ciation for the Advancement of Science, Section M (engineering) proposed a resolution which, on April 26, 1925, was adopted by the executive committee in the following form: "Resolved, that the American Association for the Advancement of Science heartily approves the establishment of a National Museum of Engineering and Industry, to be located in Washington." On October 25, 1925, the executive committee appointed the president of the association, Dr. Michael I. Pupin, as its representative on the board. The complete list of the board is given in the number of SCIENCE for February 12.

THE biological laboratories of the United States Bureau of Fisheries, located at Woods Hole, Mass., Beaufort, N. C., and Fairport, Iowa, will open on June 21, and are expected to remain in active operation until about September 15. A limited number of research rooms and tables will, as usual, be available to those qualified to conduct investigations in the various branches of marine and fresh-water biology. Owing to the increased demand for accommodations at the Woods Hole laboratory it has become necessary to make a more careful selection of those who will be granted the privileges of the laboratory, and preference will be given to those investigators who are working along lines of especial interest to the Bureau of Fisheries, and who have shown ability for energetic and productive research. The opportunities and facilities of Woods Hole and Beaufort are well known. At Fairport there is a new and well-equipped laboratory, with the necessary collecting apparatus, and ponds and tanks. Both river water and filtered water are provided. Those desiring to have the use of tables and other facilities at these laboratories may communicate with Henry O'Malley, Commissioner of Fisheries, Washington, D. C.

IN the paper by Callie Hull and Clarence J. West on "Doctorates Conferred in the Sciences" printed in SCIENCE for December 25, the Iowa State College of Agriculture and Mechanic Arts is credited with having given no doctorates in the sciences from 1916 to 1923, whereas it should have been stated that thirteen doctorates were conferred during this period. The table of doctorates conferred shows nine for the year 1924 and twelve for the year 1925. The correct figures are eleven and thirteen, respectively.

UNIVERSITY AND EDUCATIONAL NOTES

WESLEYAN UNIVERSITY has received from an anonymous donor the sum of $40,000 for research work in chemistry, to be known as the Wilbur Olin Atwater Fund, in honor of the late Dr. Atwater, who was professor of chemistry at Wesleyan.

CORNELL UNIVERSITY has received a bequest of $25,000 for the use of the college of agriculture from the estate of the late Gustav Ulbricht, who died on February 19, 1924.

DR. HAROLD C. M. MORSE has been appointed assistant professor of mathematics at Harvard University.

EARL THORPE SCOTT, assistant plant pathologist of the Missouri Agricultural Experiment Station, has been promoted to the rank of assistant professor of botany.

ROLAND M. CHASE has been appointed professor of civil engineering and mathematics at the Alaska Agricultural College and School of Mines, Fairbanks, Alaska.

J. AUSTIN BURROWS, of the chemistry department of Iowa State College, has been appointed assistant professor in inorganic chemistry at the University of North Dakota, University Station, Grand Forks, North Dakota.

PROFESSOR C. A. LOVATT EVANS has been appointed to the Jodrell chair of physiology at University College, London, to take the place of Dr. A. V. Hill, who recently resigned to take a Foulerton chair of the Royal Society, tenable at the college.

DR. RATHERY has been elected professor of experimental pathology, and Dr. Lemierre professor of bacteriology, in the Paris Faculty of Medicine.

PROFESSOR FILIPPO BOTTAZZI, director of the institute of physiology and biological chemistry, has been selected to succeed Professor Zambonini in the rectorship of the University of Naples.

DISCUSSION AND CORRESPONDENCE

BLACK CHAFF OF WHEAT IN RUSSIA

IN 1917 I described a bacterial disease of wheat from our middle west under the title: "A New Disease of Wheat" (*Jour. Agr. Res.* X, 51). That year I had fifteen persons at work upon it with three collectors in the field. The same year I contributed two notes to the mimeographed Plant Disease Bulletin (issued by the Plant Disease Survey, Bureau of Plant Industry, at intervals) in which I further described the disease, mapped its distribution and speculated on its origin. From its restricted distribution (states west of the Mississippi, where much Russian hard wheat had been introduced), from its very infectious nature (as indicated by its occurrence in many localities and by our very successful inoculation experi-

ments), and from the fact that it is transmitted on the seed from one crop to the next, I assumed it to be a recent importation. I confined myself to saying only that much in 1917, but in 1920 I stated textually:

I think, for example, that our black chaff of wheat is an importation from Russia. At least it should be searched for in that country. It was not observed in the wheat region west of the Mississippi River until after numerous importations of Russian wheats.[1]

Word now comes from Russia[2] that this disease was observed in many localities in Russia in 1924. It occurred also in 1923 in the Crimea and he has found it on Russian wheat collected as long ago as 1916, Rjovzi, Government of Poltawa, and in wheat collected in 1910 in the province of Mohilew, Government of Elis-a-vetpol.

I quote from a translation as follows:

In 1924 the disease was noticed in the Kuban district, in the Don district, in the Governments of Charkow, Kiew and Woronesh. . . . There remains no doubt whatsoever that this form of bacteriosis exists in Russia, where it is evidently widely distributed for a long time.

Janczewsky thinks he has also observed it on wheat collected in Sunpan, China, in 1893.

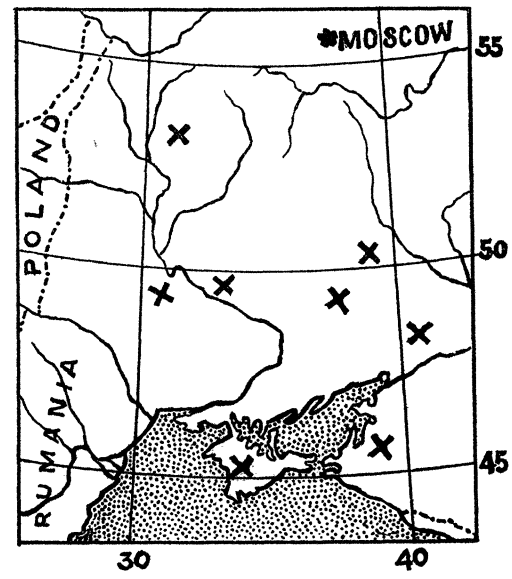
A. Kusmenko, in a letter to K. S. Flaksberger, cited by Dr. Janczewsky, writes as follows:

This summer, while working in the Ivanow Agricultural Experiment and Breeding Station, where there is a large collection of wheats, I have observed an exceedingly interesting fact of pigmentation of many winter wheats which I wish to communicate to you.

The pigmentation (coloring of glumes and beards into dark color) was exclusively observed on red wheats and consisted in that the entire (or part of the) beard or of the glume (or both together) blackened on the given ear. This phenomenon is observed for the first time on wheats which never had it before, even in individual cases, while this year it represents a mass occurrence with many wheats. . . . On closer investigation, pigmentation was also found on the typical white, beardless wheat—"Rakooka" No. 13/676 of the Charkow Agricultural Experimental Station, whereby its glumes were heavily colored (black).

The bacteria have been found not only in the glumes but also in the kernels.

The black chaff, therefore, occurs, according to Professor Janczewsky, the well-known Russian mycologist, in eight widely separated localities in southwest Russia, to wit, in the provinces of Crimea, Kuban, Don, Charkow, Woronesh, Poltawa, Kiew and Mohilew, stretching over an area of approximately ten degrees of latitude and longitude. I append an outline map of southwest Russia with the



localities marked by a cross. From this it will be seen that the disease occurs in that part of Russia explored by Mr. Mark Alfred Carleton for the U. S. Department of Agriculture in 1898 and again in 1900, and from which under his direction we imported large quantities of hard wheats for planting in our semi-arid west. The disease, according to Dr. Janczewsky, undoubtedly occurs in other parts of Russia.

I have always considered Mr. Carleton's work to be the most far-reaching and practical piece of work ever done by the Bureau of Plant Industry, since in a district in our west stretching from Texas to North Dakota and covering several degrees of longitude, through his energy and ability, we now grow annually 100,000,000 bushels of the Russian hard wheats, where previously we did not grow any.

I write this not to condemn Mr. Carleton but only to point out that, if our government were as intelligent as it ought to be (few governments have much foresight), we should now have agents scouring the whole world studying all sorts of crops and crop diseases so that in future when we import valuable ornamental plants and food plants we may do so without at the same time bringing in their parasites. Had we known of this Russian wheat disease in 1889 we should have imported the Russian hard wheats more slowly and grown the plants in quarantine first and so have avoided introducing the parasite along with the grain. In similar ways we might have avoided the introduction of a dozen very destructive parasites which have come to us from the old

[1] "Bacterial Diseases of Plants," W. B. Saunders Co., Philadelphia and London, 1920, p. 66.

[2] Janczewsky, *Bull. Applied Botany and Plant Breeding*, Vol. 14, No. 1, pp. 377–385.

world in the last three decades. The United States, even at the present time, is very derelict in making explorations in foreign countries for the benefit of its citizens and the conservation of its industries, but if we would lead the world, we must change our policy. Japan is the only country thoroughly awake to the need of foreign exploration. Her scholars are in every quarter of the globe, dozens of them, picking up every grain of information possible for use in the mother country. It is much to be regretted that we have not already adopted the same far-sighted and commendable policy.

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A SEISMOLOGICAL NOTE

THERE seems to be rather widespread misunderstanding as to the way in which the velocity of seismic waves varies with the density of the medium in which they travel.

From the theory of elasticity it is developed that the velocity of longitudinal waves in an elastic medium is $\sqrt{\frac{\lambda+2\mu}{\varrho}}$ where λ is Lame's compression constant, μ is the rigidity and ϱ is the density. The velocity of transverse waves is $\sqrt{\frac{\mu}{\varrho}}$. For surface waves of the Rayleigh type the velocity is $0.92\sqrt{\frac{\mu}{\varrho}}$ where Poisson's constant is taken as 0.25.[1] In the Rayleigh wave the particle vibrates in an ellipse in a vertical plane which contains the direction of propagation. Uller[2] has also found theoretically a value for the velocity of surface waves which varies inversely with the square root of the density.

Now Angenheister[3] found a greater velocity under the Pacific than under Asia for both types of surface waves, the L and M groups. He also found for nearby earthquakes a greater velocity for the preliminary groups for an under-sea path. Tams[4] and Visser[5] have also found the L group to have a greater velocity for sub-oceanic paths. Gutenberg[6] found for the Chilean earthquake a greater velocity in the M group for a Pacific path than for a path under South America, the Atlantic and Europe. He found the velocity of the L group to be independent of path. But it is important to notice that the phase of very long waves identified by him as the L group, and checked by the writer, are of greater velocity than the group which has usually been identified as L. Thus it is apparently not the group identified as L by other investigators, as Gutenberg suggests. The new velocity is 4.35 to 4.4 $\frac{\text{km}}{\text{sec}}$. For oceanic paths Angenheister found a still greater velocity for L but a lesser velocity for continental paths.

It seems established then that for at least part of the surface waves the velocity under the Pacific is greater than the velocity under continents.

Some writers have cited this increase of velocity under the Pacific as evidence that the density is there greater than under the continents.[7]

But from this increase alone the conclusion would be that of a less density beneath the ocean, since the velocity varies inversely with the square root of the density. It is only when we compare with gravitational measurements which indicate a greater density for ocean bottoms that we are forced to conclude that the greater velocity of seismic waves beneath the Pacific should be explained, as we explain the velocity increase with depth in the earth, by an increase in the elastic constants λ and μ which more than compensates for the increase in density.[8]

Thus we see that the increased velocity of seismic waves beneath the Pacific can not be cited as an evidence of greater density beneath oceans than beneath continents.

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THE TREATMENT OF WART DISEASE OF POTATOES WITH SULPHUR

IN the "Annals of Applied Biology," XII, 2, 1925, a paper was published by Roach, Glynne, Brierley and Crowther entitled "Experiments on the Control of Wart Disease of Potatoes by Soil Treatment with Particular Reference to the Use of Sulphur." In 1922

[1] G. Angenheister, "A Study of Pacific Earthquakes," *New Zealand Journal of Science and Technology*, Vol. 4, No. 5, 1921; also J. H. Jeans, "The Propagation of Earthquake Waves," *Proc.* Royal Soc. London, A, Vol. 102, 1923.

[2] Karl Uller, *Annalen der Physik*, Folge 4, 56, 1918, S. 463.

[3] *Op. cit.*

[4] E. Tams, *Centralblatt für Mineralogie, Geologie und Paläontologie*, Jahrgang, 1921, 2, S. 51.

[5] S. W. Visser, "On the Distribution of Earthquakes," Batavia, 1921.

[6] "Das Erdbeben in der chilenischen Provinz Atacama am 10. November, 1922," Veröffentlichungen der Reichsanstalt für Erdbebenforschung in Jena, heft 3, 1924.

[7] N. H. Heck, "Earthquakes of 1925," Bulletin of the Seismological Society of America, Vol. 15, No. 2, June, 1925, page 107; also Alfred Wegener, "The Origin of Continents and Oceans," English translation, Methuen and Co., Ltd., London, 1925, page 35.

[8] Angenheister, *op. cit.*