two alternatives in the last sentence of Dr. True is correct. The writer defined physiologically balanced salt solutions as solutions in which the toxic effects are annihilated, which each or certain constituents would have if they were alone in solution. Thus the fertilized egg of *Fundulus* develops naturally in sea water, is killed in a pure NaCl solution of the concentration in which this salt occurs in sea water, and is kept alive if some $CaCl_2$ or $KCl + CaCl_2$ is added. Since the egg lives and develops perfectly normally in distilled water the $CaCl_2$ or $KCl + CaCl_2$ are only needed to counteract the directly injurious effects which the NaCl solution produces as soon as its concentration exceeds a certain limit (about $m/8$) (but not to counteract the injurious effects of distilled water which do not exist in this case). The nature of this injurious action of the NaCl solution of a sufficiently high concentration is perfectly well known, since it consists in the injury or destruction of the specific impermeability or semipermeability of the membrane.[3]

The term *physiologically balanced* or *protective* salt solution was intended to be used in contradistinction to the term *nutritive* solution. If from a *nutritive* solution one or the other constituent is omitted (*e. g.*, K or NO_3 in the case of plants or K or the ion NH_4 in the case of bacteria) so that a malnutrition or a deficiency disease follows, it can not be stated that the organism suffers from the toxic effects of the salts left in the solution (as in the case of a pure NaCl solution of a sufficiently high concentration) but it suffers because the missing elements are indispensable building stones in the construction of the complicated compounds of the organism. The writer is not aware that anybody has proved that NO_3 or K or PO_4 in the nutritive solution of a plant are merely needed to overcome the toxic effects of the rest of the constituents of the nutritive solution; while in the case of *Fundulus* the experiments with distilled water show directly that the egg does not depend for the building up of an embryo upon any of the salts contained in the sea water or any other physiologically balanced solution.

In the writer's opinion the last sentence in Dr. True's note should read as follows: A deficiency of nutritive salts deprives the organism of some of the necessary building stones for the construction of its specific complicated compounds, and this deprivation may result in the formation of inadequate or directly injurious compounds, causing the phenomena of malnutrition or of the "deficiency diseases."

Jacques Loeb
The Rockefeller Institute
for Medical Research,
New York

[3] *Pflüger's Archiv*, CVII., p. 252, 1905; *Biochem. Ztschr.*, XLVII., p. 127, 1912; *Jour. Biol. Chem.*, XIX., p. 431, 1914.

The Typical Case Exemplified[1]

I received three offers when I came up for my degree; two from institutions in the east and one from a typical state university in the northwest. The opportunities for scholarly work were pictured to be as great by the western university as by the two eastern, and the former offered me considerably more in salary than either of the latter. Everything else being equal, the difference in salary decided the case. I came west, was disillusioned, and now wish that I had chosen differently; but, by the light that I had to follow, I could not have made a different choice. Therefore, it is with the purpose of casting some new light upon the offers that come from the west that I now write.

In general, the positions out here seem more attractive than those in the east, because usually the beginning salaries are higher—the fact that the maximum salary is much lower is overlooked or disregarded; and because usually the opportunities for scholarly and research work are represented to be as large. Or, rather, I should say, misrepresented, for all the time that I have had for original work I have taken from my sleep and recreation.

In the correspondence that I had with the head of my department and with the president of the university in reference to the position,

[1] See the letter by Professor Edward C. Pickering, Science, February 19, 1915, p. 288.

they spoke glowingly "of the opportunities in a comparatively new institution in a rapidly growing section of the country," and assured me that "every facility will be given you to continue your research work." My program as outlined by mail was reasonably light; but when I came to assume my duties I found that I was expected to grade all the quiz and examination papers. Consequently a great part of my time during the first year was spent with the blue pencil. In my correspondence pertaining to the position this sentence appears: "Graduate or advanced student assistance will doubtless be furnished," if I should become unduly burdened with academic work. I have made several requests for assistance, but so far have been denied it.

Nevertheless I was determined to keep the pot boiling, and I was, after a short delay, at work upon a minor problem. My first requisition for apparatus was granted immediately. I was forced to wait three months for my second; and when I made my third request I was asked the startling question, "Are you conducting personal research?" If so, I should have to meet personally the expenses of such work. I could not answer the question at first, for I did not know what personal research was, never having heard the phrase before; but when I learned that work which is self-initiated is personal, I realized that my work belonged to that category. The officer of administration with whom I had this conversation tried to show me that it was an imposition on my part to make this request. Why! had he not done research in San Francisco, in Omaha, in Chicago, in New York, yes, and in London and Paris too—the results of which, he informed me, were published in pamphlet form—and he did not request or expect the university to pay his expenses. So my third requisition was refused. This attitude toward original work is characteristic, and is not due entirely to ignorance of scholarly work, but in part to the importance and emphasis that the university gives to its correspondence and extension work.

These departments receive very liberal support. Courses are given in nearly every subject, and nearly every member of the faculty gives some of his time to extension work; some men give their entire time to it. The extension department is probably the most important in the university. This is due to the fact that the popular lectures which are given by the faculty upon their extension tours offer the best means of gaining the people's good will. Here, where the university and the agricultural college exist as separate institutions, there is much need of this. Public favor means appropriations. Therefore it is not research but extension work that the administration desires.

One's endeavors upon the extension platform soon receive recognition and promotion, whereas research work is disregarded. It is not wanted; it is not encouraged, no matter what may be said to the contrary. I have talked the matter over with several members of our faculty, with men who have been here for eight and ten years, and they agree with me—in fact I have advised with them in writing this letter—that there is no future here for a man with scholarly ambitions. And the pity of it all is that there are many men who have no desire to continue research after their doctorate, and who would be supremely happy in these positions, where the work is new, where the people are eager for knowledge, and where no one is critical; but the administration, by feigning to hold certain ideals, attracts and elects men to the faculty who are entirely out of sympathy with the conditions of their work as soon as they discover them. The man who comes imbued with the spirit of research and who desires to continue his scientific investigation will struggle hopelessly for a year or two against the odds, and will then resign; either resign his position and return east, or resign his scholarly ambitions. If he return east he must start again at the bottom; if he remain at his post he will be discontented in the sacrifice of his ideals—a victim of dry rot.

I feel rather strongly in this matter because I am myself at the parting of the ways. I too must "resign." Which course I shall pursue is a question that is giving me no little concern. It is one, also, that I feel should never

have been forced upon me; but it is one that all who have come out here, with ideals such as mine, have been forced sooner or later to meet. The issue should have been placed squarely before me two years ago when I was considering the position. Had I then known that research was practically impossible I should never have come to the northwest. One can never learn the true conditions of an appointment from correspondence with the administrative officers. They are naturally biased. For that reason I have written this letter. I sincerely hope that it will enable others to choose less blindly than I.

X.

A TYPICAL CASE

Professor ——— graduated at ——— University and, taking a postgraduate course, received the degree of Ph.D. He then went abroad, studied at ——— University, and returned to America, full of enthusiasm for original research. He had published an important memoir for a thesis which was well received, his instructors encouraged him and his fellow students appreciated and were interested in his work.

He now received an offer of a professorship in a small country college, married and began his new life, expecting to continue his investigations. He soon found that almost all his strength was consumed in teaching, and was horrified at the end of his first year that his salary had not been increased, as had been promised upon satisfactory service. This induced him to review his forces and readjust to the situation. He assumed a more sympathetic attitude toward the tyro and looked deeper into the organization and purposes of the institution. He began to fall in with the teaching problem and reduced the expenses of his department by taking a larger number of classes himself and for a nominal sum employed a few bright upper classmen a few hours weekly to do the drudgery. He attacked the problem of efficiency in instruction and found himself well equipped for the undertaking, for the machinery of his superior training gave a diamond point to his drill in the form of system and habits of thought, and this was backed up by the battering-ram of a growing enthusiasm.

He also became interested in the historical and vocational aspects of his subject and began to relate himself and his work to the world he lived in. In process of time his ideas began to show themselves in increased comfort and efficiency in the lives of human beings. His teaching task was now a magnet to all his powers, while his classes forgot their examinations in the joy of their daily lessons.

On the Olympic heights of the university he had learned to despise the rôle of the sturdy farmer and faithful wife who were responsible for his birth and education and much of the ethics of that parental pair had become a mere convention or a timely expedient. But there stole into the years of the busy Ph.D. a renewed conviction of the high worth of social purity, and his fictitious ideas of temperance, kindness, etc., gave way to principles more in keeping with his earlier teaching, while he ceased to despise the ultimate source of his bread and butter.

The finding of such men as this—men adaptable to the highest needs of the small country college—would be a worthy object for a Committee of One Hundred.

S. L. Macdonald

Fort Collins, Colo.

SCIENTIFIC BOOKS

Animal Experimentation and Medical Progress. By William Williams Keen, M.D., LL.D., professor emeritus of surgery, Jefferson Medical College, Philadelphia, with an Introduction by Charles W. Eliot, LL.D., president emeritus of Harvard University. Boston and New York, Houghton Mifflin Company, The Riverside Press, Cambridge, 1914. Pp. xxvi + 312.

In this book Dr. Keen has brought together the thirteen papers on experimentation which he has published in various periodicals during the past twenty-nine years. Nine of these deal chiefly with the contributions which this method of research has made to medical—and chiefly surgical—progress, while the remaining papers are devoted to the antivivisectionists and what they have been doing. Not him-