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Chemical Transmitters of Nerve Impulses

When, therefore, some seven years later, Loewi described his beautiful experiments, showing that stimulation of the vagus nerve produced its inhibitor effects on the frog's heart by the liberation of a chemical substance; and when his successive papers provided cumulative evidence of the similarity of this substance to acetylcholine, including its extreme liability to destruction by an esterase, which Loewi extracted from the heart muscle; I believe that I was more ready than most of my contemporaries for immediate acceptance of the evidence for this "Vagusstoff," and more eager, almost than Professor Loewi himself, to assume its identity with acetylcholine.—HENRY H. DALE: Some Recent Extensions of the Chemical Transmission of the Effects of Nerve Impulses. In Nobel Lectures: Physiology or Medicine. New York, Elsevier Publishing Co., 1965, p. 403.


Physiology does not consist in a knowledge of recondite phenomena, of difficult names, and of complicated instruments. It should fundamentally consist in the living mental picture of what the great organs below a man's skin are like, what they are doing, how they can be examined, what happens when they are not working properly, how their actions hang together, how they may be influenced for good and for evil. But physiology, as it is written, contains more than this, and, in sparing measure, it is well that the 'Institutes of Medicine' should not be restricted to the visibly 'useful,' or to the obviously 'utilisable.'—AUGUSTUS D. WALLER: An Introduction to Human Physiology, ed. 2. New York, Longmans, Green, & Co., 1893, p. vii.
Otto Loewi (Nobel Prize in Medicine, 1936)

In the night of Easter, 1921, I awoke, and jotted down a few notes on a tiny slip of paper. Then I fell asleep again. It occurred to me at six o’clock in the morning, that during the night I had written down something most important, but I was unable to decipher the scrawl. That Sunday was the most desperate day in my whole scientific life. During the night, however, I awoke again, and I remembered what it was. This time I did not take any risk; I got up immediately, went to the laboratory, made the experiment on the frog’s heart... and at five o’clock the chemical transmission of nerve impulses was conclusively proved.—A. C. Corcoran: A Mirror up to Medicine. Philadelphia, J. B. Lippincott Co., 1961, p. 261.
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Vicissitude and Perseverance in Research

... on Christmas Day, 1914, thyroxine was isolated in crystalline form; it contained 65.3 per cent of iodine. ... It was necessary to prepare more of the crystals but when this was attempted the result was a failure—not a partial failure, it was a complete failure. ... A second attempt was made with the same result. For a young man, still in his twenty-eighth year, this was discouraging, frustrating, and, eventually, frightening. The days became weeks and the weeks passed into months but the crystals were sought in vain. ... After 15 months, more crystals, and several reasons for the delay, were in hand.

... From the vantage point of 50 years after the event, it is evident that the 15 months were well spent. It was necessary to show that a galvanized iron tank can not be substituted for nonmetallic glass flasks but that a nickel tank is satisfactory; that, because of a seasonal variation in the iodine content of thyroid glands, it is not practical to use glands collected during late fall and winter; that glands of cattle which have been fed a diet low in iodine contain almost no thyroxine; that certain impurities will prevent separation of thyroxine in crystalline form, although it is present; and, finally, that it is possible to remove these impurities and then to obtain even small amounts of thyroxine in crystalline form.—Edward C. Kendall: Reminiscences on the Isolation of Thyroxine. Proc Mayo Clin 39: 548, 1964.

Francis Bacon: Of Regiment of Health (Circa 1625)

Physicians are some of them so pleasing and conformable to the humour of the patient, as they press not the true cure of the disease; and some other are so regular in proceeding according to art for the disease, as they respect not sufficiently the condition of the patient. Take one of a middle temper; or if it may not be found in one man, combine two of either sort; and forget not to call as well the best acquainted with your body, as the best reputed of for his faculty.—Hugh G. Dick (Ed.) Selected Writings of Francis Bacon. In The Modern Library. New York, Random House, 1955, p. 86.
HEMODYNAMIC STATE


Roger Bacon on the Errors of Physicians (Circa 1652)

Now there are four chief obstacles in grasping truth, which are stumbling blocks for every man, however learned, and scarcely allow anyone to win a clear title to learning—and they are:

- submission to faulty and unworthy authority
- influence of custom,
- popular prejudice and
- an ostentatious display of our own knowledge,
- coupled with the concealment of our own ignorance.

Everyone is entangled in these difficulties, every rank is beset. From these deadly banes come all the evils of the human race...—Sir John Charles: Roger Bacon on the Errors of Physicians. Med Hist 4: 272, 1960.


Subacute Bacterial Endocarditis—Ruptured Chordae Tendineae,
Dr. Peacock 1860

He ascribed his illness to cold taken four months before, and stated that though he had served for ten years in the army, he had not had rheumatism or any serious illness or accident before his present attack. . . . A systolic murmur was audible in all parts of the chest, but it was decidedly most distinct and harsh at the apex, and thence towards the left axilla. At the level of the third cartilage it was very indistinct, and it was inaudible at the upper part of the sternum. It was feebly heard at the lower angle of the left scapula. There was also a distinct musical murmur heard at the base of the heart, with the diastole, but this was inaudible at the apex. . . . The heart hypertrophied and dilated and weighed twenty-one ounces avoir. The free edge of the posterior semilunar valve was retroverted, and hung loosely into the cavity of the left ventricle . . . , so as to have allowed regurgitation from the aorta. The under surface of the retroverted portion had a few fibrinous fringes adhering to it. The free fold of the mitral valve was perfectly loose, owing to the destruction of several of the chordae tendineae, and must have allowed of free regurgitation from the ventricle into the left auricle. The fragments of the destroyed chordae tendineae were covered by vegetations, as was also the under surface of the valve itself.—Tr Path Soc Lond 12: 59, 1861.


200 Years Ago—Reflection of an Aged (Curmudgeonish?) Genius

When Linnaeus, at an advanced period of life, published for the last time in the year 1766, his System of Nature, that monument of his immortality, he concluded it with the following declaration of his past conduct. "I have ranged through the thick and shady forests of 'nature, I have to and fro found sharp and perplexing thorns, I have "as much as possible avoided them; but I learned at the same time, that "foresight and attention do not always conciliate perfect and entire safety. "I have therefore quietly borne the derision of grinning satyrs, and the "jumps of monkies upon my shoulders. I have entered the career and "completed the course assigned by fate."—D. H. Stoever: The Life of Sir Charles Linnaeus. (Translated by Joseph Trapp.) London, B. & J. White, 1794, p. 139.
I have shewn, that, upon injecting fluids into the ventricles by their respective arteries (the sigmoid valves being destroyed), the left or bicuspid valve was always seen to close completely and firmly; the curtains being so extensive as to fold together in the form of a cone or wedge within the ventricle, whilst the tricuspid was constantly found in its ordinary state, incapable of preventing a considerable reflux. With every attempt to induce an accurate closure of this valve, its scanty and divided curtains united imperfectly or scarcely met, and were only sufficient, at the best, to form a plane equal to the area of the opening.—T. W. King: An Essay on the Safety-Valve Function in the Right Ventricle of the Human Heart: and on the Gradations of this Function in the Circulation of Warm-Blooded Animals. Guy Hosp Rep 2: 126, 1837.
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Pasteur's Crystals as Symbols of Pure Science

... he was already a famous scientist when he began to work on practical problems. From 1847 to 1857 his dominating scientific interests were problems of no apparent practical significance but with large theoretical implications: the relation of molecular structure to optical activity, and the bearing of stereoisomerism on the origin of life; a few years later he became engrossed in other abstract thoughts concerning the bio-
chemical unity of life. As time went on, however, he yielded more and more to the
social pressures of his environment, and he spent the largest part of his productive
life working on practical problems of fermentation and disease. He became increasingly
involved in using science as an instrument of economic conquest rather than as a
technique for understanding the universe.

... he often regretted the choice that had been imposed on him by the Zeitgeist.
Time and time again he stated that he had been “enchained” by an inescapable for-
ward-moving logic that had led him from the study of crystals ... the desire of his
eyearly days to work on crystallography and on the nature of life apparently remained
with him as a haunting dream. Pasteur’s grandson, Professor L. Pasteur Vallery-Radot,
has recently told a moving story ... (with Pasteur saying) “Ah! my boy, I wish I
had a new life before me! With how much joy I should like to undertake again my
studies on crystals!”—RENE’ DUBOS: The Dreams of Reason: Science and Utopias.
in blood hemoglobin concentration, and two patients had reversible alterations in liver function during triamterene therapy. Triamterene may be a useful adjunct for thiazide-treated hypertensive patients by decreasing the likelihood of complicating hypokalemia.

References

Concordance to Jargon

Jargon, too, is often a cagey, noncommittal attempt to walk all around the description. I mean this with all respect to anyone sweating to work his way through to fundamentals. When you really are unsure about a function or a process, you tend to get lost in a maze of protective adjectives and in many abstractions, which are the linguistic elements of cloudiness and fog. But abstractions breed abstractions, as swirling vapors build up into impressive masses of cumulus cloud. Soon the jargon, if repeated often enough, is doing the thinking for you. . . . Of course, the impulse towards jargon is very much a matter of character; and it's likely that you can no more cure a naturally pompous person than you can reflower a virgin. So that you won't think I'm attributing indigenous pomp to the medical profession, let me give you some melancholy proof that the jargoneer appears in all walks of life.—Alistair Cooke: The Patient has the Floor. Proc Mayo Clin 41: 111, 1966.


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**On Scientific Pursuits and Discoveries**

Of the many traits recognized among scientists, the most essential—indeed, almost a *sine qua non*—is some form of intellectual curiosity. H. L. Mencken believed that the prototype of the scientist “is not the liberator releasing slaves, the good samaritan lifting up the fallen, but a dog sniffing tremendously at an infinite series of rat holes.” This curiosity leads to questions that each individual tries to answer according to his own temperament. There is, in truth, no such thing as a method of discovery. The solution of a problem may come to one man after immense systematic analysis, to another by analogy, to a third as a sudden thought or vision, to yet another as a dream, or in many other ways. There is a method for scientific verification or demonstration, but that is a different thing from discovery.—**Rene Dubos**: *The Dreams of Reason: Science and Utopias*. New York, Columbia University Press, 1961, p. 136.