nation handed over to the federal government some of the most fruitful sources of revenue. It left with the states some of the heaviest burdens of expenditure. The time has come when a readjustment in this respect should be brought about. Education should be made in form, what it is in reality, a national function. It should be placed by the side of the army and the navy, and internal improvements and federal justice as one of the great and fundamental functions of the American people finding its expression in every department of our national life; from the rural district of our remotest states to the federal government at Washington.

Such a policy means federal appropriation on a large scale for the development of national education. It would naturally end in a secretary of education who, as a member of the cabinet, should represent in a concrete form the beginning of a new and larger policy calculated to bring about new and larger results in the educational field.

We have done much as a nation to help develop our material resources. We have done little to help develop our intellectual resources which, after all, underlie and determine the possible development of our material resources.

Our school system should reach every child in the nation with effective elementary teaching. It should offer elementary technical training for vocation to every child. It should offer the advantages of high school, *i. e.,* secondary, education to all children who may be able intellectually to profit by it. It should bring to all the youth of a country who desire it the chance to train themselves scientifically for their future vocations. The returns for such expenditure would exceed by far all returns thus far made upon investments in internal improvement of a material sort. If the nation would give its attention earnestly to the matter of establishing such a school system, as should in every section of the country find out the natural abilities of its children and then assist in developing them to the highest possible degree of trained efficiency, an era of national expansion, national development, national influence, of increase of national wealth, would dawn upon us such as the world has not thus far dreamed of.

SPECIAL ARTICLES

OCCURRENCE OF THE ÆCIDIAL STAGES OF WILLOW AND POPLAR RUSTS IN NATURE

THE writers have frequently collected the teulotosporic stages of the rusts, *Uredo* (*Melampsora*) *bigelowii* (Thüm) Arth., on species of *Salix* and *U.* (*Melampsora*) *medusæ* (Thüm) Arth., on species of *Populus,* in the vicinity of Ithaca, N. Y. Knowing that the æcidial stage should be found on species of *Larix,* frequent search has been made for this stage on the larch trees on the Cornell campus. One tree in particular, which grew in close proximity to a badly rusted willow tree, was watched through several seasons, but the æcidia were never found. On May 23, 1910, however, Mr. W. H. Rankin, a graduate student in the department, found a tree of *Larix decidua* on the campus, which appeared decidedly yellow from an extreme infection of the *Melampsora.* Recognizing the fungus, we went to the tree and found growing with interlocking branches, a tree of *Salix cordata.* Examination of the fallen willow leaves of the previous year showed an abundance of the teleutosporic crusts. During the past summer the tree has been largely defoliated by the extreme attack of the *Uredo* stage. Teleutospores have also developed again in abundance. A few days later, May 28, we were collecting in a swamp (Michigan Hollow) six miles south of Ithaca, and again found a larch tree (*L. laracina*) attacked by an æcidial stage of a rust. Search was at once made for willow trees and a clump located at some distance. Careful examination of fallen leaves failed to reveal the presence of teleutosporic crusts. We then turned our attention to some trees of *Populus deltoides* in the vicinity and here we found teleutosporic crusts on the fallen leaves.

Specimens of all of the collections were sent to Mr. F. D. Kern, Lafayette, Ind., who

gave them critical examination. Under date of June 14, he writes:

In regard to the *Larix* rust, I am convinced that you are right in both cases. As you will note from the "North American Flora" which we have published, the *Salix* and *Populus* forms are very similar. Since your material came in, I have gone over it very carefully and I feel sure that they do have some fundamental differences. The *Larix* rust associated with *Salix* has been collected before, once in Alberta and once in Wisconsin. The one associated with *Populus* has been proven by cultures, but not before collected.

H. H. Whetzel,
D. Reddick

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SOCIETIES AND ACADEMIES

THE NATIONAL ACADEMY OF SCIENCES

The academy met at St. Louis from November 8 to 10, when the following program was presented:

Tuesday, November 8

"Some Problems of Stellar Motion," George C. Comstock.

"Preliminary Note on the Sun's Velocity with Respect to Stars of Spectral Type A," Edwin B. Frost.

"On the Origin of Binary Stars," Forest R. Moulton.

"The Cycadophytes," John M. Coulter.

"A Monograph of Agave in the West Indies," William Trelease.

"The Mode of Chromosome Reduction," Reginald R. Gates (introduced by Mr. Trelease). Followed by a demonstration under the microscope.

Visit to Washington University and demonstration of Professor Nipher's experiments on wind pressure and the electric discharge.

Evening lecture in the Central High School auditorium (Grand Avenue and Windsor Place)—"China," Thomas C. Chamberlin.

Wednesday, November 9

"The Front Range of the Rocky Mountains in Colorado," William M. Davis.

"Mutualism, Parasitism and Symbiosis," George T. Moore (introduced by Mr. Trelease). Followed by a laboratory demonstration.

Visit to the G. Cramer Dry Plate Works, under the guidance of Mr. Cramer and Dr. Wallace.

Thursday, November 10

"Sugar Chemistry from the new Chemico-physical Standpoint, or the Behavior of the Sugars toward Enzymes, Alkalies and Oxydizing Agents," John U. Nef.

"Molecular Rearrangements in the Camphor Series: Isocamphoric Acid," William A. Noyes and Luther Knight.

Inspection of the river front, bridges, electric power plants and municipal waterworks, under the guidance of the Hon. Maxime Reber, president of the board of public improvements of the city of St. Louis.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

The 682d meeting of the society was held on October 22, 1910, President Woodward in the chair. Two papers were read:

Present High Temperature Work Abroad: Dr. A. L. Day, of the Geophysical Laboratory of the Carnegie Institution of Washington.

The paper dealt with the speaker's observations while recently visiting the three principal physical laboratories of Europe, in France, Germany and England, with special reference to the present status of high temperature work now in progress in those countries. The reasons why none of these countries are at present active in high temperature work was explained, and it was also stated that such work would soon be resumed by them.

At the Reichsanstalt good activity was found in vapor tension and absolute temperature determinations and radiation measures at these temperatures. In this connection Nernst's spectrobolometric measures were mentioned.

The speaker told of his efforts to calibrate a thermo-element by means of the boiling point of sulphur, and of finding a difference of about one and one half degrees from the gas thermometer. This led him to inquire into the previous determinations of the sulphur boiling point and of the conditions surrounding them. The difficulties of making such determinations were explained at some length.

Weather Proverbs and their Justification: Dr. W. J. Humphreys, of the U. S. Weather Bureau.

The paper dealt especially with the causes of the phenomena described by some of the useful proverbs and the relation of these phenomena to others they precede.

Weather conditions have always exerted great influence upon human affairs, and due to which