Determination of Some Inorganic Substances in the Labyrinthine Fluids

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As a part of a general investigation of the chemical composition of the labyrinthine fluids we have made an attempt to determine some inorganic substances in the endo- and perilymph of sharks *(Acanthias vulgaris)*.

The contents of sulphur was determined by the method of Bürger [1], modified by Zimmermann [2]. We found that the endo- and perilymph contained 75.47 mg, respectively 51.75 mg of sulphur per 100 ml of the fluids.

On account of the scantiness of material, and the complete ignorance as to the contents of inorganic substances contained in the labyrinthine fluids we examined these fluids by means of spectrographic analysis.

After incineration in a platinum crucible the sample to be analysed was placed in a small core in the lower graphite electrode, the upper one being another graphite electrode ground to a blunt point. The sample was now vaporised in the course of 45 seconds during which time one spectrum was recorded within the wavelengths of about 2 200 – 3 200 Å. The intensity of the emission lines was registered on a photografic film. The result is in Fig. 1, which gives the spectra of the endo- and perilymph, and the spectra of iron and sodium chloride for qualitative identification. The more important lines of analysis are denoted by their chemical symbols and their wavelengths in Å. The spectrum of the perilymph shows several lines which are not found in the other spectra. These lines arise from platinum, the perilymph being, it is supposed, contaminated with platinum as a result of its treatment in the platinum crucible.

Besides, sodium and potassium were determined quantitatively by means of a Beckman flame spectrophotometer. The result is in Table 1.

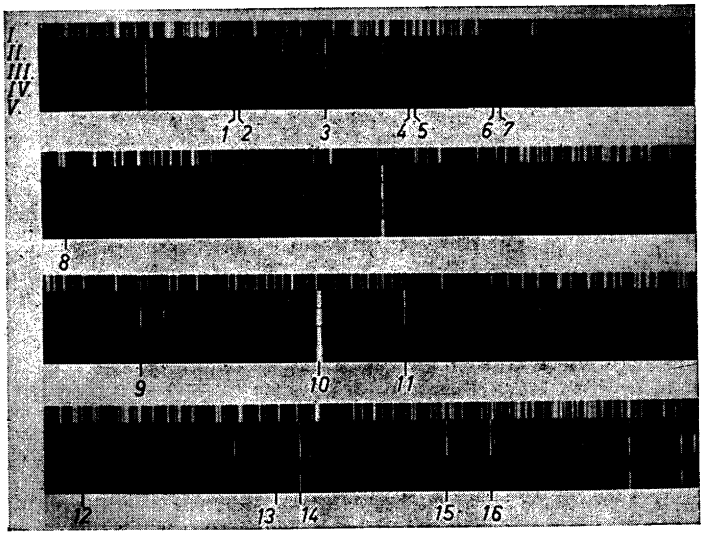

Fig. 1. The spectrogrammes of endo- and perilymph. I Pure Fe. II Endolymph. III Perilymph. IV and V NaCl. 1 B 2496.8, 2 B 2497.7, 3 Si 2516.1, 4 P 2534.0, 5 P 2535.7, 6 P 2553.3, 7 P 2554.9, 8 Fe 2599.6, 9 Mg 2795.5, 10 Na 2852.8, 11 Si 2881.6, 12 Ni 3002.5, 13 Al 3082.2, 14 Al 3092.7, 15 Ca 3158.9, 16 Ca 3179.3. Explanation in the text.

Table 1. The contents of sodium and potassium in the endo- and perilymph.

	Na mmoles	K mmoles
Endolymph	2.80	0.60
Perilymph	2.47	0.37

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1. Bürger, K. *Angew. Chem.* **54** (1941) 479.
2. Zimmermann, W. *Mikrochem.* **31** (1943) 15.

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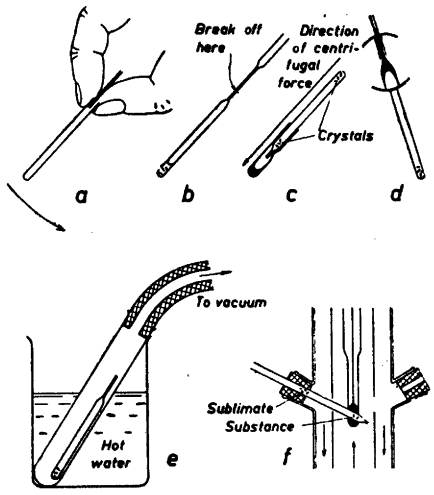

Fig. 1. Explanation in the text.

Syntheses in Capillary Tubes

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For several years the students at the Institute of Chemistry, Helsinki University, have carried out several syntheses on a micro scale, using as textbook A. A. Morton's "Laboratory Technique in Organic Chemistry". Experiment on a micro scale included in this book have chiefly been devised by A. Fuchs [1]. The reactions and the purification of substances are carried out in a capillary tube about 2 mm in diameter. Fuchs freed the crystals from the mother liquor by centrifuging the contents of the reaction tube to the bottom and sucking off the liquid with a capillary pipette. However, it is not possible to remove all the liquid in this way. This is a serious drawback, since it is known that complete removal of the mother liquor is a necessary condition for the purification of substances by crystallization.

The present author has devised some improvements to Fuchs' technique, that make the micromanipulation easier and more effective. The most noteworthy of them is the manner of removing the mother liquor from the crystals.

This is a general course of a synthesis with modifications:

A capillary tube, 2 mm in diameter is drawn out from 10 mm glass tubing. 6 cm long pieces of this capillary tube are sealed at one end. The small "test tubes" so made are here called reaction tubes.

Liquid substances are best introduced by means of 3 cm long pieces of 1 mm capillary tube (the same kind of capillary tubing as is used in melting-point determinations). Each piece of tube is used for filling one substance only, a new piece being taken for each substance. When a liquid is touched with one end of a capillary tube, it rises spontaneously in the tube. The height of the liquid column in the capillary tube is a measure of the quantity of the liquid. Any excess of liquid is removed by touching a piece of filter paper with the lower end of the capillary tube. To transfer the substance from the filling capillary to the reaction tube, the former is placed half-way into the latter (Fig. 1 a). The liquid can be shaken to the bottom of the reaction tube by jerking the tubes by hand. When all the necessary substances are in the reaction tube, it is sealed and heated in a metal block for the time required for the reaction. When the reaction is complete, the tube is opened. At this stage the reaction mixture can be stirred with a capillary stirring rod to promote the