

## **Nobel Prize in Chemistry 1910**



**Otto Wallach**

The Nobel Prize in Chemistry 1910 was awarded to Otto Wallach *"in recognition of his services to organic chemistry and the chemical industry by his pioneer work in the field of alicyclic compounds"*.

### **RESEARCH INFORMATION:**

The aim of the scientist is, or should be, to extend the limits of human knowledge. However, the roads open to him At the meeting of 12th November, the Royal Swedish Academy of Sciences decided to award this year's Nobel Prize for Chemistry to Geheimrat Otto Wallach, Professor at Göttingen University, *for the services which he has rendered in the development of organic chemistry and the chemical industry by his pioneering work in the field of alicyclic compounds.*

As is well known, plants contain more or less strongly smelling components, which play an important part in their vital functions and particularly in their fecundation. These components, from ancient times, were always combined under the name of "essential oils" on account of their volatility. Very early, certain peculiar hydrocarbons had been isolated from these essential oils, which were called terpenes, because the ordinary turpentine oil is

constituted of a mixture of these. These hydrocarbons occupied a special position in comparison to others in the chemical aspect. They all had the same composition by percentage and most of them even had the same molecular weight, they reached boiling-point at approximately the same temperature; they showed, however, certain differences in smell, in optical properties and in chemical reactions, so that they could not be identified with each other. In the course of time nearly one hundred of these terpenes have been described in the chemical literature and they were usually named after the plants from which they were isolated. On account of their instability they were particularly difficult to handle and chemical theory could not accommodate anywhere near such a great number of isomers; a thorough study of this field therefore seemed practically hopeless.

Under such circumstances, the fact that this previously so mysterious field is now presented to us clearly in experimental as well as in theoretical respects, must be regarded as one of the greatest triumphs which chemical science has celebrated in the last few years. The honour for this is due, primarily, to Otto Wallach, who not only pioneered this work from the start, but also continued to a certain degree to lead in its continuation.

Wallach started working in this field as early as 1884. After six years he submitted the results obtained up to that time in form of a compilation. He had succeeded in finding methods of sharply and distinctly characterizing the various terpenes, so that these could be recognized in mixtures and also separated from each other in these. By means of these methods he had also been able to reduce the number of the so-far known terpenes to a surprisingly low figure - i.e. 8 - to which later a few newly discovered ones were added. He had further proved that terpene compounds very easily undergo changes when in contact with even the most ordinary reagents and are transformed into each other, which makes investigations in the field of terpene chemistry especially difficult and delicate. By investigating as many compounds as possible, he succeeded in determining in principle those conditions which excluded isomerization; he also developed the general technique for these investigations.

Through this pioneering work Wallach opened up a new field for research, which could be investigated further with good hope of success. And it is true that this field was immediately tackled by a great number of research scientists in various countries. Organic chemistry, during the decade that followed, was characterized by the study of the so-called alicyclic compounds, among which the terpenes and the closely related types of camphor with their derivatives played the most important part. Wallach himself, by overcoming considerable difficulties with admirable success and though perseverance, made continuous progress in the field opened up by himself. An extraordinarily large number of compounds were prepared by him and he also determined their structure. Apart from the terpenes proper, he also investigated and scientifically characterized various previously known or newly discovered natural products, such as alcohols, ketones, sesquiterpenes and polyterpenes belonging to the terpene series, which in part are also of great significance in biological and technical respects. For this reason the alicyclic series has, since the middle of the eighties, assumed such size and importance as to make it the equal of the other three main series within organic chemistry. Wallach contributed more towards this than any other research scientist.

Wallach's research activity did not only decisively influence theoretic chemistry, but also chemical industry, namely that branch of the industry which processes essential oils. According to recently published statistics, annual production of such preparations in Germany alone has risen from 12 million Mark in 1885 to 45-50 million Mark. Wallach's scientific work contributed to this directly as well as indirectly-directly by making the terpenes and their derivatives known and analytically determinable, whereby technology was provided with new methods of manufacturing and the previously often occurring adulterations of the raw materials were prevented; and indirectly by the fact that a large number of his students entered industry and there applied his working methods and his exact way of research. Wallach himself has never patented his discoveries, but always put his observations at the disposal of industry free of charge.

The Royal Swedish Academy of Sciences wished to pay tribute to this work - which had from the start been carefully planned, executed with great skill and terrific energy, had in the course of time become ever more profound and more comprehensive, by which science has conquered new fields, and pioneering work has been done towards industrial development by awarding the Nobel Prize in Chemistry for the year 1910 to Professor Otto Wallach

Professor Wallach. The Royal Academy of Sciences has awarded to you this year's Nobel Prize for Chemistry in recognition of the momentous services you rendered in the development of organic chemistry and the chemical industry by your pioneering work in the field of alicyclic compounds.

Once again it has been proved that results obtained by scientific research, which at first seem to be solely of theoretical interest may actually be of great practical importance.

Because you have introduced us to a significant field in organic chemistry which previously was practically unknown, you will now receive the Nobel Prize, the highest award which our Academy can bestow.

***For more details please visit:***

[http://www.nobelprize.org/nobel\\_prizes/chemistry/laureates/1910/press.html](http://www.nobelprize.org/nobel_prizes/chemistry/laureates/1910/press.html)