the result of the experiment, after the event; for, as the author would say, "The principle remains the same." To criticize the scientific standpoint of this book would, therefore, be like shooting at a disappearing target.

But if the discussion of the regulation of the composition of the blood is taken for what it seems to mean, it presents a conception of equilibrium which is sound physical chemistry, as it deals with stationary states, but is essentially erroneous as a description of physiological functions, since the characteristic equilibria of life are dynamic. The energy equilibria of the organism are as much in flux as the chemical equilibria of metabolism.

Evidently the author of this book in lifting the subject of the regulation of the blood equilibrium from an experimental to a mathematico-metaphysical basis feels that his predecessors and contemporaries, who have worked in this field by merely experimental methods, deserve little credit, if indeed he condescends even to mention them. He recognizes fully and properly the splendid contributions of Van Slyke. But toward Haldane (whose contributions from an experimental standpoint are really so immense that without him and his collaborators the subject of this book would scarcely have existed), the author at times uses a derogatory tone which violates the ethics of scholarly relations and which every one who has followed the development of this subject must condemn. Of one matter, which is almost the central point of the entire book, the author says (pages 80 and 81):

> To those who have not themselves experienced that state of bewilderment which is the usual condition of the investigator, it must seem strange that the physiologists who were studying the respiratory function of the blood should not have drawn . . . the conclusion that, since carbonic acid influences the oxygen equilibrium in blood, oxygen must influence the carbonic acid equilibrium. If proof of so obvious a condition is necessary a mere glance at the above equation will suffice. . . . Yet so little are physiologists accustomed to mathematics and such is the natural inertia of the mind, that this conclusion escaped us all and it remained for Christiansen, Douglas and Haldane to discover by experiment that the carbon dioxide dissociation curves of oxygenated and of reduced bloods are different.

Others do not think it so surprising that this discovery was made by Haldane and his collaborators.

The final evaluation of such a book as this must depend on whether it leads to further experimental advance or, on the contrary, encourages others to imitate its obscurity, its metaphysics and its condescension toward experimental workers, whom it further discourages by overloading the field with unnecessary technicalities. Certainly no worse example can be offered to those who in future should carry science forward than that of an eminent scientist and scholar preferring to impress his readers with his own profundity and erudition rather than to inform them by a clear simple and modest statement of the facts and theories of the subject.

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## WORDS AND LIFE

To say the least, scientists are now being afforded a little amusement in the field of agronomic advance with respect to the creation and adoption of a suitable terminology. In spite of the humor and irony and sarcasm which appear ominously to be in the air in the discussions of the matter, there is a deep organic side perchance which sooner or later must be faced squarely. Love, language, life are no trivial playthings of scientists, but deep and vital moods of being, which are not easily subject to deliberately controlled extensions and prohibitions as one sees fit to make them. Language is no fixed entity but a facile thing, reflecting all the moods and modes of life. It begins with no group; it ends with no group. Words as we use them come from all the classes and castes among us, good or bad, and they perish or survive as the moods of the times would decree, oftentimes as the man of the street decrees. Men will not have words put into their mouths or taken out of them, only as they themselves will it. Years ago the writer left a little New England town to enter the doors of the University of North Carolina. In one of its English courses he wrote a theme using the word *swale* for a small meadow. It was thrown out unconditionally as a word not complying with the linguistic canons of *good use,* and he was given to understand a word must not be used which was not in present, national and reputable use. *Swale* withal is a good English word in New England, for a tiny meadow. It was suggested politely that the writer was provincial in his language. I still cling stubbornly to the good word swale for my tiny meadows, nevertheless, because it has a history, because it is a part of me, because I am more or less of an individualist and do not care to be standardized in every detail of my life by outside groups. We may easily invent new words but their universal adoption into the everyday English language is quite another matter. If the people wish them, they take them, good or bad, whatever their history, meaning, application, and no force of life will check them. As our language exists to-day, the agronomists, the botanists, the pathologists,

in truth every scientific group is doing only what the various economic groups are doing, inventing and using words for their own use. They need not become generally known, and in truth they do not. Years ago before entering into the sacred cloisters of our imposing monasteries of science, I was fortunate enough to make a trip to London on a *jolly* English cattle boat as a *bally* cattleman. Here did I find a new diction I had never heard before. I had to learn not only a new code of ethics and life and philosophy, but a weird new language. A potato was eternally a *spud;* a big roll which looked like a plain bun was always a *cob;* plain meat and potato stew was always *lobscouse,* and on and on. This was the plain spoken language of the roaming galleys of the high seas, and I fell in naturally, normally, willingly, for there is no escape among these Romans, so to speak. The best writers do not make our language necessarily but oftentimes the people themselves. Dwell among the sea tramps and you find one language; among the land tramps another. The iron-workers, the bricklayers, the carpenters, in truth every specialized group of workers, whether in economic or scientific fields or what not, has its current usage. If one writes for carpenters he must know their special language, their tool-names, etc., and weird and incomprehensible are some of them too. A preacher for the general mass of humanity is a religious preceptor or interpreter; but the carpenter-guild have a handy little tool which is a narrow piece of board with a parallel-sided cleft at one end sufficiently wide to allow the insertion of boards. It is used to cut siding squarely with the window frame, or floor boards with the door frame, etc. It, too, is a "preacher" in their parlance. Nevertheless it is a very restricted word in its usage, and rarely has the average man heard preacher used in this connection. Yet who shall presume to be so élite that he will refuse to use it if the occasion demands, or invent for it a new word? The carpenter guild somewhere, sometime have invented the word, and it is going to stay with them and for them, contrary to all the interdictions of any élite writer among us who would presume to talk of a present, a national and a reputable test to make it good usage. It was in our monasteries of science and education that I was told to renounce this or that word, this or that spelling, this usage or that, but I have found that education, artificiality, etc., are one thing and language, mood, life another.

Words seep into the language from every source, and may or may not become the vernacular of the street, the common passwords of the day. The word "bughouse" originated with that notorious woman-tramp of Josiah Flynt's experience, Boston Mary. It left the underworld brotherhood with powerful wings, and is now or has been the slang of the élite among us more than once. No one has unraveled all the mysteries of words, their origin, use, final reversals of meaning or death. "Storied windows richly dight" meant much to Milton and others of the day, but who can resurrect the good old word "dight" mummified to-day and make it living coin again? Who shall make the detestable "imp" of to-day the small boy of yesterday? Words have their day and die with our moods, just as our fashions and customs and laws, and no one man or one group has much to do about it, it would seem. Telephone, telegraph, radio, and hundreds of other words have become common, readily understood property from the laboratories of science; but people accepted them because they came into the possession of new devices and found it necessary to label them. Bans, interdictions, prohibitions even with a death penalty will not stop a trend, a mood among men. There were times in the ancient days of Europe when smoking was punishable with torture and even death penalties, but pipes, cigars and what not that could be smoked became ever larger, ever more ubiquitous. Moods and laws die natural deaths, rarely violent deaths by gun or sword or rack.

Back of language then, is natural law and life in its most subtle manifestations, and what one restricted group says or does or recommends will not necessarily change matters seriously. I spell *thru* under a secret protest, for it is too much like pulling one bent straw from a hay stack, and then feeling one has done much to straighten all that remain. Our language is a living thing with all the moods of life and death in its make-up. A dead shelf-language like the Latin appears as a dried and shrivelled mummy, but men still persist in carrying it around, and the mere carrying will surely change it, and sooner or later make it reflect some of the whims of modern life. Volapuks and Esperantos may come and go, but the best of these pulse with very weak sparks of life and heartbeat in spite of the most entreating and vigorous scientific sanctions. The agronomists would do only what every minor group of the great web of life is doing, make a more or less restricted dictionary of their own, for their own understandings, not for the universal usage and understanding of humanity. The term "preacher" as a tool-name exists for carpenters alone, and no amount of "preaching" is going to make the man or woman of the street carry a little "preacher" in his pocket. It is not even recorded in the respectable dictionaries of the English language, but a respectable dictionary is no true index of living vernaculars, words, usages, etc.

The sequestered cloisters of our monasteries of science are going to play a very minor part in the adopted usage of the people. There are already many Esperantos among us, scientific and otherwise, yet all unknown except to the restricted group which speaks them. It may be a comparatively simple matter to introduce a scientifically coined name for a totally new device, as telegraph, telephone, radio, etc., for people have no alternative but to accept it. People may accept a new term as a slang novelty, just as they seized greedily upon the common, low-bred word "bughouse." It is another matter, however, to make them forget or distort old, familiar usages, recommended by limited groups of society, regardless of their refinements or fitness in the last analysis.

Even the laws of simple pronunciation seem not well understood. The vernacular of the New Englander is never going to agree with the vernacular of the South Carolinian or the Kansan, etc. It is no intentional committal toward or away from purities of intonation, etc., but a variation, natural and normal to the locality somehow, based on some of the deep, mysterious physiologies of life which have not yet been very well understood. I can detect significant variations in the singing of different katydids of the same morphological species in different regions. Some have adopted a widely different "song" but in other groups there is a vernacular difference. For instance, the Oblong-winged Katydid (*Amblycorypha oblongifolia*) in New England rasps with subtly different intonations and accents from the Washington forms. E. E. Snodgrass, of the Bureau of Entomology, U. S. Department of Agriculture, has noted similar differences in the notes of the New England groups and the Washington, D. C., groups of the True Katydid (*Pterophylla camellifolia*). Bentley B. Fulton has reported similar findings with certain crickets (*Oecanthus*). Certain birds are known to sing better in some localities than others. So even the purity of the spoken King's English affords a legitimate subject for the analyzing scientific mood when need be, but one which has implications even in the "voices" and vernacular of crickets and katydids perchance. Even the purity of the spoken word is not so simple as would at first appear, for back of it all is the intricate physiology of life, mood and mode, and back of it all are the refinements of climate, food, habit, heredity, tradition and what not in the universe.

This discussion takes no stand against any one, for it is well to keep on the calm, dispassionate side, but to the writer language is a beautiful thing because it is a living, plastic, versatile function having its weal and woes in the very warp and woof of life itself, subject to no man's whims or moods, keeping its mannerisms if need be, growing others, but as resisting and as irresistible to deliberate conscious chopping and hewing as the trends of life which give it birth.

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## AN EXPERIMENTUM CRUCIS IN DIABETES

THE problem of diabetes is again in a stalemate. Diet therapy and insulin have yielded their major contributions and probably have little more to offer. Before the problem of therapy can be again brought out of the blind alley in which it now stands, it must be determined whether the islet tissue of a diabetic individual is really a wrecked chemical factory, or whether it is intact. Pathologists are not agreed that the histologic changes that are commonly present adequately account for the failure of the internal function of the pancreas in diabetes. It is therefore an open question, of the first importance, to determine the functional state of the pancreas in diabetes, so far as the production of insulin is concerned. This question can be answered by determining whether the pancreas of a diabetic can be restored to normal function when transplanted into a healthy animal. The first step in the experiment would consist in making and establishing the transplant into the healthy animal. After this is accomplished it would probably be necessary to depancreatize the animal, unless the sum of insulin production of the pancreas *in situ* and that of the transplant could be effectively determined. If the transplant was now found to produce more insulin than it did in its former habitat, the experiment would indicate that in some cases of diabetes at least the loss of function is due to an environmental factor.

Although insulin is not as sensitive to chemical influence as was at first thought, it is by no means inert. Moreover, it can be inactivated *in vitro,* in ways that are not too remote from conditions that can exist in the organism. It is also well known that the glucose metabolism of a diabetic, which is a measure of his insulin production, varies with several circumstances. Such considerations, which need not be discussed in detail, make it possible that in diabetes one of two conditions may exist: (1) Either the formation of insulin by the intact islet tissue is prevented by the chemical influence of some environmental fact, through the presence of some inhibiting substance or through the absence of some chemical link in the process; (2) or the insulin produced in normal amounts is rendered useless by some other chemical condition in the organism. In any case the detailed