THE NUCLEUS

Published by the
Northeastern Section of the American Chemical Society
with the coöperation of
The Connecticut Valley Section
and
The Rhode Island Section

VOL. I JUNE, 1924 NO. 5

Lay your plans now to attend the fall meeting of the American Chemical Society at Ithaca, N. Y., Sept. 8—13

IN THIS ISSUE

JOINT MEETING AND OUTING OF THE NORTHEASTERN SECTION and the RHODE ISLAND SECTION AT EAST WALPOLE AND NORWOOD JUNE 6, 1924

The one hundred and ninety-fifth meeting of the Northeastern Section will be held jointly with the Rhode Island Section at the plants of Bird & Son at East Walpole and Norwood on Friday afternoon and evening June 6th. The inspection of the plants will be divided into two trips and it will be necessary for members to make a choice, as time will not permit a visit to all three plants. Trip No. 1,—Paper Mill and Box Factory at East Walpole. Trip No. 2,—Roofing Plant and Floor Covering Plant at Norwood.

PROGRAM

Plant Visits	**1.30—4:00 P.M.**
Ball Game, Tennis and Social Time at Norwood Civic Club	**4:30—6:00 P.M.**
Dinner at Norwood Civic Club	**6:30—7:30 P.M.**
Greetings by Mr. Charles Sumner Bird followed by Moving Pictures of the Bird plants	**7:30—8:15 P.M.**

Arrangements are being perfected by Dr. Pratt and Professor Arnold to furnish automobile transportation to members who wish it, as far as possible.

Members traveling via N.Y., N.H. and H. R.R. should take the 11:44 A.M. train Daylight Saving Time arriving at East Walpole at 12:23. The return train leaves Norwood at 8:34 P.M. Daylight Saving Time.

Ladies are cordially invited.

Dinner Tickets $1.50.

Please send check or money order covering tickets to Dr. Pratt. Tickets will be forwarded by mail.

Committee on the Outing,

L. A. Pratt, Merrimac Chemical Co., Woburn, Mass.
J. F. Maguire, Bird & Son, Norwood, Mass.
S. T. Arnold, Brown University, Providence, R. I.

SPECIAL TRAIN TO ITHACA

A special car can be secured to run direct from Boston to Ithaca for the fall meeting of the A. C. S., Sept. 8-13, for a minimum of twenty-five people. It would leave Boston at 7:35 P.M. (Sunday or Monday, Sept. 7 or 8), and would be due at Ithaca next morning at 10:03 A.M. (E. S. Time). Without the special car at least two changes of train are required.

If you are going to the Ithaca meeting from Boston, please communicate as soon as possible with Dr. G. J. Esselen, Jr., 276 Stuart Street, Boston.

THE NUCLEUS

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The NUCLEUS is distributed to the members of the Northeastern, the Connecticut Valley and the Rhode Island Sections of the American Chemical Society.

VOL. I BOSTON, MASS., JUNE, 1924 No. 5

A WHOLESOME PRECEDENT

The joint outing of the Northeastern and Rhode Island Sections, June 6th, is the third enterprise of the year in which the Sections of this part of New England have united their efforts. The Symposium at Cambridge in January was supported by four Sections, and the Nucleus itself is the official bulletin of the three largest New England Sections of the Society.

We hope that this bulletin will serve in the coming winter to keep New England chemists better informed about each other, for our corner of the country has enough community of interest to make increased cooperation and interchange of ideas desirable and valuable. With best wishes for a pleasant summer!

IMPRESSIONS OF THE WASHINGTON MEETING

Charles V. Briggs

The Washington meeting of the American Chemical Society was the largest ever held; over nineteen hundred members registered between Monday and Friday, and over two hundred more went to Edgewood without registering. In spite of being swamped by numbers, the committees in charge of business and pleasure acquitted themselves nobly, and no one was prevented from enjoying any of the features presented for our entertainment.

Monday was given up to the meeting of the Council. Invitations for the spring meeting next year were received from several cities, and it is understood that most of the councilors favor holding the meeting in Los Angeles in June or July, 1925.

On Tuesday the general meeting in the ballroom of the New Willard Hotel was attended by about fifteen hundred. R. S. McBride, president of the Washington section, welcomed the members to Washington, and then resigned the chair to Dr. Leo H. Baekeland, president of the Society.

Dr. Robert A. Millikan, professor of physics at the California Institute of Technology, was then introduced, and gave an address on "The atom as seen by the physicist." The chemist has been upholding the "loafer" theory of the electron, he said, picturing them as sitting

around on dry-goods boxes on corners ready to shake hands with similar loafers in other atoms. The physicist, on the other hand, has preferred to think of them as leading more active lives, playing ring-around-the-rosy, crack-the-whip and other interesting games. Dr. Millikan advanced a number of arguments in favor of the Bohr theory of electron orbits and opposed to the "loafer" theory.

Dr. Gilbert N. Lewis, professor of chemistry at the University of California, then took up "The atom as seen by the chemist," and defended the chemical point of view. He also put forth a new theory of the composition of matter, according to which all atoms are made up of magnets, and all chemical action is magnetic action. The magnets result from the motion of the electron with its electric charge. Electrons are nearly always in pairs; when arranged parallel to each other with poles in opposite directions, they neutralize each other, but when arranged end to end, with unlike poles together, they reenforce each other. Dr. Lewis has found that all atoms have either one or zero units of magnetism according as the number of electrons is odd or even; a fact which tends to verify the magnetic theory.

In the afternoon several special divisional programs were carried out. The Division of Chemistry of Medicinal Products gave a special public program. The Division of Industrial and Engineering Chemistry held a symposium on heat transfer; the Division of Organic Chemistry presented a special program on the mechanism of organic reactions; and the Divisions of Physical and Inorganic Chemistry and Biological Chemistry held a joint symposium on photochemistry.

The evening meeting at the New National Museum included a narrative of the recent expedition of the United States Geological Survey through the Grand Canyon of the Colorado river and a presentation of the motion pictures taken by the expedition. Music was furnished by the United States Marine Band, and the museum was open for inspection by the guests.

On Wednesday morning the general divisional programs were begun in the Central High School and in the afternoon excursions were run through the various governmental laboratories. On Wednesday evening Dr. Edwin E. Slosson delivered one of his inimitable addresses on "The expansion of chemistry" to a crowd that taxed the capacity of the New Willard ballroom to its limits. His play of wit on chemical subjects kept the party entertained for more than an hour, after which music and refreshments were enjoyed.

On Thursday morning the divisional programs were continued. At 12.30 the members assembled on the White House grounds, where they were received by President Coolidge, who also delivered an address.

In the afternoon the members crowded aboard the steamer Charles MacAlister for the beautiful sail down the Potomac to Mount Vernon. Perfect weather and good management made the excursion a great success in spite of the size of the crowd. In the evening the Department of Agriculture and the Bureau of Mines showed technical and popular motion pictures to enthusiastic audiences at the Raleigh Hotel and the Cosmos Club.

Friday was given to the conclusion of the divisional programs and

trips through the government laboratories. In the evening a dinner and dance were held in the Wardman Park Hotel, which was enjoyed by a large party.

On Saturday morning a special train took the party to the Edgewood arsenal, the home of the Chemical Warfare Service. After the members had been shown through the arsenal a demonstration of chemical warfare activities was staged on the aviation field. Aeroplanes laid smoke screens; a tank did the same in spite of being stuck in the mud; a detail from the troops fired Livens projectors, Stokes mortars, rifle grenades, and hand-grenades, and lit smoke-candles to show the different methods of setting up a smoke screen. Both white phosphorus and titanium tetrachloride were used in the demonstration, and after the candle screen had been lit, the men, clad in gas-resisting suits and gas-masks, walked through the smoke to show how effectively the dense cloud of white vapor concealed all objects near it.

One of the officers lit a lachrymatory candle so that any one who desired might pass through the gas, and succeeded in so locating the cloud as to gas about half of the crowd who had no desire for the experience. No permanent ill effects were observed, but the demonstration was a complete success. This exhibition closed the week's program although a large delegation went to New York by special train to attend the Garvan dinner.

THE NATIONAL RESEARCH COUNCIL

*James F. Norris**

The recent dedication in Washington of the building to house the National Academy of Sciences and the National Research Council has served to bring to the attention of the public these organizations which have made it possible for the Government to receive the cooperation of scientific men in national crises. The National Academy of Sciences was organized by Lincoln during the Civil War, and the National Research Council was established by an executive order of President Wilson at the beginning of the World War. The desirability of having an organization to act as the scientific adviser of the Government and to stimulate research in pure and applied science led to the establishment of the Research Council on a permanent basis at the end of the war. This was made possible by a grant of five million dollars by the Carnegie Corporation. About one and one-half million dollars have been expended on the building, which faces the Lincoln Memorial in Washington. The income from the rest of the endowment will cover the cost of administration. No financial aid is received from the Government. The officers of the Council are nominated by the members of the several divisions which have been established, and are approved by the President of the National Academy of Sciences.

President Coolidge delivered the principal address at the dedication of the new building; he reviewed in a scholarly way the development of

* *The fact that Professor Norris is to be Chairman of the Division of Chemistry of the National Research Council for next year gives added interest to this article.*

science in the United States and emphasized the importance of science in helping to solve the national problems of the future. The building contains an unusually interesting collection of apparatus to illustrate the more important recent advances in science. In the case of many of the exhibits, the observer can demonstrate for himself the phenomena illustrated. No one interested in science should omit a visit to the collection, which is open to the public.

The Council is organized in thirteen divisions which cover the whole field of the natural sciences. The divisions consist of representatives appointed by the several scientific organizations in the country. Each division selects its chairman, and committees.

The space available for this article makes it necessary to limit it to a brief description of the more important work accomplished by the Division of Chemistry and Chemical Technology. The outstanding achievement of the Division is the successful completion of plans for issuing tables of chemical and physical constants, which are to be based on the critical examination of existing data. The project involved an expenditure of two hundred thousand dollars in the preparation of the material for the press. All but about forty thousand dollars of this amount has been collected. The work is well in hand under the direction of an editor who is being asssisted by over two hundred experts in this country and in Europe. The book will be published in ten volumes of about two hundred pages each; the first volume will be issued the first of next year. The value of such work has appealed to industrial organizations, and most of the money has come from these sources.

The Division has a number of committees whose business it is to stimulate and assist research in the several fields of chemistry. The committee on colloids has issued valuable reports on the progress in this branch of the science, and a list of problems for research which has resulted in attracting investigators to this field. It is now working for the endowment of an institute for colloidal research which involves the collection of seven hundred and fifty thousand dollars. It appears that the success of the project will soon be realized.

Other committees of the Division are actively at work; the ones on explosives and medicinal products have been markedly successful in increasing the amount of valuable research in these fields.

During the last year the Division completed the plans for the publication of "Chemical Reviews," the first number of which appeared during the recent meeting of the Chemical Society in Washington. After all the financial arrangements had been made and the material for the first copies of the Review had been obtained, the work was turned over to the American Chemical Society, which will undertake its future publication.

The Division has published recently a number of important bibliographies, a census of research carried out by graduate students in American universities, and a list of research problems obtained as a result of the co-operation of the Division with the association of directors of industrial research laboratories. The desire of the university men engaged in research to cooperate with the industries was evident from

the attention which the list of problems received. One industrial organization has furnished 22 dye stuff intermediates to as many men who are to undertake the problems outlined. It is planned to get the academic men more in touch with fundamental research problems that arise in the industries.

A committee of the Division has prepared a series of rules for the numbering of organic ring systems. The rules will be submitted to the committee on the nomenclature of organic compounds of the International Union of Pure and Applied Chemistry, and will become a part of a new system of nomenclature to be adopted by international agreement.

For a number of years the Research Council has had at its disposal money to award fellowships to especially well equipped and gifted young men who desire to continue research after receiving the degree of Doctor of Philosophy. The Rockfeller Foundation has recently given to the Council six hundred and twenty-five thousand dollars to be used for this purpose during the next five years. This gift will be used for fellowships in chemistry, physics and mathematics. Other benefactions support research fellowships in medicine and the biological sciences. The chairman of the division of chemistry is a member of the board which awards these fellowships. This activity of the Council is planned to develop the investigators of the future; it should have a marked effect in years to come.

Some of the outstanding achievements of but one of the divisions of the Council have been outlined. Other projects are being worked out in an endeavor to fulfil the chief ideal of the Council,—namely, the advance of science through research.

NEWS OF THE SECTIONS

The Northeastern Section

G. J. ESSELEN, JR., Chairman, 276 Stuart Street, Boston.
H. C. LYTHGOE, Vice-chairman, 538 State House, Boston.
E. B. MILLARD, Secretary, Mass. Inst. of Technology, Cambridge.
R. S. WILLIAMS, Treasurer, Mass. Inst. of Technology, Cambridge.

Executive Committee

F. C. Atwood, L. F. Hamilton, G. W. Harris, R. T. Haslam

Councilors

J. B. Conant, W. C. Durfee, W. L. Jenniugs, L. C. Newell, L. A. Pratt
George Defren, G. S. Forbes, R. W. Neff, J. F. Norris

ASSOCIATE MEMBERSHIPS

It is suggested that, in common with some of the other Sections, the Northeastern Section add social or associate members, who, upon payment of a small yearly fee to the Section, shall be entitled to all the privileges of the Section's meetings, dinners, picnics, etc.

The editor would like your opinions upon this suggestion.

Officers for the Coming Year. At the regular meeting of the Section, May 9th, the following officers were elected for 1924-5:—*Chairman,* H. C. Lythgoe; *Vice-chairman,* L. C. Newell; *Secretary,* W. C. Whitman; *Treasurer*

R. S. Williams; *Councilors,* George Defren, W. C. Durfee, G. J. Esselen, Jr., G. S. Forbes, W. L. Jennings, R. W. Neff, L. C. Newell, J. F. Norris, L. A. Pratt; *Executive Committee,* K. L. Mark, J. A. Seaverns (for two years). (F. C. Atwood and R. T. Haslam are also members of the Committee for another year.)

The May Meeting

Nearly 150 members gathered in the Wedgewood Restaurant for the last meeting.

On recommendation of the Executive Committee and Council and after some discussion, it was voted to put the meeting on record as being opposed to any change in the requirements for membership in the American Chemical Society from those at present.

L. A. Pratt and J. F. Maguire of the Outing Committee explained the arrangements planned for the affair. After the election of officers for next year, two interesting papers on "Rubber" were read to the Section.

"Plantation Rubber."

Mr. John W. Bicknell, Vice-President of the U. S. Rubber Plantations, Inc., related the story of plantation rubber from the carrying of a few seeds from South America to England in 1876 to the present immense development in the East today. He then exhibited some motion pictures that showed the steps by which the dense tropical jungle was supplanted by orderly forests of well-kept rubber trees, and the process of gathering the latex and preparing the rubber.

"Rubber Latex,"

an address by Dr. W. A. Gibbons of the Research Laboratories of the U. S. Rubber Co., New York City.

A large and steady supply of rubber latex is being shipped in tank steamers to this country, an innovation that marks a third epoch in the rubber industries. The first epochal event was the discovery of vulcanization and the second, the introduction of plantation rubber.

Latex is a colloidal system in which the individual spherical particles of rubber constitute the dispersed phase. A large beakerful of the fluid, exhibited by Dr. Gibbons, looked decidedly like milk. Moreover, it behaves in certain respects somewhat like milk, for in concentrated solutions the particles of rubber rise like cream, only to redisperse again on dilution. The latex shipped to this country is stabilized by the addition of a little ammonia. On treatment with acetic acid the dispersed phase, rubber, is coagulated and may be removed as a solid mass, not unlike the curd of milk.

Latex will yield on the average 30% of commercial rubber. It can be concentrated also up to about 60%, becoming continually more viscous with increasing concentration. Small amounts of proteins, reducing sugars, and important substances soluble in acetone complete the list of components.

Of the four methods of preparation, the drying process is of special interest, since the arrival of tank steamers full of latex instead of bales of sheet rubber is largely due to the development of this process. By means of a revolving disk, the latex is atomized at the top of a chamber and the tiny droplets are dried by a rising current of warm air, so that they collect in a solid mass at the bottom of the tower. When vulcanized such rubber has a high tensile strength.

Another method, filtration, utilizes the fact that certain porous materials will let the water pass through, but will hold the rubber back. In this way a layer of viscous material may be collected on the surface of the porous body, and this layer may be built up to a substantial thickness which gives a skin on drying.

An important application of latex is the impregnation of cords for fire fabric. Beside the advantages this liquid offers because of its high concentration of rubber combined with low viscosity, the rub-

ber obtained from it, because it has not been subjected to any rolling or milling, is considerably tougher and more resilient than the plantation product.

Reported by S. B. F.

Recent additions to our membership.

Byron E. Cohn, Adams, Mass.
Clarke T. Harding, Boston.
John W. Ingram, East Lynn
Henry J. MacMillan, M. I. T.
Burnham S. Walker, West Bridgewater
Nandor Porges, M. A. C., Amherst
H. G. R. Schneider. Brookline
Pauline S. Richardson, Keene, N. H.
Warren A. Chilson, Milford, Mass.
George M. Siedel, Woronoco, Mass.
Luang Vidya, Boston.
Edward H. Ellms, M. I. T.
Norman D. Scott, Cambridge
William J. Dobinson, Somerville
Sumner B. Young, Boston
Reginald B. Parkhurst, Lynn
William F. Boucher, Jr., Newton
Raymond P. Norton, Watertown
Alfred C. Smart, Jr., Waltham
Arthur E. Nye, Worcester
George H. Ellinwood, Brookline
Phillip Sellew, Gloucester
Hector A. Lopez, Dorchester
Melvin A. Perkins, Cambridge
Tsung-Shu, M. I. T.
Ke-Chung, M. I. T.
Karl Burroughs, Watertown
Henry F. Weber, Jamaica Plain.
Raymond S. Manley, Worcester
T. K. Sherwood, Winchester
Walter P. Chen, Lowell
Raymond Reuter, Cambridge
C. Campbell Baird, Wollaston
Roland B. Hutchins, Methuen
Leland M. Rice, Cambridge
Walter J. Fried, Cambridge

Gained by transfer from other sections.

B. J. Eiseman, Jr., Cambridge
Samuel Kogan, Boston
Joseph M. Haughton, Cambridge
H. A. Moxon, Cambridge
M. F. LeDuc, Cambridge
R. H. Martin
E. C. Geotz
F. Wellington Gilcreas

The Rhode Island Section

SAMEUL T. ARNOLD, Chairman NELSON BARLOW, Vice-chairman
LUCIUS A. BIGELOW, Secretary-Treasurer, Brown University, Providence, R. I.
ROBERT K. LYONS, Councilor

The April Meeting.

The April meeting was held on the 11th, at the Jesse Metcalf Chemical Laboratory, Brown University. This was a joint meeting of the R. I. Section of the Chemical Society, the Association of Textile Chemists and Colorists, and the Providence Engineering Society. The ladies were invited. Professor Herbert F. Davison of the Department of Chemistry spoke upon the subject:—"Some Lecture Table Demonstrations." Professor Davison is experienced along this line, and he gave us a very entertaining, interesting, and instructive talk.

Once again we became as humble Freshmen, and marvelled at the wonders of chemistry. You shoot a stream of hydrogen out into the air—it strikes a porous cup, diffuses through, creates pressure inside, and the light comes on. You pour on water only to start a fire. You but turn on a light to create an explosion. You find yourself forced to believe that after all there is something in the Mass Action Law. And so it went, from one interesting phenomenon to the next. Added to this, the skill and easy assurance of the speaker made the talk most pleasant. We were warned not to be at all surprised if some of the experiments failed to work, but we could hardly fail to observe that they all did work.

After the talk, the entire building was thrown open for inspection, and the larger part of the audience of 175 wandered through the various rooms, smoking and chatting to their hearts' content.

Refreshments were served during the

evening, which seemed to go "right to the spot" from the way the supply vanished almost as fast as it was brought forth—but not quite.

We all felt that the occasion had proved valuable and well worth while.

The June Outing.

The June meeting and picnic which will be held on June 6th, jointly with the Northeastern Section at E. Walpole, Mass., is something you will not want to miss! Save that date! Special notice regarding this is being sent to all our members.

Your secretary wishes to quote in this column a statement which appeared in the May issue of the Nucleus, with which he is most heartily in accord.

"Come to our meetings, fellow members, bearing in mind that in this old world of ours we get just about as much as we give. Give freely of yourselves and your knowledge, others will do likewise by you, and soon you will make acquaintances, many of which will result in friendships loyal and true—the *greatest asset* any chemist can have, regardless of the field in which he works."

Mr. Neff is most emphatically right. Come to our picnic, and come to our meetings! Let us double our attendance next year! If all our fellow-members who are not with us in our enterprises came out—everyone who could—why it would be a wonderful inspiration to our speakers and to your officers. And furthermore, you would get a lot out of it, too—perhaps more than you ever suspected!

The June Nucleus comes out too early to carry a report of our May meeting.

The Connecticut Valley Section

G. ALBERT HILL, Chairman G. B. HOGABOOM, Vice-chairman
E. W. LOVERING, Secretary, Trinity, Trinity College, Hartford.
HENRY McDONALD, JR., Treasurer, 11 Laurel Street, Hartford.

Executive Committee

V. K. Krieble J. C. Newlands
H. Edward Wells

Councilors

J. S. Chamberlain C. R. Hoover

The joint meeting of the Western Section of the N. E. Association of Chemistry Teachers and the Connecticut Valley Section was held at Mount Holyoke College, Saturday, May 3. In the afternoon Dr. Kendall of Columbia addressed the members on "The Use and Abuse of Water," giving an outline of the recent work on the theories of solution. After the talk, the Chemistry Department of the College served tea to the members, and the Sections inspected the building and the College grounds. Some went out to play golf, but found the day a bit too windy.

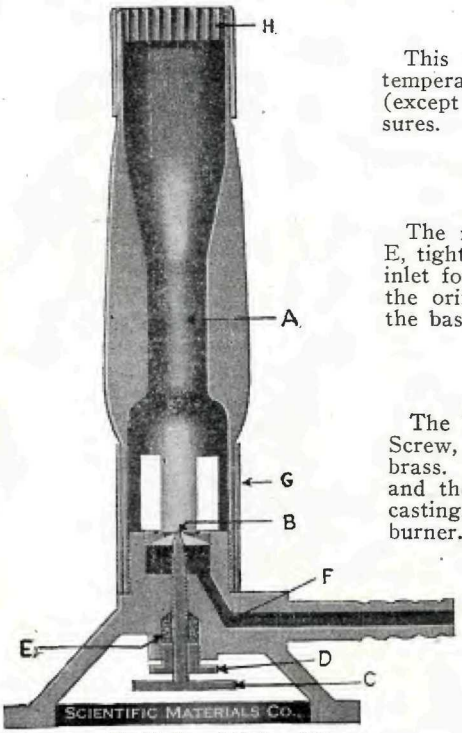
After a dinner at the College Inn, the Sections met in the Art building. Dr. Bogert addressed the Section on "Science and Art in the Perfume Industry," showing colored slides of the plants from which essential oils are obtained, and of the apparatus by which they are extracted. After the talk and some discussion of the future of the industry, the audience inspected the samples, which were largely specimens of the raw materials.

Results of the Garvan Prize Contest in Massachusetts.

First prizes were won by Grace King, Girls' Latin School, Boston; Lores W. McCloskey, Wakefield; Eary Vatcher, Cushing Academy; Walter E. Marston, Durfee H. S., Fall River; Jennie Lamarca, Academy of Notre Dame, Roxbury; Robert A. Pratt, Greenfield H. S. Honorable mention was awarded to Marjorie P. Berle, Reading H. S.; Priscilla Temple, Thayer Academy; Dorothy Dolliver, Girls' Latin School, Boston; Julia Sandberg, Orange H. S.; Helen Mahoney, St. Augustine's School, So. Boston; William J. Gorman, Jr., Pittsfield H. S.

NEW FISHER BURNER

WITH NICKEL GRID



Pat'd. Jan. 1913-Jan. 1921

TEMPERATURE

This burner will produce the highest temperature without blast, using any gas (except acetylene) and at different pressures.

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The needle-valve has a packing gland, E, tightened by the screw, D. A separate inlet for the gas, F, brings the gas up to the orifice, B. The hose connection and the base are cast in one piece.

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The Tube, A, air regulator, G, Needle-Screw, C, and Screw, D, are made of brass. The grid is made of pure nickel, and the base is a one-piece white metal casting. No iron or steel is used in the burner.

SAFE

The nickel grid is 10 mm. thick, and contains 100 square openings; this prevents back-flashing. Leaks are eliminated by the gas-tight features.

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The price of $1.75 is just about one-half the price of other high temperature burners, none of which have all the features of this burner. This low price is possible because we make this burner in our own shop, in lots of 10,000 at a time, and employ special jigs, dies, tools and automatic machinery.

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