of the existing Landwhar organization, and resculted in a complete change of the system. So, too, immediately after the Austrian war of 1866, and the French war of 1870 71, commissions were appointed in all arms and branches of the service to investigate closely the workings of the military system, and to recommend the change required to obviate existing defects. These inquiries covered everything—tactics, weapons, ammunition, food, clothing, equipments, transportation, etc.; nothing was regarded as so good as to be above examination and criticism, nothing as so unimportant as to be beneath notice. In few words, the Germans, unlike their late antagonists and many other nations, have never regarded as perfect the military institutions which have given them victory; no matter what successes they may achieve, their first step is to examine carefully the means by which they were gained, and to ascertain what possible chances of failure may be guarded against in the future. He who should encounter a German army tomorrow, and act upon the supposition that its tactics, its arms, and its manner of operation would be precisely as in 1870 71, would learn to his cost that he had made a grave mistake. Much of the German success may safely be attributed to his course on their part, and it is an example which can be recommended to the immitation of other nations.

Our subject will probably present itself in the simplest and most natural light to the general reader if we first explain.

(To be Continued).

THE DESTRUCTION OF OUR FORESTS.

To Hon. P. W. Hitchcock, U. S. Senate, Washington, D. C.

MY DEAR SENATOR: I cannot say when I was more gratified than in reading in the papers the other day that the President had made the preservation of our forests the subject of a special message to Congress, and recommended the passage of an act creating a Commission of Forestry. I doubt if a wiser recommendation has been made by any President, and I hope Congress will not adjourn without acting upon that message. None but those who have made tree-growing and the criminal wise of timber a careful study can appreciate the necessity of legislation on this subject. We have now left untouched, in the whole United States, but one really great tract of timber, consisting of about one half of Washington Territory and a third of Oregon. California has, perhaps, 500,000 acres of forests, one-half of which has been cut away within the last two years; but that State, aware of the future necessity, and keenly alive to the depletion of our forests, has already commenced the cultivation of the Australia, a tree that grows rapidly and to great size.

New York has lost her maple, walnut, hickory, and has now no considerable forest left, except what is to be found in her Adirondacks. The Wisconsin forests are in process of rapid destruction—no less than 1,000,000,000 feet having been cut in a single year. Tens of Thousands of logs are annually rafted down the Mississippi to towns in Iowa, where they are cut into lumber. One firm—Young and Co.—I am told have a mill at Clinton, Ia., that runs 20 saws and three fourths of all the lumber they cut goes to Kansas and Nebraska. In one year, 185,000,000 of Wisconsin logs were cut in Iowa; and I predict that, if the present destruction goes on, in ten or twenty years at most, not only the forests of Wisconsin, but Michigan and Minnesota, will be swept away.

Only consider for a moment that 50,000 acres of Wisconsin timber are cut annually to supply the Kansas and Nebraska market alone. The Saginaw forests are now practically destroyed; and, if the Northern Pacific Railroad should be built, it will open up the subject to the axe in the Oregon and Washington Territory forests, and then the last great belt of American timber will be destroyed. Let us at least save, and use with economy, the magnificent yellow pine trees (many of them 300 feet high) that cover this portion of our public domain.

The greatest cormorants we will have to contend with will be the railroads. They already use one hundred and sixty millions of ties annually, and our railroading has but just begun. Ties have to be replaced every seven years, and, when 10,000 miles more of rails have been laid, it will require all the young trees in the country to supply the demand for ties. A tie, as every one knows, is made from young timber, the trees being only 8 to 10 inches in diameter, and few trees will cut more than two ties.

There can no longer be any doubt that the rainfall and water courses of a country are greatly affected by its forests.

A peach tree will give off 18 pounds, or about 2 gallons of moisture every twelve hours. The evaporation, then, from the earth through trees must be immense, the roots often drawing from underground springs, and throwing off through their branches vast volumes of humid air. Especially is this true of Kansas and Nebraska, where at the depth of some 20 feet, white sand is struck which is so full of water that, in many places, subterranean streams have been formed, and are frequently struck when boring shafts for wells.

I think the great currents of air which leave the Pacific Coast humid and warm empty in snows on the Rocky Mountains; and, leaving the mountains dry, they sweep over the great plains, finding no moisture to take up until they pass over the Missouri and Missippi, when, having been recharged, they empty into Illinois and Wisconsin. In Wyoming Territory, as we know, the dearth is almost complete: but in Nebraska, the heavily timbered heads of her streams give some humidity, and the clouds empty in frequent showers along the Loups, Nobrara, Plattes, Elkhorn and Missourie. Those who have watched the effect of forests on rainfalls, say that by commencing at the edge of a dry belt, the forest, and consequently rainfalls, may be gradually extended across the whole of the dry belt. So we might commence here at Omaha, and by gradually planting trees westward, increase the humidity of the atmosphere, until the required moisture for rain is reached.

The deplorable result of the loss of timber is now to be seen all over Europe. The Elbe has lost 18 per cent. of its flow in consequence of cutting away of the trees along its banks, exposing its waters to the hot sun, and consequent increased evaporation. The island of Santa Cruz, in the West Indies which twenty five years ago, was a garden of fertility, is now a desert alone,—the result of cutting away the forests. The theory is, that the dry currents of air are retarded by forests, and elevated until a point of condensation is reached. Radiation is also prevented, the air cooled, and the clouds passing over forests are rendered more easily condensed. Electricity is also a great agent, the trees being negatively charged, and drawing with great power the positively charged clouds. This theory is no longer doubt or experiment, but positive fact, demonstrated by experience and knowledge of the laws which govern the atmosphere. I know you agree with me in these views, and it was a conviction that they are correct which led you to frame and have passed the great timber growing bill, giving every person 160 acres of the public lands who would plant and keep in good order for ten years forty acres of timber. That law, as amended at this session of Congress, I think is nearly perfect, and does you great credit as a wise law giver.

But not only in Europe, but in America, is the loss of timber already lamentably felt. Many of our rivers have lost half their usefulness for manufacturing purposes. The Connecticut is hardly navigable, and the Kennebec and Merrimac have shrunk one fourth. The Potomac has lost nearly a fourth of its volume, and the Hudson nearly a sixth. If the Adirondack wilderness and other forests adjacent are destroyed, I believe it would render the Hudson wholly unnavigable.

Perhaps the greatest drain at present on our timber supply is the fences of the United States. This cormorant is now felt in every State of the East, and every year farmers are becoming more saving of their timber. It is an astonishing fact, but nevertheless true, that the fences have cost more than the lands, and are to day the most valuable class of property in the United States, except railroads, and real estate in cities. Our fences are valued at one thousand eight hundred millions to keep them in repair. The new State of Illinois alone has $2,000,000 invested in fences, 60 per cent. of which are in boards, posts, and rails, and 40 per cent. wire and hedges. They cost annually $175 000 for repairs.

In Nebraska, fences have cost less in proportion to the population than in any other State in the Union, the excellent herd laws in force here having lessened the necessity for fences. These laws should be adopted in every State, and farmers should hedge, and thus utilize the $1 000,000 or more of dead capital now invested in fences in the State.

Incredible as it may seem, forests are still felled and burned for the purpose of bringing the land under cultivation. From 1860 to 1870 no less than twelve million acres of forest were cut, the timber logged, and burned on the ground, so the land could be farmed. The annual decrease of forests by logging and burning, I am told, is still some 200,000 acres per year. And while we have been doing nothing to replace our forests, the demand for lumber in the United States has increased at the rate of 25 per cent. each year. There was received at Chicago in 1871 over 2,500,000 000 feet of lumber, and 10 000 acres of land were stripped of timber to supply that great city with fuel. I cannot say with certainty what is just our annual decrease of forest, but it is not far from 8,000,000 acres, as against 10,000 acres now forest planted. This is truly alarming, and certainly it is high time for some one to call the attention of Congress to the subject of forestry.

Your excellent bill to provide for the growing of new forests will do much to save us from a timber dearth; but we must, nevertheless, take the best care we can of