

IN MEMORY OF R. A. KONOVALOVA (1886-1973)

Doctor of Chemical Sciences Professor Raisa Abramovna Konovalova died in December 26, 1973.

The first investigations carried by Raisa Abramovna relate to 1812, in the period of her work in the Women's University in the laboratory of A. Pictet, where she studied some theoretical questions of organic chemistry (Zur Kenntnis der ungesättigten Verbindungen. I. Über die Abspaltung von Chlorwasserstoff aus unsymmetrischen Carbinolchloriden). Subsequently, in the Moscow Higher Technical Institute (MVTU) under the direction of A. E. Chichibabin, Raisa Abramovna investigated heterocyclic compounds, developed methods of isolating the optimum alkaloids, and obtained apomorphine from morphine, after which she went over completely to the study of alkaloids.



The scientific activity of Prof. Konovalova achieved its flowering in the S. Ordzhonikidze All-Union Scientific-Research Institute of Pharmaceutical Chemistry (VNIKhFI). Here Raisa Abramovna's capacity as a research worker, outstanding experimenter, and talented pedagogue shone particularly brightly.

"When in 1928 I organized the alkaloid division in VNIKhFI there were three of us - R. A. Konovalova, who had some experience of work with alkaloids, G. P. Men'shikov, and myself" (A. P. Orekhov).

"A. P. Orekhov was the first Russian scientist who had studied alkaloid chemistry - an interesting and extremely difficult field of organic chemistry. He was the first person in the Soviet Union to undertake the systematic study of alkaloid-bearing plants of the extremely rich flora of the vast Motherland in order to discover new alkaloids, to deepen the study of their structure, and to obtain new medicinal agents" (R. A. Konovalova).

With great enthusiasm, Raisa Abramovna with her pupils and colleagues performed very important work on the investigation of previously unstudied plants. Of the 72 new alkaloids discovered in the alkaloid division of VNIKhFI, many were found by Konovalova or under her direction. The structures of 16 alkaloids were proved.

Raisa Abramovna's greatest work was in the investigation of the Senecio alkaloids, and those of plants of the family Papaveraceae and of some species of Aconitum and Delphinium.

Plants of the genus Senecio are fairly widely distributed in the Soviet Union and have been used since ancient times in folk medicine. Raisa Abramovna isolated five new alkaloids: platyphylline, seneciphylline, the N-oxide of platyphylline, the N-oxide of seneciphylline, and condoline. She demonstrated completely the structures of the first four bases. These alkaloids proved to be complex cyclic diesters of the bicyclic base heliotridane and dicarboxylic acids. G. P. Men'shikov had shown previously that the same heterocyclic system is characteristic of alkaloids of other botanical families. Raisa Abramovna made a fundamental contribution to the study of the spatial structures of the alkaloids of this group.

The pharmacological and clinical investigation of platyphylline has shown that it possesses valuable atropine-like properties. Platyphylline has been introduced into medical practice as a new original Soviet drug.

The isolation and study of the chemical properties of platyphylline N-oxide has acquired great practical importance for increasing the yield of platyphylline in its production.

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Translated from *Khimiya Prirodnikh Soedinenii*, No. 6, pp. 820-822, November, 1974.

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Eight new alkaloids have been isolated from plants of the family Papaveraceae: floripavine, floribundine, bracteine, bractamine, oripavine, arnepavine, and roemerine. The structures of the last three have been determined. The high physiological activity and toxicity of plants of the species Aconitum and Delphinium have long attracted the attention of chemists and biologists. From the Central Asian Aconitum talassicum Raisa Abramovna isolated four new alkaloids: talatisine, talatisamine, talastisine, and isotalastisine. The chemical analysis of the last three bases showed that their partially developed formulas are similar, differing only by the nature and position of the substituting groups. On this basis, A. P. Orekhov and R. A. Konovalova proposed the hypothesis of the common nature of the structures of these alkaloids with the "aconitines." Later, this prediction was confirmed by the work of Raisa Abramovna and other authors.

From Central Asian species of Delphinium, likewise long known in folk medicine, five new alkaloids were isolated under the direction of Raisa Abramovna; eldeline (deltaline), eldelidine, delphamine, condelphine, and delartine. The developed formulas of these alkaloids show the common nature of their carbon skeletons. Extremely important information was obtained in a study of the hydrolysis of condelphine and delartine. The first yielded isotalastisine and the second lycocotinine. Thus, for the first time, a direct link was shown in the structure of the alkaloids of Aconitum and Delphinium and the hypothesis put forward previously on the closeness of the structures of the alkaloids of these plants was confirmed.

Raisa Abramovna developed and introduced into industry methods for obtaining euchinin, scopolamine, harmine, pilocarpine, ephedrine, cocaine, emetine, arecoline, and platyphylline. R. A. Konovalova maintained a close connection with workers in the alkaloid factories and consulted them constantly.

In the last years of her life, Raisa Abramovna was much occupied with literary activity. Together with A. A. Konovalova she performed very great and extremely necessary work on the revision of the only Soviet monograph on the chemistry of alkaloids up to that time - A. P. Orekhov's book "Khimiya alkaloidov" ["Alkaloid Chemistry"], which had become a desk book for all those working in this field. They introduced into the second edition corrections and supplements to its main information, illuminating the work of Soviet chemists in particular detail. In addition, the papers of A. P. Orekhov were published in the form of two monographs.

All those interested in questions connected with the deepening of our knowledge of natural compounds of complex structure and methods for their isolation, separation, structure-determination, and synthesis owe much to Raisa Abramovna Konovalova, the true friend and comrade in arms of A. P. Orekhov. She made accessible to a wide circle of organic chemists the outstanding work of Academician A. P. Orekhov in the field of theoretical organic chemistry collected in the book "Vnutrimolekulyarnye peregrupirovki" ["Intramolecular Rearrangements"], which was published in a number of editions and has long become of bibliographic rarity, and a considerable part of which was published for the first time in the Russian language.

The papers of A. P. Orekhov have been collected in the book "Khimiya alkaloidov rastenii SSR" ["The Chemistry of the Alkaloids of Plants of the USSR"], which has become part of the gold reserves, so to speak, of the science of alkaloids. Some of them were translated by R. A. Konovalova into Russian. The book "Vnutrimolekulyarnye peregrupirovki" includes a sketch of the life and work of Academician A. P. Orekhov written by Raisa Abramovna in which the breadth of the interest, the depth of the ideas, and the untiring activity of a man whose whole life was devoted to science is shown very clearly and with great love.

"He infected all who worked with him with great love of knowledge and an ardent desire, not fading in the face of any difficulties whatever, to advance bearing aloft the banner of Soviet science" (R. A. Konovalova). Raisa Abramovna devoted herself with great solicitude and love to her pupils and colleagues, sharing with them her accumulated knowledge and experience and inspiring in them an enthusiastic relationship to her selected branch of science.

The image of Raisa Abramovna Konovalova, a great scientist sincerely devoted to Soviet science, an outstanding pedagog, a sensitive and sincere human being with whom it was delightful and interesting to work, will always remain in the memory of her pupils, colleagues, and friends.

#### LIST OF SCIENTIFIC PAPERS BY R. A. KONOVALOVA

Ber., 45, 861 (1912).

## Synthetic Investigations

Zh. Vses. Khim. Obshchestva im. D. I. Mendeleeva, 53, 193 (1921); Ber., 54, 814 (1921); Zh. Vses. Khim. Obshchestva im. D. I. Mendeleeva, 57, 315 (1925); Ber., 58, 406 (1925); Ber., 59, 2055 (1926).

## Alkaloids

The Family Solanaceae: Hyoscyamus reticulatus - Zh. Prikl. Khim., 1, 180 (1928); Arch. Pharm., 266, 449 (1928). Anisodus luridus - Zh. Obshch. Khim., 16, 2121 (1946).

Berberidaceae: Leontice ewersmanii - Khim.-Farmats. Prom., 10, 371 (1931); Arch. Pharm., 270, 329 (1932).

Convolvulaceae: Convolvul pseudocantabrica - Khim.-Farmats. Prom., 1, 52 (1933); Arch. Pharm., 271, 145 (1933); Ber., 67, 1153 (1934); Zh. Obshch. Khim., 7, 646 (1937); Ber., 68, 814 (1935); Zh. Obshch. Khim., 9, 41 (1939).

Leguminosae: Sophora pachycarpa - Ber., 66, 621 (1933); Khim.-Farmats. Prom., 3, 5 (1934); Ber., 67, 1850 (1934). S. alopecuroides - Ber., 68, 431 (1935). Pipantus nanus - Zh. Obshch. Khim., 21, 773 (1951); Dokl. Akad. Nauk SSSR, 78, 705 (1951); Dokl. Akad. Nauk SSSR, 81, 1069 (1951).

Zygophyllaceae: Peganum harmala - Arch. Pharm., 272, 748 (1934); Zh. Obshch. Khim., 6, 487 (1936); Arch. Pharm., 273, 156 (1935); Zh. Obshch. Khim., 6, 1256 (1936).

Compositae: Senecio - Izv. Akad. Nauk SSSR, Otd. Khim. Nauk, 4, 961 (1939). S. platyphyllus - Structure of platyphylline: Ber., 68, 1886 (1935); Ber., 69, 1908 (1936); Zh. Obshch. Khim., 8, 273 (1938); Dokl. Akad. Nauk SSSR, 73, 315 (1950). Bull. Soc. Chim. Fr., [5], 4, 2037 (1937); Zh. Obshch. Khim., 8, 396 (1938); Zh. Obshch. Khim., 18, 1198 (1948); Dokl. Akad. Nauk SSSR, 78, 905 (1951). S. vulgaris - Bull. Soc. Chim. Fr., [5], 4, 1285 (1937); Zh. Obshch. Khim., 8, 391 (1938). S. renardi - Zh. Obshch. Khim., 20, 1921 (1950). S. sarraceni - Zh. Obshch. Khim., 23, 1417 (1953); Dokl. Akad. Nauk SSSR, 89, 865 (1953).

Papaveraceae: Papaver orientale and Papaver armeniacum - Ber., 68, 2158 (1935); Zh. Obshch. Khim., 7, 1791 (1937); Zh. Obshch. Khim., 10, 641 (1940); Zh. Obshch. Khim., 18, 855 (1943). Paper on the scientific work of members of the D. I. Mendeleev All-Union Chemical Society 1943-1945, 23 (1945). P. floribundum - Ber., 68, 2277 (1935); Zh. Obshch. Khim., 7, 1797 (1937). P. bracteatum - Zh. Obshch. Khim., 18, 142 (1948). Zh. Obshch. Khim., 19, 148 (1949); Zh. Obshch. Khim., 22, 2233 (1952). Roemeria refracta - Bull. Soc. Chim. Fr., [5], 6, 811 (1939); Zh. Obshch. Khim., 9, 1356 (1939); Bull. Soc. Chim. Fr., [5], 6, 1479 (1930); Zh. Obshch. Khim., 9, 1507, 1868 (1939); Bull. Soc. Chim. Fr., [5], 7, 70 (1940). Glaucium fimbriigerum - Zh. Obshch. Khim., 9, 1939 (1939).

Liliaceae: Fritillaria sewerzowii - Zh. Obshch. Khim., 9, 1911 (1939).

Ranunculaceae: Aconitum talassicum - Zh. Obshch. Khim., 10, 745 (1940); Bull. Soc. Chim. Fr., [5], 7, 95 (1940). Delphinium sp. - Zh. Obshch. Khim., 12, 321 (1942); Zh. Obshch. Khim., 19, 1387 (1949). D. confusum - Zh. Obshch. Khim., 12, 329 (1942).

Dipsacaceae: Dipsacus azureus - Zh. Obshch. Khim., 18, 1510 (1948).

Umbelliferae: Gentiana kirilowii - Dokl. Akad. Nauk SSSR, 66, 437 (1949).

Plantaginaceae: Plantago indica - Zh. Obshch. Khim., 22, 2237 (1952).

Santalaceae: Thesium minkwitzianum - Zh. Obshch. Khim., 30, 670 (1960); Isolation of alkaloids by the adsorption method: Zh. Prikl. Khim., 22, 995 (1949); Zh. Prikl. Khim., 23, 506, 876 (1950).