measurement. The term "thermocouple" may, unmolested, preserve its original application to a single couple only. The term "multiple thermel" seems rather better than "thermopile" since it classes its object with other thermels or thermoelectric thermometers, whereas "thermopile" is more commonly associated with current generators, or with the special thermometry of radiation measurement.

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## SOLAR ENERGY

"Creative Chemistry," by Edwin E. Slosson, M.S., Ph.D. (The Century Company), is a most interesting account of the astonishing number of important practical uses, in industry and war, of applied chemical science. For the benefit, apparently, of readers who are not educated chemists, or physicists, it makes occasional statements of pure science. One of these has the effect to revive the inquiry whether such statements ought not to refer to the observations or experiments on which they are based, unless readily available elsewhere. It reads: "*Solidified Sunshine.* All life and all that life accomplishes depend upon the supply of solar energy stored in the food." This is, in substance, but a repetition from prior publicists, many of them distinguished.

For example, Dr. Schuchert says: "Plants convert the kinetic energy of sunlight into the potential chemical energy of foodstuffs. Animals convert the potential chemical energy of foodstuffs into the kinetic energy of locomotion." And Dr. Soddy says: "Energy may sleep indefinitely . . . . In the potential form in coal, it has persisted for untold ages. Once released, heat is the sole ultimate product."

A quite extensive search has failed to find, in any literature, the account of an observation or experiment as leading to such conclusion. An elementary item of chemical teaching is that the sun's rays convert (approximately) 44 weight units of the comparatively inactive gas, carbon dioxide, into 32 like units of the universally active gas, oxygen, and 12 like units of carbon, ultimately a solid possessing no readily perceptible activity and incapable even of combination without the application of external heat. It is not easy for a non-specialist to believe, without evidence, that the energy of the sun's rays which decomposed the 44 units of the dioxide, adhered to the 12 units of carbon, and perhaps fell asleep there, while no noticeable amount went into the activity of the 32 units of oxygen.

FRANCIS B. DANIELS

## SCIENTIFIC WORK IN RUSSIA

SCIENTIFIC men may be interested in the following letter that I have received from Dr. Th. Fjeldstrup, of the Russian Museum at Petrograd:

The effect the arrival of this letter will have produced on you is probably that of something dropping into your hands out of space.

It is of no use speculating on the possible ideas you had as regards my fate, no more than on the picture you Americans have imagined to yourselves of the state of Russia's home life to-day, since they are based on scraps of news, often defective, given in papers or obtained otherwise—our two worlds have been separated too long and too completely in their intellectual life to know much of each other.

Often and often did I feel tempted to recommence correspondence with you, but the prospect of being read a year or so after having written, if at all, cut short all attempts of the kind. I have better hopes now and therefore I permit myself to remind you of my existence and send you my best greetings.

After an absence of almost full four years (since end of February, 1918) I returned to Petrograd two months ago. Throughout this long period I have had various occupations, not always agreeable to my inclinations, but this was unavoidable, nor could one expect to be allowed to choose. The scene lies beyond the Ural Mts.

I do not intend to waste your time by giving a detailed description of my doings in the run of these years. I shall only dwell for a moment on some facts that might interest you.

The summer of 1920 I spent as a member of a scientific research party sent out by the University of Tomsk in the region that you paid a short visit to before joining me in Verchni-Udinsk, viz., the Minusinsk region. The city of Minusinsk and its museum I visited twice. The curator of the museum is a new man since you saw it, but the

state in which the archeologic collections are is exactly the same, I suppose—no worse. Mr. Kozevnikoff (the curator) is a zoologist.

Part of my time was dedicated to work among the natives (folklore and collections) and part to excavation of the Bronze age mounds (kurgans) under the directions of Professor S. Rudenko—Professor Volkov's pupil and his successor at the University of Petrograd now. (By the way, I suppose you have heard that Volkov, Radloff, Princes Oukhtomsky—son and his father quite recently—are no more).

Last summer we spent a couple of months with the Kirghiz of the Turgai region, "taking stock," so to say, of possibilities for work on a larger scale, if circumstances permit. Anthropometric measurements (800 individuals) and 2-3 Neolithic stations were among the results.

Next spring and summer I may return to the Kirghiz—they are in my department at the Russian Museum with which I am now scientifically connected.

In spite of unfavorable conditions and difficulties scientific work in Russia has not ceased to progress, and scientists of all classes continue their field and home studies with all the energy they are capable of. There is one great privation of which we are acutely sensible, and that is—book famine. We are so thoroughly isolated that scarcely any literary news comes filtering through the frontier. The appearance of a copy of some comparatively fresh publication from the outside world becomes known immediately to the circles interested in its subject, is welcomed with joy and every one tries to get at the book and have it lent to him for a time; individual book, periodicals, pamphlets, all one.

Without knowing what goes on elsewhere in science one feels like going about with plugs of cotton wool in one's ears.

Now, Professor Rudenko, with whom I am on very friendly terms, begs me to put a businesslike question to you in a quite unofficial way.

During your stay in Petrograd in 1912, you spoke to Professor Volkov and Pr. Oukhtomsky of the desirability of establishing here a bureau for the exploration of the northeastern portions of Siberia by Russians with American cooperation. Having this idea of yours in mind, Rudenko, who is now the curator of the Siberian Department and is proposed to the post of director of the Russ Museum,[1] would like to know whether you still think this project practicable, and if so would your or any other institution wish to participate in the realization of a series of expeditions to the Far East (Mongolia, the Amur region, Central Siberia) which would make it possessor of scientific results and collections. The Russ Museum has a sufficient number of well qualified explorers. The question of fitting them out for the field may prove difficult in some respects; but such difficulties would be easily allayed if the work were planned on the principles of cooperation.

[1] Formerly the Museum of Alexander III.

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## DOCTORATES IN AGRICULTURE

IN SCIENCE, Vol. LV, page 271, appears an article by Callie Hull and Clarence J. West on "Doctorates conferred in the sciences by American universities in 1921." Three theses are listed for the subject of agriculture. There are in universities, generally, no departments of agriculture, but colleges of agriculture consisting of departments using methods of their own development and methods of the different sciences in studying agricultural problems.

Students being trained for work in such departments are listed in the article mentioned as having done their work primarily in bacteriology, botany, chemistry and zoology, perhaps because the titles indicate that the methods of these sciences were used. The fact remains, however, that they were preparing to study agricultural problems. Thus, at Cornell University alone, at least fifteen of the persons named under these four sciences were working in the College of Agriculture, preparing to study agricultural problems. And from the titles, I can be certain of at least four such men for other universities.

If no names had been listed under the subject of agriculture, no harm could have been done, but to list a subject of agriculture with only three names, it seems to me, might leave the impression that, with the great development of the agricultural colleges, there is very little tendency for workers to secure the training necessary to attack problems in an effective way. I believe that every one acquainted with the conditions in the colleges is convinced that there is a very hopeful development of graduate work and that the number of young men who are securing sound training for effective