Johan Schioldann: History of the Introduction of Lithium into

Medicine and Psychiatry

Birth of Modern Psychopharmacology 1949

Part I

Birth of lithium therapy 1859

Chapter 4. The discovery of lithium

Lithium is one of the monovalent alkali metals. In 1800 the Brazilian, Joze Bonifacio de Andrada e Silva,[115] on a geological survey of the Swedish island of Utö, found two new minerals in a pile of rocks from an iron ore mine.[116] He named them spodumene and petalite. However, nothing more was heard about them until 1817 when the Swede Eric Thomas Svedenstjerna found them again on Utö. He sent samples of petalite to various colleagues around the world. One of the recipients was his famous teacher and countryman, Baron Jöns Jacob Berzelius, who handed the mineral to his assistant, Johan August Arfwedson, for analysis. In turn, Arfwedson succeeded in identifying all but four per cent of the petalite, which fraction he therefore proposed was a new alkali. At the suggestion of Berzelius it was named lithion after the Greek word for 'stone', to designate its mineral origin. From this the name lithium originates, and it was given the chemical symbol of Li.[117]

The discovery was described in the scientific literature the following year.[118] However, Arfwedson failed to isolate this 'odd-ball',[119] in which endeavour Humphrey Davy[120] succeeded the same year. But it was not until 1855 that Robert Bunsen[121] found a method for the production of metallic lithium. His work on the so-called Bunsen burner,[122] with which he and Kirchhoff constructed the first flame spectrophotoscope,[123] was published two years later. With its high sensitivity they demonstrated the ubiquitous occurrence of lithium in nature, but as trace elements only[124] - about 20 parts per million of the igneous rock of the earth's crust.[125]

According to Garrod (1863),[126] lithium was now becoming of 'additional interest' not only to the chemist, but also to the therapist, in part due to 'the recent discoveries of Kirchhoff and Bunsen'.

---

[115] Andrada JB. de: 'Kurze Angabe der Eigenschaften und Kennzeichen einiger neuen Fossilien aus Schweden und Norwegen, nebst einigen chemischen Bemerkungen über dieselben'. Scherer's Allgemeine Journal der Chemie 1800;4:28-39. Quoted here from Johnson, 1984, op. cit., pp.1-2, 137. Johnson, 1999, op. cit., pp.195-196.

[116] Johnson FN.: 'The early history of lithium therapy', in: Bach RO. (ed.): 'Lithium: current applications in science, medicine, and technology'. New York: Wiley, 1985. pp.337-344.

[117] . Johnson, 1984, op. cit., pp.1-4, 137-139. Johnson FN, Cade JF., 1975, op. cit., pp.9-22. Johnson, 1999, op. cit., pp.195-199. Vaquelin M.: 'Note sur une nouvelle espèce d'alcali mineral'. Annales de chimie et de physique 1817;2(7):284-288. About this 'new alkali', Berzelius wrote to the French chemist, Claude Louis Berthollet: 'Wir haben dieses neue Alkali Lithion genannet, unter dies[em] Name soll darauf hindeuten, dass es in dem Steinreiche entdeckt worden ist, indess die beiden andern feuerbeständigen Alkalien vegetabilischen Ursprungs sind. In der französischen Nomenklatur wird man es wahrscheinlich Lithine, und in der englischen Lithina nennen, der Analogie nach den Namen der andern Alkalien in diesen Sprachen'. Gilbert's Annalen, 1818, cited here from van der Krogt P.: 'Lithium: history and etymology'. Online [URL: www.vanderkrogt.net/elemen]. Garrod, 1859, op. cit. Johnson, 1984, 1999, op. cit. Rancke-Madsen E.: 'Grundstoffernes Opdagelseshistorie'. Copenhagen: Gad, 1984. Amdisen A.: 'The first lithium era', in Johnson FN. (ed.): 'Depression & mania'. Modern lithium therapy. Oxford: IRL Press, 1987. pp.24-28.

[118] Arfwedson A.: 'Undersökning af några vid Utö Jernmalmsbrott förekommande Fossilier, och af ett deri funnet Eget Eldfast Alkali', in: Afzelius J, Almroth NW, Arfwedson A, Berzelius J. et al. (eds.): 'Afhandlinger i Fysik, Kemi och Mineralogi. Sjette Delen. Stockholm: Nordström 1818:145-176, quoted here from Johnson, 1984, op. cit. pp.2-4, 137-139. Johnson, 1999, op. cit., pp.197-198. cf. Kline NS.: 'A narrative account of lithium usage in psychiatry', in Gershon S, Shopsin B. (eds.): 'Lithium. Its role in psychiatric research and treatment'. New York: Plenum Press, 1973. pp.5-13.

[119] Birch N.: 'Lithium: its chemistry, distribution and transport in the body', in Bauer M, Grof P, Müller-Oerlinghausen B. (eds.): 'Lithium in neuropsychiatry. The comprehensive guide'. Abingdon: Informa, 2006:311-320. Schou M.: 'Biology and pharmacology of the lithium ion'. Pharmacol. Rev. 1957;9:17-58 (this article includes an extensive bibliography).

[120] Johnson FN.: 'The early history of lithium therapy', in Bach RO. (ed.): 'Lithium: current applications in science, medicine, and technology'. New York: Wiley, 1985. pp.337-344. cf. Jefferson JW, Greist JH.: 'Lithium. Introduction and history', in Kaplan HI, Sadock BJ. (eds.): 'Comprehensive textbook of psychiatry'. 6th Edn. Vol. 2. Baltimore: Williams & Wilkins, 1995:2022-2031.

[121] Bunsen R.: 'Darstellung des Lithiums'. Justus Liebigs Annalen der Chemie 1855;94:107-112.

[122] Bunsen R, Roscoe H.: 'Photochemische Untersuchungen. Zweite Abhandlung. Massebestimmung der chemischen Wirkungen des Lichts', in Poggendorff, JC. (ed.): 'Annalen der Physik und Chemie', Hunderster Band, 1857:43-88.

[123] Kirchhoff G, Bunsen R.: 'Chemische Analyse durch Spectralbeobachtungen', in Poggendorff JC. (ed.): 'Annalen der Physik und Chemie'. 4. Reihe, 20. Band, 1860:161-189.

[124] Kirchhoff G, Bunsen R.: 'Chemische Analyse durch Spectralbeobachtungen', in Poggendorff JC. (ed.) 'Annalen der Physik und Chemie'. Drei und zwanzigster Band, 1861. Bunsen R.: 'Über Benutzung der Flammenspektren bei der chemischen Analyse'. Verhandlungen Naturhistorisches Medizinisches Vereins Heidelberg 1862;2:31-32. Georgotas A, Gershon S.: 'Historical perspectives and current highlights on lithium treatment in manic-depressive illness'. J. Clin. Psychopharmacol. 1981;1:27-31.

[125] Georgotas A, Gershon S.: 'Historical perspectives and current highlights' etc. 1981, op. cit.

[126] Garrod, op. cit. 1863, p.424. cf. Amdisen A. 'Lithium treatment of mania and depression over one hundred years', in Corsini G. U. (ed.): 'Current trends in lithium and rubidium therapy'. Lancaster: MTP Press, 1984:11-26 (Danish edition: Amdisen, A.: 'Lithiumbehandling af mani og depression i forrige århundrede'. Med. For. (Cph.) 1983;110-119).