founded a veterinary college at Cornell University, for which it votes $25,000 a year, and it has given us a dairy building at a cost of $50,000. We hope it is going to do more now, and a bill providing for agricultural buildings is pending at Albany. It also gives us $35,000 for extension work in agriculture.

Mr. BOWIE. That is for that correspondence work that you have just detailed?

President SCHURMANN. Yes.

Mr. BOWIE. Is it not true that the officers of your university and the professors of the university also do some farm-institute work?

President SCHURMANN. Yes; that is a voluntary thing, but we do it constantly. I say to the agricultural professors at the time of their appointment that along with their official duties I want them to attend agricultural meetings and institutes in the State whenever it is possible.

Mr. ADAMS. Your statement is interesting, and the facts that you have given us as to the support of Cornell University I never have understood before. I never have understood before that the scrip was sold.

President SCHURMANN. Yes; it had to be sold under the provisions of the act of Congress.

Mr. ADAMS. I can see that in the State of Wisconsin where Cornell University has lands how we have always supposed that they had conserved their lands there and made a profit out of them when we went on and sold our lands, and what we got for them did not amount to anything. Can you tell us how much that has amounted to?

President SCHURMANN. Yes; I have the report of the treasurer in my hands. In our books we use specific names for these different funds. We call that under the second Morrill Act the "Congressional industrial fund," for instance.

Mr. BOWIE. That is the bookkeeping name?

President SCHURMANN. Yes; the fund to which you refer, Mr. Adams, is included in what we call the Cornell endowment fund. Mr. Cornell's original gift was $500,000; to this he later added more. His latest gift, in the form of profits from his lands, was over $4,000,000. The Cornell endowment fund amounted on the 1st of August last to $4,928,568—practically $5,000,000.

Mr. ADAMS. All the lands have been sold?

President SCHURMANN. All except a few odds and ends which may bring us in money enough, in view of the decline of interest, to keep the income from the fund where it is for the next five or ten years; and instead of treating the residue of our western lands as ordinary capital we are using it as a reserve fund to keep the income where it is in view of the decline in interest.

Mr. SCOTT. That is the Federal endowment fund?

President SCHURMANN. I must protest against Mr. Cornell's gifts being called the Federal endowment fund. That is money that Ezra Cornell made by going into the open market and buying of the State the scrip which any other man in the country could have bought; and there was only this difference, that if any other man had bought it and made money on it he would have put the money in his own pocket, whereas Mr. Cornell donated the profits which he made by holding the scrip to the university as a personal gift.

A MEMBER. Does this include the actual amount received for the scrip by the State of New York?

President SCHURMANN. No; the actual amount received by the State of New York for the sale of its land scrip was $688,000, and that amount is held by the State of New York in trust for Cornell University. The State pays the university 5 per cent interest on this land-scrip fund.

Mr. SCOTT. And the difference between that amout and this $5,000,000 is the amount that was turned over to the university as a private gift by Ezra Cornell?

President SCHURMANN. No; the $5,000,000 represents Ezra Cornell's gift to the university, and the land-scrip fund of $688,000 (which is held by the State) is additional thereto.

Mr. SCOTT. I understood your first statement.

President SCHURMANN. I am glad to have these questions asked, because we have critics in New York who say that we have had millions from the Federal Government, and they say, "Here you are now asking for something from the State of New York."

Mr. BURLESON. The secretary mentions first the soil physics, and in

the conclusion he mentions the soil physics, and is it not only fair to the secretary to assume that when he spoke of Cornell never having done anything that he referred to matters along the line of soil physics?

President SCHURMANN. If that is the interpretation it would relieve my feelings very much.

Mr. BURLESON. Is not that a fair interpretation to place upon it?

President SCHURMANN. The first sentence and the last sentence deal with soil physics, as you say, and if it was meant that all the intervening sentences should refer solely to soil physics I have very little to say, because I have already acknowledged that Cornell, not receiving from the State of New York what your State colleges receive in the West of your State legislatures, we have been unable to provide for the teaching of soil physics.

Mr. BROOKS. I think it is only fair to say, also, that I personally heard the statement of the Secretary, and I did not gather from that statement that he was making any sweeping indictment against Cornell University, but I thought that it was as to the subject of soil physics.

President SCHURMANN. Well, I acknowledge that with the resources at our command we are not able, and unless the State of New York helps us we shall not be able, to secure for all the subdivisions into which the science of agriculture in this day has fallen full and proper attention, and soil physics is one of those subdivisions which we have not money to care for. In other colleges of the university the fees of students enable us to expand, but in agriculture all tuition is free.

Mr. HASKINS. I have been very much interested in your statement as to what Cornell is doing, but I did not hear the statement of the Secretary. But I have read with a great deal of care what he said here, and I can not construe it as referring to anything else except soil physics?

President SCHURMANN. Well, I must acknowledge that we have not been able to do for that what we have done for agronomy and horticulture and animal industry and dairy industry and poultry keeping; and I am very grateful to the Secretary for the help he has given us in detailing Mr. Bonsteel to lecture on soil physics.

Mr. HASKINS. Is it not true that in the Agricultural Department there are a number of graduates of Cornell?

President SCHURMANN. Yes, sir; a number. There is Doctor Howard; and Mr. Coville, the botantist, is from Cornell, and there are a number of others.

The CHAIRMAN. What is the range of salaries paid your scientists at Cornell?

President SCHURMANN. The normal salary of a professor at Cornell University is $3,000 a year, and he retires at 70 years of age on half pay. That is the pay of a full professor, you know, who is appointed for life. But, while that is the normal salary, there are deviations upward to the extent of $250, $500, and $1,000 in the cases of men that we are very desirous of retaining. Deans get from $250 to $500 extra. My previous statement applied to professors only—that is to say, some professors get $3,250 and some $3,500, or more. Deans get $250, $500, or $1,000 over and above their professorial salaries. Our assistant professors get $1,500 and $2,000, and our instructors get $1,000. As to students, let me say a word. Harvard and Yale and Princeton have been celebrating their 250th, 200th, and 150th anniversaries,

respectively. Cornell opened its doors thirty-five years ago, yet, with the exception of the first institution I have just mentioned, Cornell has a larger attendance than any of them.

Mr. SCOTT. Are they undertaking anything in the way of soil-physics investigations at Geneva?

President SCHURMANN. I do not know. I think that they are not limited by the law to agronomy or horticulture.

Mr. SCOTT. Is there not any specific requirement in the act of Congress that you shall teach this soil physics at Cornell?

President SCHURMANN. No. I quoted to you at the beginning the terms of the act of Congress under which these moneys are expended.

Mr. SCOTT. There is no specific requirement of that kind?

President SCHURMANN. No; we are to give instruction in the sciences relating to agriculture and mechanic arts, including military science, and in the physical, natural, mathematical, and economic sciences.

Mr. BOWIE. You say that the cost of teaching the mechanic arts and those allied subjects is many times greater than the amount provided for?

President SCHURMANN. Many times greater.

Mr. BOWIE. You said that the university should be credited with the expenditures on that account, and that they were much in excess of the amount received from the Government?

Mr. SCHURMANN. Yes; several times over.

Mr. BROOKS. That would be including students outside of the college of agriculture, which has 276 students?

President SCHURMANN. Yes, outside of agriculture we have colleges of mechanic arts and engineering (civil, mechanical, electrical, and marine), and colleges of veterinary medicine, architecture, law, medicine, and liberal arts and sciences, on which we spend hundreds of thousands of dollars annually. The students of these colleges pay in tuition fees more than $200,000 a year. In agriculture, as I have said, students pay no tuition. Then rich men give us endowments for other colleges, but never for agriculture. I am very much obliged to you, gentlemen. I want the committee to understand that I am simply correcting errors in your records, and that I am grateful to the Secretary of Agriculture for the help that he has given us in soil physics.

(Thereupon the committee adjourned.)