i) E n g l i s h s u m m a r y (G.Bretschko):

ii) Preface; organisation of the Department for Limnology:

This is the first annual report of the Department which itself was established officially in 1974. The Department was initiated in 1959 with the foundation of the 'Limnological Station Kühtai' by Prof.STEINBÖCK (+1969). The participation in international programs (IBP, OECD, MAB)increased limnological activities drastically over the last seven years. A full limnological teaching program is carried out. A list of Ph.D.students is given, together with their research topics.

I. Ecosystem study "Piburger See".

1.) Introduction: Location, catchment area and morphology is shortly described (table 1.-1 and fig. 1.-1) as well as the impact of man. Although this impact is rather modest a dangerous eutrophication was to observe in the last decade. Finally in 1970 an OLSZEWSKI-pipe was installed. The lake is under close observation since 1973.

2.1.) Analytical methods and sampling strategies in the pelagic zone: Analytical methods and sampling strategies are listed or, in case of variations, shortly described.

2.2.) Chemistry (N,P and Fe excluded) and temperature conditions of the lake water: Various parameters are set out in tables 2.2.1-7 and figures 2.2.-1 and 2.2.-2. The oxygen content of 1974 discloses a significant improvement since installation of the Olszewski-pipe.

2.3.) Iron and Fe-bacteria in the pelagic zone: Some modifications of the normal chemical methods are described and discussed. Ferro-concentrations are set out in fig. 2.3.-1. A short account is given to the very beginning of the study of bacteria.

2.4.) The phosphorus content of the pelagic zone: Three fractions have been determined monthly: dissolved orthophosphate and total phosphorus in filtrated and unfiltrated water. Means for different water bodiesatimes are described in the text and detailed data are set out in tables 2.4.-1 to 2.4.-5.

2.5.) Nitrogen compounds and organic carbon in the pelagic zone: Three anorganic and two organic nitrogen compounds have been studied separately. The data are given in tables 2.5.-1 to 2.5.-5. The study of organic carbon is at its very beginning.

3.) Evaporation and water economy: Evaporation is determined directly by pan measurements and indirectly by registrating various meteorological parameters. The registration unit, mounted on a raft in the middle of the lake is described. The data collected in summer 1974 are not fully processed yet.

4.1.) Bacterioplankton: The investigation started in October, 1973, and covers direct counts, plate counts, biomass and generation time estimates. The bacterioplankton is found to be singnificantly different from all other lakes investigated so far (tables 4.1.-1 to 3, figures 4.1.-1 to 5). Coli-counts have been made in the bathing season but nearly none have been found.

4.2.) Phytoplankton and short-wave radiation climate: The qualitative phytoplankton composition is shortly described and listed (tab. 4.2.-1 and fig. 4.2.-1). Biomass distributions are set out in figures 4.2.-2 and 4.2.-3 and chlorophyll A in fig. 4.2.-4. Both are compared. Radiation measurements are shortly described, resulting in a euphotic zone varying between 6 and 14 meters of depth.

4.3.) Zooplankton

4.2.1.) Protozoa: The study was initiated in 1974. A first checklist is given and the preparation method is shortly described.

4.3.2.) Rotifers and crustacea: Composition, development and distribution of the metazoic zooplankton are described for the time between August, 1971, and February, 1973, (tables 4.3.2-1 to 4.3.2.-7).

5.) Sedimentation: The study of amount and composition of the sedimentating seston started in 1974. The method is shortly described (fig. 5.-1 and 2) as well as first results are presented (fig.5.-3).

6.) Benthos

6.1.) Sampling strategy: According to the distribution of substrates and the results of a pilot study, sampling strata have been defined for each group. As final sampling strategy stratified random sampling has been adopted. Employing the central theorem 3 to 6 samples are mixed and subsampled. 70 to 100 samples are taken monthly.

6.2.) Testacea: Composition and relative frequency of benthic testacea are investigated. A quantitative study for estimating population dynamics is initiated.

6.3.) Nematoda: A method for concentrating living nematodes is described in detail. The composition and distribution in space and time of the nematode fauna is discussed briefly (figures 6.3.-2 to 4).

6.4.) Mollusca: Abundance and biomass of Anodonta cygnea (L.) are shortly described as well as the first results of an in situ development experiment. A correlation between the weight of the soft body and the lenght of the shell has been established.

6.5.) Benthic crustaceans: A checklist with short notes on the distribution of the species is given. Distribution and population dynamics of Macrocyclops albidus and Cypria ophthalmica is dis-

cussed. A trap for collecting M.albidus during its vertical migration is described.

6.6.) Chironomids: A new emergence trap is described (fig.6.6.1.-1) and the phenology of quantitative important species is discussed (fig.6.6.1.-2). Sampling methods for estimating larval production are briefly described.

7. Fish fauna: A checklist is given and the estimation of the perch population as well as their feeding behaviour are described (table 7.-1 to 3, figures 7.-1 to6).Amount and quality of sport fishing is discussed (tabl. 7.-4).

8. The brook Piburg: The small brook with a discharge rate of 5 to 25 l/sec is the only surface inflow of the lake. Its morphometry and fauna is shortly described. 90% of the fauna are insect larvae representing about 50 taxa. Mean abundance amounts 100 individuals in 1 dm^3 of substrate.

III. Ecosystem study "Vorderer Finstertaler See".

1.) Introduction: A brief description is given (table 1.-1 and fig. 1.-1) followed by a complete publication list. Both lakes, Vorderer and Hinterer Finstertaler See are bound to vanish in a large hydro - electric impoundment to be built in the next years.

2.)Fertilizing experiment: The aim of the experiment is to decide the question, whether the deep layering of the phytoplankton is basically an effect of the radiation climate or of the availability of plant nutrients. Previous to the experiment the flushing rate was estimated, resulting in a water renewal rate of roughly two times per year for the main part of the lake. The experiment itself is described. First results show a clear trend towards a more shallow phytoplankton layering.

3.)The drift into and out of the lake:Measurements have been carried out in the ice free season, 1972. The method is described and first results are presented (table 3.-1). On a annual basis the balance is supposed to be negative for the lake.

4. Benthos

4.1.) Topography of the lake bottom and analytical data on sediments: Substrate types and their distribution are described (fig. 4.1.-1, table 4.1.-1) and various chemical and physical sediment parameters are listed in tables 4.1.-2 to 4.1.-8.

4.2.)Bakteriobenthos: Methods and first results are discussed (figures 4.2.-1 and 4.2.-2). Biomass is surprisingly high with 100 to 600 g m^2 FW in the topmost 5 cm of sediment.

4.3.) Phytobenthos: Composition and distribution of phytobenthos is briefly described (fig. 4.3.-1). Diatoms, inhabiting the entire lake are studied quantitatively (fig. 4.3.-2). Their annual mean biomass varies between 36 and 63 g m^2 FW. Daily vertical migrations of diatoms into the sediments are analyzed experimentally.

4.4.) Oligochaets: A checklist is given and the distribution in space and time of the quantitative important species is described (tables 4.4.-1 to 5 and figures 4.4.-1 and 2). T.tubifex as the quantitatively most important species is studied intensively. Its generation time amounts roughly one year.

4.5. Cyclops a.tatricus: Young stages ($<C_3$) are planktic and filtrators, older stages are predating meiobenthos. A crustacean trap (fig. 4.5.-1) is described and discussed (tab. 4.5.-2). Feeding - and a few growth-rates are evaluated experimentally (fig. 4.5.-2, table 4.5.-3). Availability of food is discussed as a parameter regulating life history.

5. Decomposition of allochthonous organic matter: Allochthonous organic matter is substituted by hay samples exposed at different depths and over different periods. First results deal with the weightloss as indicator of decomposition processes (table 5.-1). Weightloss is in the range of 5% per month.

III. Independend studies

1.) Freight and turnover of Phosphorus in the Ötztaler Ache (Tirol): Sewage input varies widely during one year as well as the discharge rates. Phosphorus compounds are sedimentated during times of low discharge rates and high inputs of sewage but flushed again when discharge increases. On an annual basis the actual phosphorus elimination is negligible.

2.) Ecology of Salvelinus alpinus L. and Coregonus wartmanni BLOCH in Achensee: Composition, size and distribution of the populations are estimated and life histories and feeding behaviour are described.

IV.) Restauration of small lakes heavily used for recreation: Three small lakes - Piburger See, Hechtsee and Reither See - developed a dangerous degree of eutrophication due to heavy recreational use. In all three lakes an OLSZEWSKI-pipe has been installed. In Reither See an additional precipitation of dissolved phosphorus with $FeCl_3$ has been done in situ. The reactions of the lakes to the restauration measures are shortly described.