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**AMERICAN CHEMICAL SOCIETY**

**Sept. Meeting, Wed. Sept. 24th**  
at 8:00 P. M.

**BAGLEY HALL, University of Washington**

**Speaker**

Professor Karl Freudenberg of Heidelberg, Germany

**Subject**

Natural Tannins and Related Substances

*The*

**PUGET  
SOUND**

**CHEMIST**

BULLETIN OF THE PUGET SOUND SECTION OF THE AMERICAN CHEMICAL SOCIETY

SEPTEMBER, 1952





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## SEPTEMBER SPEAKER

### KARL FREUDENBERG

The Chemisches Institute of the University of Heidelberg has been headed by Leopold Gmelin (1817-53), Robert Bunsen (1853-88) Victor Meyer (1889-97). Theodor Curtius (1898-1926) and (since 1926) by Karl Freudenberg.

Karl Freudenberg was born in Weinheim, Baden, on January 29, 1886. He received his training at Bonn (1904-07) and then under Emil Fischer at Berlin (1907-10) where he received the doctorate in 1910. He stayed on in Fischer's laboratory, studying the linking of gallic acid and similar materials, which occur in plants. After m-digallic acid was prepared in pure form, and its supposed identity with the vegetable tanning material gallotannin was disproved, one of these tannins (pentagalloyl glucose) was successfully produced from gallic acid and dextrose. At the same time, he observed the first indications of the wandering of ester groups (acyl migration), a topic which was later investigated by E. Fischer and Max Bergmann. In one of the natural tannins, *Hamamelis virginica*, Freudenberg found a branched new sugar, whose structure was later clarified by O. T. Schmidt.

Dr. Freudenberg became Privatdozent at the University of Kiel in 1914; the habilitation essay dealt with the spatial

arrangement of the atoms of lactic acid. Four years of military service followed immediately. He then returned to Kiel to begin his teaching career. Another class of vegetable materials, the catechins, was opened up. At the suggestion of R. Willstatter, he moved to Munich, where he again habilitated (1920). Here he entered the field of high-polymer natural products and interpreted cellulose as being made up of chains of similarly linked glucose units, a position that at the close of the debate, which was then just beginning, was proved to be correct.

As Extraordinarius in organic chemistry at Freiburg, under H. Wieland in (1921-22), and as Ordinarius at the Technische Hochschule in Karlsruhe (1922-26), Professor Freudenberg continued his researches on tannins and brought the study of catechin to a close (synthesis of catechin from cyanidine (1925) in collaboration with O. T. Schmidt). At the same time the studies of the sugars was carried further. Some of the results were elucidation of diacetone-glucose and other acetone sugars, synthesis of disaccharides and discovery of the cyclic acetates of sugars. A new field of interest was lignin, the binding material of wood. It was considered to be a phenylpropane derivative with many ether linkages.

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vanced students, i. e., collaborators in Professor Freudenberg's researches, and accordingly the scope of his fields of interest was extended. Together with Werner Kuhn, he put the configuration theory on a broad basis and the steric relation of the amino acids and the  $\alpha$ -halogeno fatty acids to the hydroxy acids was definitely established. The shift rule of the optical rotatory power, which had already been set up in the Freiburg period, was given a firm theoretical foundation and extended to sugars and polysaccharides. The significance and limits of optical superposition were characterized. At this time he and Kuhn produced optical activity through physical means by irradiating azido-propionic acid with circularly polarized short-wave light. The kinetics of the degradation of cellulose were intensively studied from both the theoretical and practical standpoints. These studies, along with the discovery and synthesis of methylated cellobiose, confirmed the statement of 1921 that cellulose is a chain molecule made up of like glucose units linked together. Starch the other great polysaccharide of glucose was the next center of interest. The branching positions of the starch molecule were determined. The remarkable starch degradation products, the Scharinger dextrans which result from bacterial action, were found to be ring-shaped saccharides, and a third example was added to the ones previously known.

Insulin and blood-group stuffs are instances of the many single subjects that have been investigated in Freudenberg's laboratory. Sugars, glucosamines, and amino acids have been separated with the aid of ion exchangers. The laborious study of lignin, which at first did not offer any obvious point of attack, advanced steadily and in the last years has become the center of most of the attention. Steady progress has brought the conviction that this natural product is likewise constructed according to an orderly principle, though to a limited extent. Recently, Professor Freudenberg and his co-workers have successfully achieved the synthesis of lignin through

the simultaneous dehydrogenation and polymerization of coniferyl alcohol. This accomplishment removed the obstacles which hitherto have impeded the task of unraveling the constitution of this important natural product.

In addition to the long list of papers which bear Karl Freudenberg's name, and which have made his name a household word in organic circles, he has published in book form: "Chemie der natürlichen Gergstoffe," Berlin, 1920; "Tannin, Cellulose, Lignin," Berlin, 1933; "Stereochemie," Vienna, 1933; "Organische Chemie," 7th edition, Heidelberg, 1950.

His honors include membership in the learned academies of Heidelberg, Munich, Gottingen, Helsinki, Uppsala, Lund Hall. Professor Freudenberg has been visiting Professor at the University of Wisconsin and has in 1949-50 completed a term as Rector of the University of Heidelberg.

## Nominating Committee for 1953 Candidates for P. S. Sec. A.C.S.

### CHAIRMEN

Gerald Freeman, Lauckes Testing Lab.  
1008 Western Ave. MA. 0727.

Roger Harrison—DE. 4500.

Bob Scott—EL. 3311.

Ed Lingafelter—ME. 0630.

Harlow Snyder—EL. 1134.

Make your wishes for candidates known to any of the above, well before the October 24th meeting.

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## **TESTING**

The scientists of the Atomic Energy Commission and the agents of the Central Intelligence Agency are getting periodic lie detector tests, according to Newsweek (August 25, page 14). Two of the questions: Have you given away any official secrets during the past six months? Have you done anything for which you could be blackmailed? The Federal Police believe that such precaution might have spotted Klaus Fuchs.

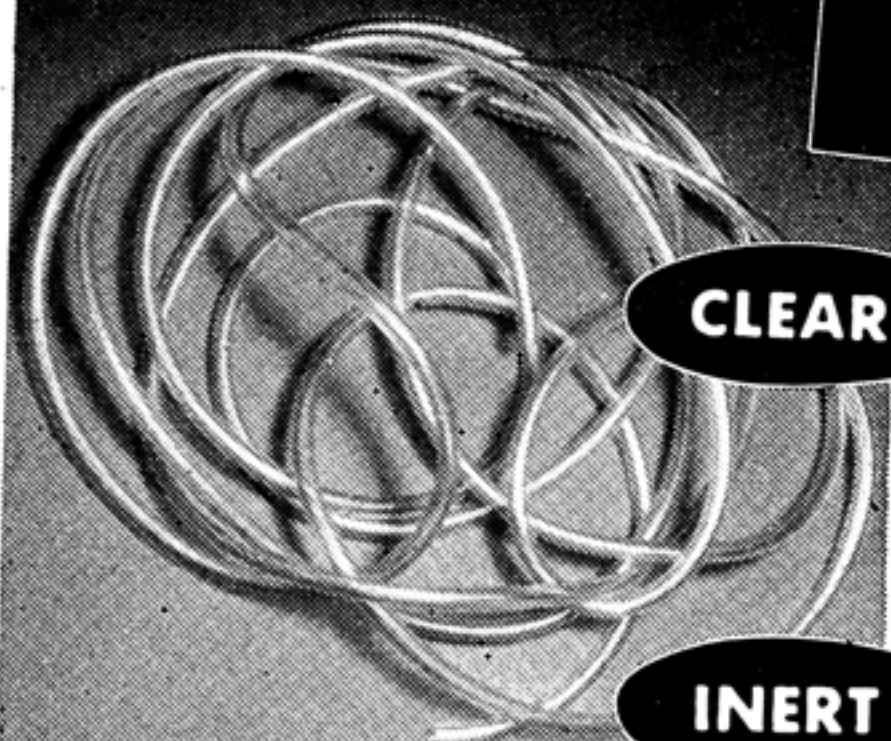
## **CENCO MOVES TO NEW QUARTERS**

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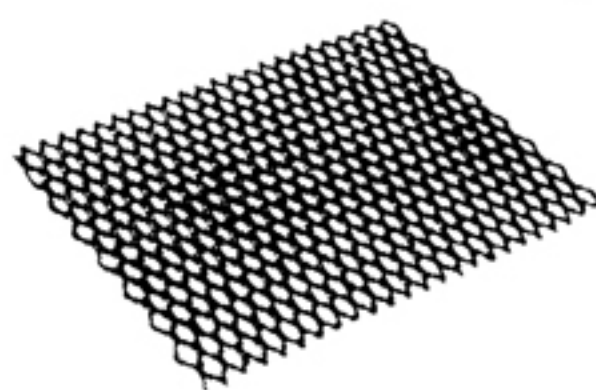
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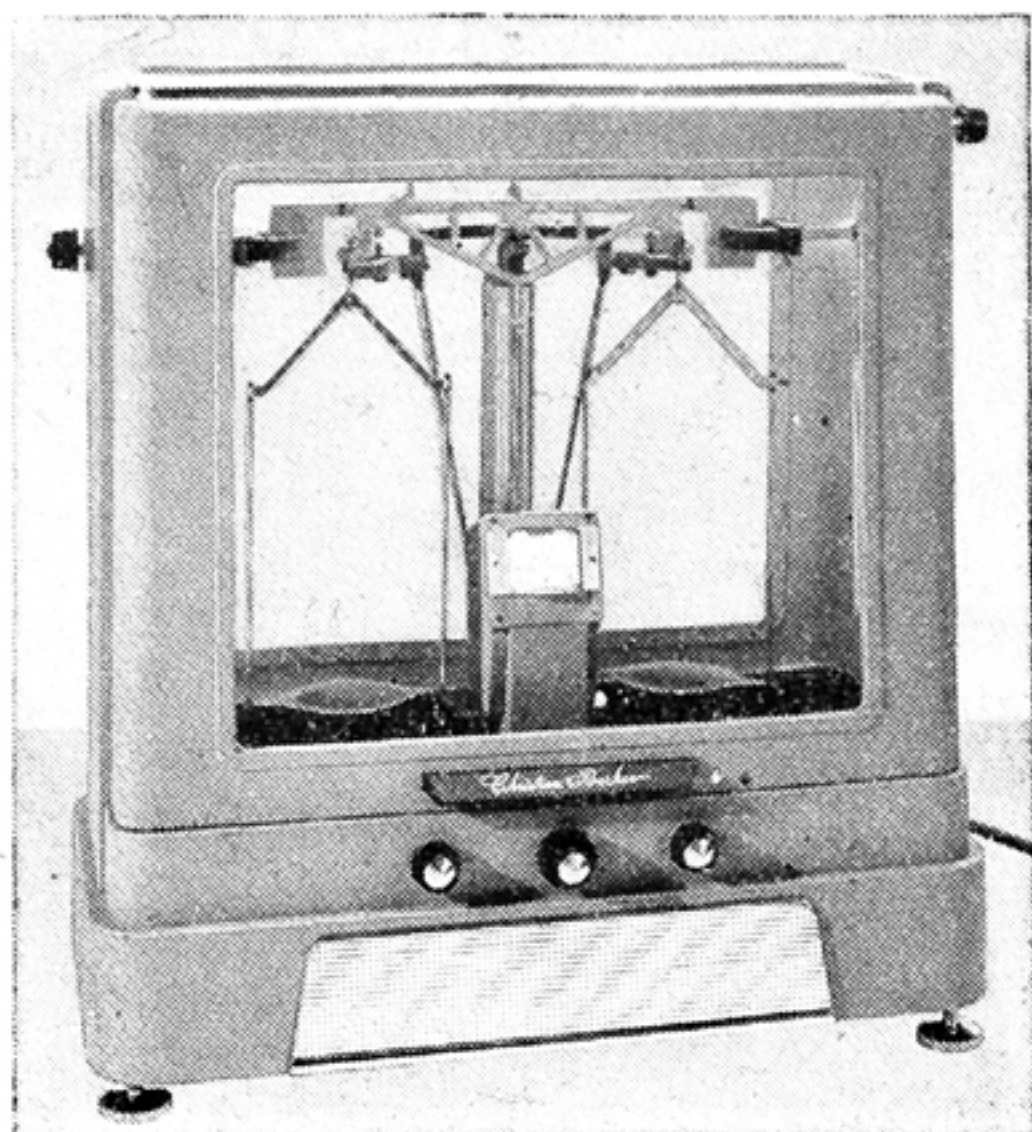


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