view of this fact, which may have been overlooked, and also because of the complicating effects of pantothenic acid and other nutrilities in tissue extracts, the use of fungi in quantitative testing for vitamin B_1 in extracts appears hazardous in the extreme. At the time the writer's first suggestion was made the current conceptions regarding the chemistry of the vitamins were exceedingly primitive, and the suggestion, even though it did not turn out to be directly usable, was nevertheless of some value as provocative of thought and experimentation. The writer believes that the observations referred to, which form the basis of the proposed tests for vitamin B_1, are interesting and important scientifically but that their value as the basis of quantitative tests is questionable.

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FIRST RECORD OF THE BLACK WIDOW SPIDER IN MINNESOTA

DURING the past several years numerous records have been published on the occurrence of the black widow spider in the United States. While generally regarded as a distinctive southern species it had been reported from every state in the Union except Minnesota. Numerous unsuccessful attempts had been made to collect it in this state, and we can now add definite record of its occurrence here.

On May 21 and 22, 1937, the black widow spider was collected in southeastern Minnesota, in the southern portion of Houston County, a few miles north of the Iowa state line and across the Mississippi River from Wisconsin. Three female specimens were taken, at points several miles from one another. All were found on the sun-exposed sides of hills, where they had built an irregular web under a protruding stone. One specimen was sent to Professor R. V. Chamberlain, who determined it as *Latrodectus mactans texanus*.

A method by which the black widow spider may become further distributed is shown in the finding of a female *Latrodectus mactans* at Hallock, Minnesota, the specimen having been carried from Mississippi in a truck-load of bee-hives.

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SCIENTIFIC BOOKS

FOREL

August Forel. Out of My Life and Work. Translated by BERNARD MIALL. W. W. Norton and Company, New York. Pp. 352. 1937.

FOR fifty years past we have known of Forel as one of the great leaders in entomology, specializing in ants, which he studied from all parts of the world, describing over three thousand new forms. We have known of his patient investigations of the life histories and habits of ants, and from various sources have come intimations of his unique personality. We have been told how he was led, by his experiences as physician to those mentally deranged, to take up the fight against the use of alcoholic drinks, so that people in the opposing camp nicknamed him "The Great Phylloxera." We have heard how he condemned the false standards and evil practices connected with sex, and spoke of these things in any company with a frankness which in earlier days was considered shocking.

When I was a young man, having incipient tuberculosis, I seriously contemplated residence in Switzerland. Circumstances decided otherwise, but I got so far as to read about Switzerland, and for a time almost lived there in imagination. It is curious to think how different my life would have been, had I adopted Switzerland as my country. Although well content to be an American, I have never lost my sentimental regard for that little European country, which combines so much of physical beauty with such a diversity of folks, living peacefully in a genuine republic. At all events, I have missed something by not living in Switzerland; I might have been one of the friends of Forel.

Forel was born in 1858 and died in 1931. Toward the end of his life he decided that he could best tell his own story, neither undervaluing nor overvaluing himself. He felt that he had made many friends and enemies, through his advocacy of reforms, and regretted that some might be offended by his narration. Yet, "I can not get out of my own skin, nor do I wish to." As a matter of fact the book is extremely frank in its statements of facts and its estimates of people, including Forel's nearest relatives. The reader naturally can not say whether all the judgments are sound, but the impression gained is that of a most lovable and entirely sincere personality. He describes in considerable detail his attitude toward religion, which in due course of time led him to reject Christianity altogether. Near the end of his life he adopted the world-religion of the Baha'i, which had its origin in Persia. It was between his fifth and eighth years that he began to study ants. "The social life of these insects had a great fascination for me. I did not as yet understand their habits, but I saw how they helped one another, and how they crept into their nests; and I became extremely curious as to the contents of the latter."

When he was about eleven years old his grandmother came to him and said: "Just think, I once had a dancing partner who was a great lover of ants. He always scolded me when I destroyed the creatures, which used to eat my candied fruits; he was such a kind man and such a lover of animals. He gave me his book; I never finished reading it, but it is said to be a work of great scientific value. Here, take it, but be careful of it and never torment the little creatures again as you have done hitherto." The book was that of the celebrated Pierre Huber, published at Geneva in 1810. Says Forel: "In a flash all the mysteries of ant life, which had hitherto been enigmas to me, were revealed. Huber's book literally became my Bible, and I swore that I would one day become his successor as the historian of the ants." From this time on, in all the possible interludes in an excessively busy life, he studied, collected and described ants. Wherever he might be, if he had half an hour or half a day to spare, it was always possible to look for ants, and actually many new kinds were found in this almost accidental way. Quite early in his career, he published his "Ants of Switzerland" ("Les Fourmis de la Suisse," 1874, 447 pp.), a work which at once established his entomological reputation. He sent a copy to Charles Darwin, who wrote him "a long, very interesting and appreciative letter." Darwin regretted that he could not for the moment send any work of his own, but he sent Belt's "Naturalist in Nicaragua," asking at the same time, "Do you read English easily?" He was much ashamed to have to confess that he did not read English at all, and was spurred by Darwin's words to take up the study of that language so that in time he was able to read the whole of Belt's book and even to speak English after a fashion. "For this Darwin was responsible, and I have been grateful to him all my life."

Like several other distinguished naturalists, Forel took up the study of medicine because it promised a scientific career. He entered as a medical student at Zurich, but at the same time enthusiastically continued his work on ants. He thus attracted the attention of Professor Oswald Heer, who was a very able entomologist and botanist, especially known to-day for his work on fossil insects. Many years ago, when I visited Zurich, I found Heer's fossil insects all preserved as he left them, some with his manuscript names. Although he published much, he left much unpublished work, which no one, to this day, has been able to complete. Heer exerted a strong influence on Forel and persuaded him to write his account of the Swiss ants. On the medical side, Forel was attracted to psychiatry, and did some important work on the anatomy of the brain. He became assistant to Professor Gudden in Munich, and while there succeeded in making such improvements in the microtome that he made the first thin microscopic section of the human brain. In this way, he was able to see clearly structures which had before been described only in vague and confusing terms, and became, in a manner, the teacher of the professor under whom he served. In 1879 Forel took charge of the Cantonal Asylum at Burghölzli, where he remained until 1898. In this period of nearly twenty years he developed his professional skill and matured his ideas about many subjects. At the outset he found the institution in the most deplorable condition, and it required extraordinary courage and persistence to cope with the many difficulties. In 1883 he was married to Emma Steinheil, and of this he says: "Now there was an end of my troubles, and the icy winter in my heart gave way to radiant spring." Madame Forel soon became a force in the asylum and supplied the kind of influence which was so much needed in the campaign for humanizing the treatment of the insane. Forel's experience as director of the asylum led him to think about the underlying causes of mental breakdown, and while he fully recognizes the force of heredity and the impossibility of curing various types of insanity, he also found that many cases could be cured, and was sure that very many would never have developed under proper conditions. Thus the problem of alcoholic drinks was forced upon him, and both he and his wife became total abstainers and did everything possible to persuade others to follow their example. When I visited Switzerland nearly thirty years ago, I drank the alcohol-free wine which could be obtained anywhere, and heard of the great success of resorts offering no alcoholic drinks, something which greatly astonished those to whom alcohol had long seemed a sort of necessity. All this influence radiated from Forel and his wife, and it would be difficult to exaggerate its significance. During the same period, Forel took up hypnotism, and of this there is much to tell. Eventually, he felt that his work was becoming too complex and too burdensome, and decided to retire from the asylum. He writes of this: "Free! Free at last! That was my first sigh of relief. I had done with my asylum duties, with the government councillors and the supervisory commission, with my courses of lectures, with all my burdensome anxieties; and now I was free to settle down in a little country village near my former home, where I could quietly cultivate my garden. This had always been my longing; now it was gratified." This freedom did indeed enable him to travel about, but as for settling down to cultivate his garden and forget the troubles of the world, that was an impossibility. He was now a leading figure in certain reform movements, especially those having to do with alcohol and sex. Everywhere he was in demand for lectures, and

he always responded to the limit of his ability. In 1902 he went as far as Russia. "We were given a magnificent reception by the Mayor of Moscow, Prince Galitzin, and conducted through all the prisons and institutes of the city. He then invited all the guests to a supper, when the Tsar's health was drunk on champagne. To the horror of Frau von Wolfring, I did not join in drinking the toast, since there was no water on the table! . . . Moscow was at that time a curious mixture of barbarism and culture, with striking contrasts between wealth and poverty, education and ignorance, integrity and corruption, feasting and starvation. And everywhere society was fermenting under the surface."

In 1910, Forel suffered a great blow in the death of his oldest son Eduard, who had just passed his medical examination, and was thought of as the one to continue and develop the great traditions of his father's work. Two years later, just as he was preparing to go on a long voyage to tropical Asia, Forel suffered a stroke, which seemed at first to threaten total disability. He partially recovered, and went on with his studies of ants. The great war of 1914–1919 stirred him up to new activities, in the cause of peace and better social conditions. Forel's matured political faith is eloquently stated by him as follows (written in 1920):

"Socialism is now inevitable, and the social work of 1919 and the following years was, as we see, foretold by Lange. A strong capitalistic, monarchistic and militaristic reaction could only lead to international anarchy and fresh wars, which might indeed delay the final, international social reform by a few decades, but could never, never prevent its final victory. One must be really hidebound and crazy not to see this today, after such infinite ruin, after such an aimless shedding of blood. The modern technique of intercourse, almost unknown a century ago, has to-day made the World Federation of Peoples not only possible, but inevitable. But this will *quite automatically* abolish wars between states, which without it have grown constantly more extensive. Modern warfare is war waged *ad absurdum. This, in a few words, is my political and social testament.* Predatory, egoistic and hypocritical though human nature may be in itself by inheritance, yet it can be tamed from childhood upwards *by social education.* My perception of this I owe in the first place to Pierre Huber—that is, to the study of the ants; then to the study of the dead and living brain of men and animals; then to psychiatry, hypnotism, psychotherapy and medical psychology; further, to Darwin and Semon, and at last, but not least, to my dear wife, and to abstinence from alcohol, to speak only of persons and studies and activities which have had the profoundest influence on my career."

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SPECIAL ARTICLES

PURIFICATION OF TRAUMATIN, A PLANT WOUND HORMONE

ONE of the classical problems of botany is that presented by the "wound hormone," a concept first proposed by Wiesner[1] and later elaborated upon by Haberlandt[2] and others.[3] From the experimental evidence which has accumulated it may safely be concluded that when a plant tissue is injured, a substance or substances are produced which are capable, under suitable circumstances, of inducing renewed growth and division of other, uninjured, mature parenchymatous cells. That this hormone is necessary for the successful cultivation *in vitro* of some plant tissues has also been demonstrated.[4] It may, in addition, play a rôle in such processes as the healing of wounds, callus formation and adventive embryony.[2] In investigations which will be reported in detail elsewhere the present authors have undertaken a chemical and physiological study of such a "wound hormone."

A quantitative physiological assay for wound hormone was developed upon the basis of Wehnelt's[5] discovery that the parenchymatous tissue lining the seed chambers of immature string bean pods reacts to the application of a drop of tissue extract with the formation of a cylindrical "neoplasm" or intumescence. The new growth is the product of simultaneous cell division and cell enlargement. As a measure of activity the present authors have used (a) the concentration of wound hormone needed to produce an intumescence of a definite, relatively large size, and (b) the minimum concentration of active extract which gives a measurable response.

It has been found that the "bean test" is specific for the wound hormone in question. Other substances, such as hetero-auxin, pantothenic acid, etc., cause a response only if they are used in toxic concentrations which cause injury to, and the liberation of hormone from, the test cells themselves.

Using this quantitative assay to work out and to

[1] J. Wiesner, "Elementarstructur," Wien, 1892.

[2] G. Haberlandt, *Beitr. allg. Bot.*, 2: 1, 1921; *Biol. Zent.*, 42: 145, 1922.

[3] H. Reiche, *Zeit. f. Bot.*, 16: 241, 1924; A. Wilhelm, *Jahrb. wiss. Bot.*, 72: 203, 1930.

[4] J. Bonner, *Proc. Nat. Acad. Sci.*, 22: 476, 1936.

[5] B. Wehnelt, *Jahrb. wiss. Bot.*, 66: 773, 1927.