

A VACUUM STOPCOCK

DURING the winter of 1908 work was undertaken on the gas production of *Bacillus coli* in synthetic culture media. The method of work consisted of growing the organism in high vacuum. In the course of this work considerable difficulty was experienced in maintaining absolutely tight stopcocks and as a result a stopcock was devised that appears to satisfy the conditions for a gas-tight stopcock.

The ordinary stopcocks had to be reground with jeweler's rouge, and while this precaution rendered the stopcock gas-tight under constant temperature conditions, it was found that the changes in temperature from room to incubator caused the two ground surfaces, assisted by the resilience of the lubricant, to separate and thus make the stopcock leak. To overcome these difficulties the stopcock had to be tied into place and mercury placed in the exposed lead.

The stopcock devised to overcome these difficulties is explained by the two diagrams. The passage from *X* to *Y* leads through an obliquely drilled plug as in the ordinary improved vacuum stopcock. At *A* a small bulb takes the place of the ordinary open end. Into the center of the plug, and in the same plane as the oblique drilling, a drilling is made as far as the level of the lead *X*. From

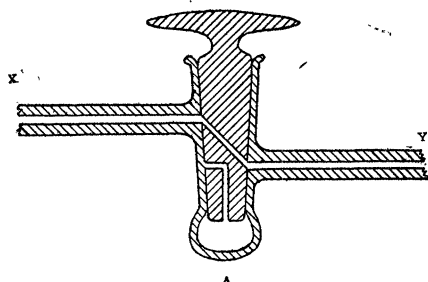


FIG. 1

this point it continues at a right angle as indicated in the diagram. The operation of the stopcock is as follows. The stopcock being in the position indicated in Fig. 1, the plug is turned through 180°, thus bringing it into the position indicated in Fig. 2. The stopcock is then connected with the pump and the small bulb exhausted. Turning the plug through another 180° will open the passage

from *X* to *Y* and then it may be opened and closed at will without the small bulb *A* ever coming into communication with the passage.

In the above arrangement the atmosphere is exerting its pressure to hold the plug in place, thus overcoming the resilience of the

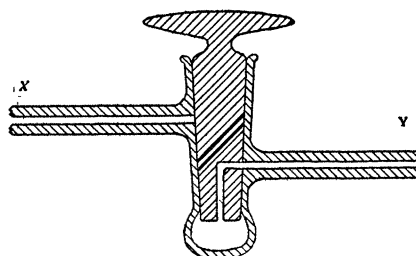


FIG. 2

lubricant and pressing the two ground surfaces together constantly, in spite of the temperature changes that tend to let one surface expand away from the other. The lubricant is composed of gutta-percha, hard paraffin wax and a heavy mineral oil; and answers admirably. Many similar lubricants are described in the literature.

The above stopcocks were very neatly constructed by Eimer and Amend.

BROWN UNIVERSITY FREDERICK G. KEYES

SOCIETIES AND ACADEMIES

THE AMERICAN MATHEMATICAL SOCIETY

THE one hundred and fortieth regular meeting of the society was held at Columbia University on Saturday, October 31. A single morning session sufficed for the brief program. The president of the society, Professor H. S. White, occupied the chair. The attendance included twenty-one members. The following new members were elected: Professor J. A. Brewster, St. Angela's College; Professor W. H. Butts, University of Michigan; Dr. C. F. Craig, Cornell University; Professor T. A. Martin, Mt. Union College; Professor M. T. Peed, Emory College; Mr. G. E. Roosevelt, New York City; Mr. L. M. Saxton, College of the City of New York. Four applications for membership were received. The total membership of the society is now 605.

A list of nominations of officers and other members of the council was adopted and ordered placed on the official ballot for the annual election at the December meeting. It was decided to hold the annual meeting at Baltimore, on Wednesday and Thursday, December 30-31, in affiliation with

the American Association for the Advancement of Science.

The following papers were read at this meeting:
R. D. Carmichael: "On the theory of functions of a triple variable."

R. D. Carmichael: "Notes on the simplex theory of numbers."

Edward Kasner: "Conformality and functions of two or more complex variables (second paper)."

G. A. Miller: "On groups generated by two operators satisfying the equation $s_1s_2 = s_2s_1$."

E. B. Wilson: "The number of types of collineations."

Frank Irwin: "The invariants of linear differential expressions."

A. E. Landry: "A geometrical application of binary syzygies."

The Southwestern Section of the society will hold its second regular meeting at the University of Kansas, on Saturday, November 28. The Chicago Section will meet at the University of Chicago on Friday and Saturday, January 1-2.

At the annual meeting of the society at Baltimore President White will deliver his retiring address on "Bezout's theory of resultants and its influence on geometry."

F. N. COLE,
Secretary

THE AMERICAN CHEMICAL SOCIETY NEW YORK SECTION

THE second regular meeting of the session of 1908-9 was held at the Chemists' Club on November 6.

The Nichols medal, awarded annually for the best paper read before the section, was presented to W. A. Noyes and H. C. P. Weber for their paper on "The Atomic Weight of Chlorine."

Dr. L. H. Baekeland, chairman of the section, spoke as follows:

"A few years ago our distinguished fellow member, Dr. W. H. Nichols, donated to this section of our society a fund wherewith to offer a gold medal every year for the best paper read at our meetings.

"I remember that, when this generous offer was made, I felt somewhat uncertain about the ultimate result. I knew that in this country of unbounded generosity it was easy to find a warm-hearted donor; I knew that it was easy enough to find an artist to make the medal an undoubted work of art; but I knew also that the Nichols medal would only be consecrated to its proper value, not in relation to the amount of gold it contains, nor in relation to its artistic value, but solely and exclusively by the quality of the work rewarded by it.

"Last year our section was unusually fortunate in the variety and the quality of the papers which were read before its meetings.

"Among several excellent papers, four attracted special attention:

"'The Atomic Weight of Chlorine,' H. C. P. Weber and W. A. Noyes.

"'The Extraction of Potash from Feldspathic Rocks,' A. S. Cushman.

"'The Ignition Temperature of Gaseous Mixtures,' K. G. Falk.

"'Drop Weights and the Law of Tate. The Determination of the Molecular Weight in the Liquid State by the Law of Tate,' J. L. R. Morgan and Reston Stevenson.

"Every one of these papers was fully worthy of the Nichols medal. Yet it was the general verdict as decided by vote that the paper of Weber and Noyes should be classed first.

"When I wrote to these gentlemen the announcement of the result, they acknowledged my letter and showed their equanimity by stating that they would have considered it an honor even if their work had been classed second to the three other excellent papers.

"To those here present who remember the struggling times of our society, when not so many years ago it was hard to get a dozen of us together at a meeting; when original research work in America was very scarce and weak in almost all departments of science, it certainly must appear as an inspiring symptom of fully awakened scientific activity that so many papers read before the New York Section alone should have been worthy of consideration for the Nichols prize.

"And now that the donor of the medal has done us the honor to-night of being among us, I request him to add to the luster of the occasion by presenting the medal himself."

Dr. Nichols, after giving a short account of the circumstances attending the foundation of the medal fund, presented the medals to the two successful authors.

Dr. Noyes in reply expressed the appreciation of himself and Dr. Weber of the honor conferred upon them and gave a brief résumé of the prize paper. He was followed by Dr. Weber, who spoke of some further work along the same lines on the atomic weight of bromine.

The remainder of the evening was devoted to a paper by Dr. J. E. Teeple on "An Enzyme Splitting Sugar into Acids."

C. M. JOYCE,
Secretary