



**Dr. Barnett Cohen**

## Barnett Cohen 1891-1952

### An Appreciation

Dr. Barnett Cohen was known to a host of friends as Barney and Barney I must call him for he and I were fellow workers and friends during about one third of a century.

We met in New Haven in 1917. To this day I recall the distinctness of the pleasant impression made by this Yale graduate student. We discussed some of the papers given at the meeting we were attending, and it may well have been that Barney's remarks then, as often in later years, revealed his uncompromising adherence to straight thinking accompanied by modesty in his expression of opinion. Then, or later, Barney took me to a group of his friends who were having a "talk-fest". There I sensed the respect and affection accorded him.

His enjoyment of good fellowship I saw much of in later years, especially at meetings of the Society of American Bacteriologists. In the natural aggregation of genial people Barney was a lodestone. Friendly with everyone, he particularly enjoyed a coterie of friends who came to be dubbed *This Bacteria*. That expression was taken from the welcoming speech of the mayor of a city where the Society met one year, a speech in which the mayor regaled the members by repeated allusions to the wonderful things "this bacteria does". By common consent Barney was the Imperial Pantologist and Mighty Magus entrusted with the initiation of new members of *This Bacteria*. He could get by with ridiculous nonsense and leave the most dignified initiate immensely pleased. This was because Barney's humor, whether exhibited in horse-play or in subtle ways, was always and obviously kindly. It may be added that *This Bacteria* was a coterie and in no sense of the word a cabal. Barney could never have been party to a cabal.

I regret that I know directly little detail of Cohen's early life. The reason is clear. Our conversations usually centered in the problems of the moment, but more significantly it was Barney's habit to make a chat pleasant for others by discussing what they had initiated. He seldom found occasion to speak of himself. This was not learned from a book; it was instinctive. The record shows that: he was born in Russia in 1891; he was brought to America by his parents when he was two years old; as a naturalized citizen of the United States he served as a lieutenant in World War I and as an official investigator under OSRD in World War II. Cohen's collegiate education was at the College of the City of New York where he and his friend Alfred Salomon became Professor Baskerville's assistants in chemistry and where he came to the attention of Professor C.-E. A. Winslow who was to have a determining influence in his life. After Cohen's graduation practical work in chemistry and bacteriology took him to positions in Meriden, Conn., Norfolk, Va. and Savannah, Ga. Then, if I am not mistaken, Professor Winslow brought him to Yale.

At Yale Cohen must have attacked characteristically whatever problems engaged his attention for his reprints show that: With Winslow he studied the

viability of certain bacteria in natural and polluted waters; he examined the action of hypochlorite on the glanders bacillus; he and Arthur Smith devised a method for determining hemoglobin; Smith, Dawson and he dealt with discrepancies in analyses of blood oxygen; under the distinguished pioneer in nutrition, Lafayette B. Mendel, or alone, or with Maurice Givens, he carried on several investigations of scurvy. One of the results that had particular value for subsequent investigators was the demonstration that scurvy in the guinea pig can be produced at will by control of the diet. It may be added that his friend, Dr. Salomon, tells me that Cohen learned from Winslow sufficient of the problems of public health to have lectured on some of them at "City College" while he was at Yale.

Having established a rapport with this Yale graduate student, I invited him to spend a summer with me in the Dairy Division of the Department of Agriculture. This he did in the summer of 1917 and we published on the effect of pH upon the growth of certain bacteria. On the basis of what I then saw of Cohen I had him appointed to my staff in the Division of Chemistry, Hygienic Laboratory (the precursor of the National Institutes of Health) when I went there in 1920. There Cohen was permitted by Yale University to complete his work for the degree Ph.D. His dissertation was on the effect of temperature and pH upon several phases of the growth and decline of bacterial populations.

During the ensuing seven years Barney and I worked together on oxidation-reduction indicators. He carried his full load of experimental work and of the intellectual tasks involved in putting the raw data into a theoretical framework. We also carried on numerous experiments dealing with various aspects of the reducing abilities of bacteria. Those experiments in which Dr. R. Keith Cannan participated were published in the tenth paper of the series. Some revealing work on the disinfecting action of halogens was reported briefly but not published *in extenso*. In the meanwhile Barney worked with Robert Chambers to master the technique of the surgery of single cells with the aid of the micromanipulator. He cooperated with Chambers, Pollack, Reznikoff and later with T.-T. Chen, a student at Hopkins, in a series of published investigations of the state of affairs within living cells under aerobic and anaerobic conditions so far as revealed by injected oxidation-reduction indicators and acid-base indicators. This work extended into his period at Hopkins. At that time there was comparatively little knowledge of the specific chemical processes of metabolism so that necessarily the results of this series of investigations had to be stated in broad, physicochemical terms. Nevertheless the perspective gained cannot now be overlooked. Cohen also extended the series of sulfonphthalein indicators and among other applications used them in control of pH in the alum treatment of water supplies. Of the new sulfonphthaleins he synthesized, his bromocresol green is of particular value in that it fills a gap in the previous series. With Phillips he showed how to make samples of neutral red that are suitable for vital staining.

When I moved to Hopkins in 1927, Barney carried our joint program on oxidation-reduction indicators into a new sector. He rejoined me in 1928 and from that date until his sudden death on October 22d, 1952 he was Associate Professor of Physiological Chemistry in the Johns Hopkins School of Medicine.

At Hopkins Cohen continued his investigations with the micromanipulative technique, and he undertook several exploratory investigations on anaerobiosis, on peculiarities of the "growth curves" of bacterial populations, and on other subjects, few of which were published. He then became interested in attempts to isolate a pneumococcal hemolysin. With due regard for the limitations of the facilities and assistance that could be put at his disposal it must be said that this was a tough problem. He attacked it with ingenuity and with occasional assistance from Miss Perkins, the Department's only assistant, and the medical students Shwachman and Halbert. Conditions for best assay, maximal yields, and the like were found, and the hemolysin was concentrated sufficiently to permit the accumulation of considerable knowledge regarding its physical and chemical properties. During the early stages Hellerman was providing the best documentation of the dependence of the activity of a hydrolytic enzyme on certain of its sulfhydryl groups. Application of Hellerman's reagents and of Cohen's extensive studies on inhibition by various oxidizing agents together with reversal by various thiol compounds brought converging evidence that the lytic action of the hemolysin is dependent on sulfhydryl. But also inactivation is caused by sterols, and Cohen showed that the greatly different actions of sterols are correlated with certain of their structural features. These basic observations enabled Cohen to demonstrate distinct differences in the lytic, dermatotoxic and other properties of the oxidized and reduced hemolysin and of the uncombined and cholesterol-bound hemolysin.

Cohen's work on the hemolysin was interrupted during and long after the war by his studies of a problem somewhat foreign to his previous experience. To him was assigned the task of explaining the behavior of certain war gases in water. This required the mastery of some difficult parts of the theory of chemical kinetics and the devising of experimental methods suited to the particular cases. In this work he had the assistance for a time of Joseph Harris and then the cooperation of Dr. Van Artsdalen. Four excellent papers were published in the *Journal of the American Chemical Society*, three of them in 1952.

I have said that this task was foreign to Cohen's previous experience and so it was in large degree. On the other hand Cohen's entire career was that of a scientist who attacked well each of a very wide variety of problems. This is suggested by the foregoing remarks but these are inadequate to show the range of his interests.

Throughout his career Dr. Cohen maintained an interest in and a scholarly, up-to-date knowledge of nutrition. This he put to excellent use in our course in physiological chemistry. He supervised volunteer students in their experiments on scurvy, rickets, and other deficiency diseases, and he so guided the students that they alone presented to the whole class their observations of the chemistry and pathology of the nutritional disorders in animals and what the literature reports of comparable diseases in man. On the whole these presentations by the students were excellent. Of particular value to the students was Dr. Cohen's inculcation of self-reliance and critical judgment.

Even during periods when he was preoccupied with physicochemical investigations and with the teaching of biochemistry Barnett Cohen's first love remained

bacteriology. He was devoted to The Society of American Bacteriologists. He served repeatedly on its council. He labored in framing its present constitution. As archivist of the Society he recovered, discovered and preserved records of bacteriology in America and he wrote for the jubilee meeting *Chronicles of the Society of American Bacteriologists 1899-1950*. For fifteen years he edited *Bacteriological Reviews* and it is interesting to note that as his mentor Dr. Winslow was the first editor of the *Journal of Bacteriology*, so Dr. Cohen was the first editor of the Society's review journal. He served as President at the Society's jubilee in 1950. During a year in which the School of Medicine depended on members of its general staff to conduct the course in bacteriology Dr. Cohen took charge.

As further evidence of the breadth of Cohen's scholarship be it noted that he had a remarkable ear for the niceties of the English language and an appreciation of the good usage of words in relation to their derivations. At our lunch table he was the court of last resort regarding the meaning or usage of a word and if, perchance, his decision was disputed it would soon appear that he and Webster seldom disagreed even regarding a rarely used word. He had a feeling for the evolution of language and could find a common sense middle ground between conservatism and an extreme to which a contributor to his journal would sometimes try to push him. He was well versed in some foreign languages, and although he had never studied Dutch, he managed with the aid of a dictionary, a Bible and his own knowledge of roots to make what I am told are excellent translations of some of van Leeuwenhoek's letters. His translation of the more famous letter he published in an attractive brochure.

Unknown to some of his friends was Barney's interest in Chinese art.

Barney's manual skills may not have equaled his intellectual powers but they ran parallel. He made a good deal of the apparatus he needed, and he could build with concrete for the rancher with whom he boarded and occasionally panned for gold during his vacations in the Black Hills. He played with lenses of his own fashioning to see as Leeuwenhoek may have seen and to find what he could of that secret of the "method for seeing the very smallest animalcules and minute eels" of which Leeuwenhoek said: ". . . that I keep for myself." He was a good sailor as I can attest from the several exciting adventures I had with him. He could steam a lobster on the shore in sea weed or bring a superfine dish from the kitchen in his bachelor's apartment.

To illustrate the service that Barney could render as a loyal friend I may tell one instance. Between sessions at a meeting he and I happened to pause near a blackboard where someone was expatiating on pH. Regarding the exposition to be somewhat confused I barged in brashly, to tell him what's what. Later Barney said to me: "Bill, do you recall your discussion with Dr. ————?"

"Yes, Barney, what about it?"

"Well, what you said was undoubtedly correct but perhaps you could have said it a little differently. Perhaps you were a bit rough. And just to put you on guard I might tell you a remark I overheard, provided you'd like me to."

"Shoot the works," said I.

Then in the tone of one reporting only a fact Barney said: "Well, the remark I overheard was 'Who the H—— is that young whippersnapper who thinks he knows so much about pH?' "

I recall with deeply felt gratitude the several times when Barney came to me amid the little turmoils that will arise occasionally in a laboratory. Each time he brought a kindly conceived, rational solution of the difficulty; never a criticism of anyone. In each of the laboratories where we worked together Barney was the balance wheel. He had the affection of everyone, and in later years they all called him Uncle B.

There may remain the question: Had this man no faults? Aside from the frailties that made him human, Cohen the scientist had a fault that bespeaks Barney the man. I base this venturesome statement on the following observations while disclaiming a foolish attempt to explain so complicated a phenomenon as is a personality. Having cooperated intimately with him in several unpublished and published investigations, I know that Barnett Cohen had up his sleeve much of which we now shall never know the fullness, and I do not have in mind the ordinary causes of lack of completion. He knew that selfless submission to those mysterious operations of the mind whereby ideas are created, but in telling what the voices said he too often faltered as if distrustful of himself the while he glowed with enthusiasm for the achievements of others. May we not call this the fault of an excess of modesty? Such a fault can sometimes deprive science of its due while remaining a potent factor in one's affection for a man.

There is an ancient saying that the gods know one another when they meet. This hardly needs interpretation but if we recall that some of the ancient gods were deifications of human virtues, we may apply a modern version of the saying to something about Barney Cohen that all his friends will acknowledge. He had a look in his eye as if ready to trade a smile, a kindly sense of humor, a habit of straight thinking and a considered gentleness in expressing opinion, a broad knowledge and a modesty, an integrity, all of which brought forth the best in others. One had to live with Barney Cohen but a little while to know that the best in oneself had met its match in this man who, day in and day out, ever remained a scholar, a gentleman and a loyal friend.

Barney dearly loved music and collected the best of records. Music solaced and sublimed him. Let us think of him at the last, as often through life, to have been wafted from his worries on a passage in a beloved symphony.

WM. MANSFIELD CLARK