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English summary (W. ELKINS)

This Annual Report of the Limnology Division of the Department of Zoology, University of Innsbruck, Austria, consists of

- A) a progress report, given by the head of the division, and
- B) a presentation of results, published by 28 authors working in the team of limnologists.

A) The progress report is divided into 5 chapters:

a) Structure

Dr. Roland PECHLANER, Professor of Limnology, is the only scientific staff member employed by the University. However, funds have been raised in 1977 to support 28 persons (scientists and technicians) on "soft money". In addition to the laboratory facilities available in University buildings in Innsbruck and Kühtai (Limnological Research Station on the shore of the lake Gossenköllesee, 2413 m a.s.l.), rooms have been rented from research funds to provide adequate space for working in Innsbruck and Piburg. (p.1-2)

b) The teaching programme, based on the new University Education Act is described. A list of graduate students who took their doctor's (6) and master's (3) degree in 1977, and of doctorands working on a thesis (13) is given, and actual occupation and address of limnologists graduated in Innsbruck from 1974 through 1977 are listed. (p.2-7)

c) The projects of basic research are outlined with hints to papers presented in section B) of this Annual Report. (p.8-12)

d) A survey of applied limnological research, its goals and funding, is given. (p.12-13)

e) Finally, the publications issued in 1977 are listed. (p.14)

B.) English summary of reports on results

I. Study of the ecosystem "PIBURGER SEE"

The question if the Piburger See, which has a considerable subsurface inflow, is also drained by an appreciable subsurface outflow, is argued in the first chapter of part I (1.1 GATTERMAYR). Chapter 1 also includes a compilation of values obtained in 1977 for temperature, oxygen content, conductivity, pH, alkalinity, calcium and magnesium contents (1.2. PEHOFER). Also presented (1.3. BACHINGER) are the range of variations for three phosphorus fractions (dissolved orthophosphate, total phosphorus in filtered and unfiltered water) and particulate phosphorus, and weighted means for different depth levels; furthermore, the mean values are calculated for the phosphorus content just above the sediment surface, at the Olszewskitube, at the source of the surface inflow (Piburger Bach) and just before its entry into the lake. The input of phosphorus by way of precipitation (in kg total phosphorus) is also given. Section 1.4. (SOSSAU) summarizes a now completed dissertation, in which nitrogen compounds (NO_3 , NO_2 , NH_4 ; DON and PON) and organic carbon (DOC and POC) were studied. An estimate of the rate of NH_4 -release from the sediment was made and the calculation of a nitrogen budget attempted. Also given are the results of measurements of various nitrogen compounds, carried out until three months after completion of the dissertation.

Problems of method and first results of a study on the importance of Empneuston for the lake is the topic of chapter 1.5 (PSENNER). Corrected values for planktonic primary production are tabulated in section 2 (2.1 ROTT) for the years 1973 through 1976. This section also includes a short summary of a paper in preparation that deals with "chlorophyll-a concentration and cell volume as parameters for phytoplankton biomass".

The topic of chapter 2.2 (PSENNER) is the bacterio-plankton in 1976. Weighted means for direct count and biomass are presented, the results being brought into relationship with important biotic and abiotic parameters (phytoplankton, zooplankton, primary production; nitrogen and phosphorus compounds).

Another completed dissertation (2.3.1 SCHLOTT-IDL) is summarized, that deals with the population dynamics of pelagic Protozoa and with the correlation of temporal and spatial distribution of Protozoa with sedimentation, O_2 -concentration, bacteria and zooplankton.

Zooplankton losses (Rotifers and Crustaceans) through wash out by the artificial hypolimnetic drainage in the years 1975 and 1976 and the importance of these losses for the metabolism in the lake is discussed in 2.3.2.1 (SCHABER). The next section (2.3.2.2 SCHABER) concerns itself with production rates of the most important representatives of zooplankton in the years from 1972 through 1976. First results of an intensive study on the horizontal distribution of Crustacean plankton, combined with a simultaneous investigation of currents in the lake, are presented in section 2.3.2.3. (HEHENWARTER).

In 2.4 (KNECHT) the possibilities of optimizing a dynamic simulation model of phytoplankton and the difficulties and limits of constructing such a model are discussed.

In the next chapter (3.1. AUER) results of a dissertation on the population dynamics of Scardinius erythrophthalmus and Leuciscus cephalus and the effect on sport fishing through stocking of Salmonids are discussed.

Chapter 3.2 (HAIMAYR) outlines the methods (counting and interviewing tourists) used to determine the influence of tourism on the ecosystem Piburger See.

II. Study of the ecosystem "VORDERER FINSTERTALER SEE"

Following up on an experiment in which the effect of artificial fertilization on the phytoplankton of the VFS was studied, the effect of said fertilization experiment on the bacterio-plankton is now presented (1. TAUTERMANN).

III. MAB-Project "FINSTERTALER SPEICHER"

In chapter 1 (JÄGER) technical data is put forward on the hydroelectric power station Sellrain-Silz, also the hydrography of the inflows and the chemistry of Hinterer Finstertaler See and of the remaining water body of Vorderer Finstertaler See. Preliminary predictions are made through the comparison of the power stations of Sellrain-Silz and Kaunertal.

In chapter 2 (SCHLÖGL) a newly developed sampler is described that collects samples continuously and in quantities proportional to the flow rate, for the measurement of suspended matter load in running waters. The remaining data on the benthos examination carried out between February 1968 and May 1977 in Vorderer Finstertaler See and Hinterer Finstertaler See is tabulated in chapter 3 (BRETSCHKO).

IV. Study of the ecosystem "GOSSENKÖLLESEE"

In chapter 1.1 (PRAPTOKARDIYO) the results of studies on population dynamics, life history, development times of larval stages and feeding rates of Cyclops a.tatricus are presented. A mathematical model for the analysis of population dynamics of zooplankton and its application to Cyclops a.tatricus is the topic of chapter 1.2 (GNAIGER). Some limnological experiments carried out by visiting scientists during an excursion (Sept. 12 to 17, 1977) are explained in form of short reports (1.3 HERZIG "diurnal migrations of zooplankton"; 1.4 DOKULIL "comparative light measurements in Gossenköllesee" 4. HERZIG-STRASCHIL).

The development of a stereoscopic underwater camera system for measuring the surface area of rough boulders, of which the greater part of the lake bed consists, is described in section 2. (2.1 WALD-HÄUSL and KLADENSKY).

Chapter 2.2 (ZADERER) describes a method for collecting Chironomids (bell jar with a brush-mechanism for larvae, emergence-traps for adulti) and gives first results in regards to the yearly cycle of abundance of larvae and the moulting rates. The method of determining the importance of allochthonous matter input in the ecosystem Gossenköllesee and first results of its measurements is given in chapter 3 (TAUTERMANN).

V. Streams

In chapter 1 (KOWNACKA and MARGREITER) the statistical initial distribution of zoobenthos in streams is calculated using the data obtained in two samples series taken from the Gurgler Ache. The results of a not yet completed study on the nutrient load fed into Piburger See by the Piburger Bach and the elimination of plant nutrients from the lake via the modified Olszewski-tube that can remove water selectively from different depths are presented in chapter 2 (TARMANN-PREM). Chapter 3 (WEICHSELBAUMER) describes the preliminary work planned for 1978 on a study of the ecology of Baetis alpinus in the Piburger Bach.

VI. Applied research

Topic of chapter 1 (PEHOFER) are the effects resulting from the installation of an Olszewski-tube since 1973 on the meromictic

Hechtsee, one of the more important recreation-lakes of Tyrol. Chapter 2 (PSENNER and ROTT) discusses the protection and restoration measures taken place for seven years now at the Reither See (sewage diversion, precipitation of phosphate with Fe-III-chloride, removal of bottom mud, installation of an Olszewski-tube) and their effect on the lake.

Finally, chapter 3 (ROTT and SCHABER) describes the alterations of eutrophic Schwarzsee near Kitzbühel since 1974, after most of the sewage of the houses adjoining the lake was canalized and its introduction into the lake thus stopped.

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