AD

ATMOSPHERIC AEROSOLS
BETWEEN 700 AND 3000 m ABOVE SEA LEVEL
PART V

A Study of the Effects of Atmospheric Fine Structure Characteristics on the Vertical Distribution of Aerosols

FINAL TECHNICAL REPORT

by

Reinhold Reiter

Rudolf Sládkovič

and

Walter Carnuth

July 1971

EUROPEAN RESEARCH OFFICE

United States Army

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Physikalisch-Bioklimatische Forschungsstelle
der Fraunhofer-Gesellschaft
81 Garmisch-Partenkirchen, Germany
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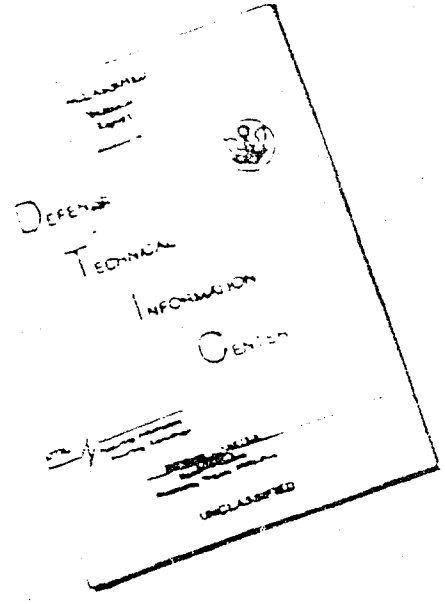

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ABSTRACT

Our research work for the purpose of studying vertical aerosol exchange up to 3000 m a.s.l., which was explained in our previous reports, has consistently been carried on. It comprises the obtaining, to the extent possible, of uninterrupted recording data, on the one hand, and, on the other, the development of appropriate methods of electronic data processing and their application toward the derivation, for practical utilization, of relations between aerological parameters and the incremental exchange coefficient. Following are details on the investigations conducted:

Obtaining of Data: Continuous recording of RaB and RaC at 700 m, 1800 m, and 3000 m a.s.l.; computation of the main vertical exchange coefficients for the strata between these levels, and computation of the ionization rate profile. Recording of air conductivities and of the concentration as well as the particle size spectrum of Aitken nuclei at the same levels. Application of these data for computing the vertical profiles of the Aitken nucleus profiles, from the soundings of air conductivities between the said levels. Performance of more than 400 soundings between 700 m and 1800 m a.s.l., and more than 1000 soundings between 1000 m and 3000 m a.s.l., by means of the cable car telemetry systems, for obtaining the profiles of the following parameters: wind velocity, temperature, humidity, polar air conductivities, and potential gradient. Application of the profiles of aerosol particle concentration as computed from the air conductivity profiles, for computing the profile of the incremental exchange coefficients.

Data Handling: Development of computer programs for automatic computation, from the said recordings, of all essential parameters and their altitude dependence; automatic transfer of the data to parameter data tables.

Scientific Processing of Data: Derivation of significant statistical relations between aerological data such as gradients of temperature, of potential and equivalent potential temperatures, of vapor pressure, on the one hand, and the incremental exchange coefficients, on the other. Detailed analyses to investigate the interrelations between all essential parameters, and to deduce appropriate principles of classification as a basis for future improved statistical data processing.

In the appendix, numerous graphs, copies of original recordings, and parameter data tables illustrate the relations found, up to now, and afford a glimpse into our analysing workshop. The most important computer program is printed out in full.

The narrative portion is concluded by a preview of advanced studies intended for the near future.

I. OBJECTIVES AND BACKGROUND

Our investigations carried out during the period from 1 July 1970 until 30 June 1971 are based upon the preparatory work of the preceding years of operation. The fundamental problem of the current investigations which have been greatly expanded, instrumentation-wise, by the telemetry system aboard the Zugspitze cable car, has been expounded in detail in the preceding report (1) and in a publication (2). It is assumed, therefore, that a reiteration of the final objective of our research may here be dispensed with. Earlier and more recent literature references to be considered have been thoroughly discussed in (1,2), also. New publications by other scientists of any importance have not since been added.

The subject to be presented, however, in this chapter is how does the work performed during the reporting period differ significantly from that of the preceding period up to the middle

of 1970. During the latter it was our objective (a) to shield the cable car telemetry systems against all effects of the weather and to obtain by them homogeneous series of recordings; (b) to develop and apply the physical and mathematical bases for the complete numeric evaluation of the recording runs, up to and including computation of the incremental exchange coefficients; (c) to continually record at the three stations the Aitken nuclei concentrations, natural radioactivity (RaB, RaC), and polar conductivities, and to utilize them in the evaluations; and (d) to derive initial deductions from the results.

The performance of evaluating operations was predominantly based on manual processes. However, certain phases of the computations, e.g. those of Aitken nucleus concentration from the total electric conductivity of the air, and of the incremental exchange coefficients from the vertical gradients of the conductivity data, were already performed electronically with the Hewlett Packard desk computer.

Now, during the reporting period of 1 July 1970 through 30 June 1971, the entire evaluation technique was completely changed. A new computer (Intertechnique Multi 8) with 12 k words (1 word = 9 bit) affords us the possibility to perform the entirety of all computation processes in one single operation, and to print them out in tables. A considerable portion of the time, however, had to be used to develop computer programs, to test them and adopt them to the computation problem in all details. The newly acquired accessory equipment such as fast reader and fast tape perforator afforded new possibilities to optimize the computation work, however, initially required time consuming conversions of the computer programs. Furthermore, it was necessary to transfer our stock of primary data, i.e. the crude data read from the recordings, on punch tapes by means of teletype, and do this both retroactively to the greatest extent possible, and continually up until they were caught up actu-

ally with the daily soundings.

Hence, there was only a relatively short period left for a thorough statistical processing of the data material as the same can only be based upon the final tables from the computer. Nevertheless, it is possible in this report to convey some interesting - tentative - results. These as well as the detailed analyses described below are in this case based upon Zugspitze cable car soundings only. Analog processing of the Wank cable car soundings will be done later. Also the vertical wind profiles recorded by both systems shall be considered at a later date.

It is by no means gratifying to merely process the data obtained statistically, "blindly", as it were. Such a "blind statistics" is even bound - if solely relied on - to lead on to wrong tracks and into incomplete knowledge. It is rather an indispensible necessity to analyse in detail and "individually", such series of soundings as belong together. Only from such practice, i.e. from an undeniably time consuming detailed analysis, grows the foundation of experience upon which a meaningful and successful statistical evaluation may be based. Part of this report will, therefore, deal with the initial results of such detail analyses.

Our long-range objective is - beside the continuation of the soundings, computer work, and detailed analysis - (1) a complete synopsis of the existing interrelations, and (2) solution of the problem to render the disclosed interrelations applicable for practical use.

II. OBTAINING OF DATA

1. Technical Facilities

a) Cable Car Telemetry Systems

During the reporting period the telemetry system in the Wank cable car was working without any troubles. In order to obtain data by it which are comparable in every respect to those obtained by the Zugspitze cable car system, the arrangement of the instruments in the bottom of the Wank cable car was changed. The inlet tube for the measuring air flow was assimilated to that of Zugspitze cable car in length, diameter and position relative to the body of the car.

To begin with, the telemetry system of the Zugspitze cable car required some further improvements.

Due to the large altitudinal difference traversed, condensation would occur occasionally on some of the sensitive electronic parts such as resistors of extremely high ohmic value. We therefore had to resort to installing those parts into sealed cartridges which are kept dry inside through anhydrous CaO. This solved the problem, and even the most severe weather conditions during the run or during waiting period at Zugspitze peak no longer affected the functioning of the unit.

Furthermore, it was possible to completely eliminate a disturbing sensitivity of the cable car equipment as well as the relay station at St. Martin's, to nearby lightning strokes; so, interesting recordings are now available from inside the thunderclouds.

Both systems have repeatedly been tested, calibrated and compared with one another in the laboratory.

b) Recordings of Natural Radioactivity in the Air (Concentration of RaB and RaC).

Recordings of RaB and RaC concentrations at the 3 stations were made without interruption, evaluated and utilized within the scientific program. This was done, on the one hand, by computing the mean vertical exchange coefficients between 700/1800 m and 1800/3000 m a.s.l., and on the other hand by using the data in computation of the ionization rate. The results of the recordings for the reporting period are compiled in X. Appendix, Section 4.

c) Recording of Aitken Nuclei Concentration at the Stations.

Aitken nuclei concentration and particle size distribution within the Aitken nuclei range were recorded at the two stations of Wank peak and Garmisch-Partenkirchen without any interruptions or disturbances. All data have been continually analyzed. These (and many other) data are picked up and processed at the latter station by our electronic computer system. Apart from basic research studies on Aitken nuclei and their behavior, these data are primarily used as a basis at 700 m and 1800 m a.s.l., for the conversion of total conductivities into nuclei concentrations.

A new Aitken nuclei counter of the make Environment/one, USA, was installed and put into operation at the Zugspitze station. This unit is smaller and lighter than the GE units, which is essential for operation at Zugspitze peak with the limited space available. But despite considerable expenditure of repair and reequipment efforts, it unfortunately was not yet possible to obtain homogenous recording series over more than a few weeks.

d) Recording of Polar Conductivities and Space Charge Densities at the Stations.

During the reporting period, instruments were put into operation for the recording of polar conductivities and space charge densities at 1800 m a.s.l. (Wank peak) and 700 m (valley floor). From the terminals of our cable car recording range, they furnish data, continuous in time, for direct comparison and link-up. The instruments are functioning satisfactorily, even under bad weather condition. The equipment that had been previously installed at Zugspitze peak has, without interruption, been yielding recorded data which have been evaluated.

e) Numerical Processing of Recorded Data

The methods of numerical processing of recorded data are outlined in (1,2).

2. Volume of Processed Data

From 1 July 1970 through 31 May 1971, we made

413 recording runs by Wank cable car telemetry system
and 1,015 recording runs by Zugspitze cable car telemetry system.

The manual evaluation operations that were still necessary have all been completed.

During the same period 380 Wank cable car and 900 Zugspitze cable car runs were transferred to punch tapes and mathematically analyzed by computer. The final results are printed out in tabulated form. Based on the fact that each run yields roughly 500 individual data, our file presently comprises 650,000 data.

III. DATA PROCESSING

1. The Physical-Mathematical Fundamentals for Data Processing

The physical-mathematical computation operations are described in every detail in (1), Chapter IV (also cf (2)). They were retained in every detail, hence there is no need for reiteration here.

2. Brief Description of the Overall Procedure of Technical Data Processing

Processing of the data, starting with transfer from the moving cable car up to the print-out of the completed tables is shown in Fig.1.

The sensors and the transmitter on the running cable car transmit the measured values to the receiver in codified form and in the known manner. Thereupon follows the electronic decoding of the data and their analog recording on three xy-recorders. The y-channel of each of the three recorders is fed with the analog pressure signal as parameter of altitude. The x-channels are occupied by the analog data for polar air conductivities, wet and dry temperatures and potential gradient + wind speed. The three record sheets obtained per sounding are then subject to intermediate manual processing: the relative values are read off at the main levels (vertical intervals of 100 or 200 m) and at the secondary levels in between. These secondary levels are determined by the processing scientist, based upon the given aerological fine structures of the soundings. These relative values are then compiled in a work chart (intermediate table) per sounding. Thereupon, they are punched (per sounding) on an 8-channel punch tape by means of a teletypewriter. These tapes are then checked for errors (omissions, wrong signs, logical errors) with the aid of a test program; defective tapes are corrected (rate of errors not in excess of 5%). This test pro-

cess is not reflected in the diagram. After the test, the punched tapes are read via the fast reader, into the core store of the computer. The reading time per sounding is approx. 2 seconds. With the aid of the computer program meanwhile developed, which likewise has to be read into the core store of the computer, the result data are computed. The computation process takes 120 seconds. Thereupon, the result data are punched by means of a fast perforator on a punch tape (approx. 80 seconds per sounding). It is advisable to punch the data of several soundings, one after the other, on a continuous tape of 250 m length. The latter is then fed into another teletypewriter which will print out the result data in the form of clearly arranged tables. They are then furnished to the scientist who will study the mutual correlations of the data, taking into consideration any characteristic atmospheric conditions.

3. The Computer Program as Such

The computer program is described in full in Chapter X, Appendix, 5.

4. Description of Final Data Tables

In Chapter X, Appendix, 3, a number of Final Data Tables are printed, true to original, as supplements to individual runs. They are arranged as follows:

Headings: Z = Zugspitze system (W = Wank system)
Number of run; Date; Hour of start of run.

a. Main levels (Haupt-Niveaus")

Vertical intervals 100 m for Wank system;
Vertical intervals 200 m for Zugspitze system.

b. Special levels, selected by temperature structure ("MP-Temperatur")

Vertical intervals are roughly 30 m as a minimum.

c. Special levels selected by humidity structure -- to the extent applicable -- ("MP-Feuchtigkeit")

Vertical intervals see b.

d. Special levels, selected by air conductivity structure -- to the extent applicable -- ("MP-Leitfähigkeit")

Vertical intervals see b,

Meaning of letters designating vertical columns of Tables:

Z	:	Number of level
H	:	Altitude (m.a.s.l.)
P	:	Pressure (mb)
T	:	Air temperature (^{o}C)
TF	:	Wet temperature (^{o}C)
PT	:	Potential temperature (1/10 ^{o}K)
EPT	:	Equivalent potential temperature (1/10 ^{o}K)
E	:	Water vapor pressure (mb)
S	:	Specific humidity (g/kg)
RF	:	Relative humidity (mm%)
+L	:	Positive polar conductivity (10^{-14} 1/Ohm.m)
-L	:	Negative polar conductivity (10^{14} 1/Ohm.m)
+/-	:	Ratio of both conductivities
L	:	Total conductivity (see above)
DH	:	Height difference (m)
TV	:	Virtual temperature (^{o}C)
G-T	:	Gradient of T
G-E	:	Gradient of E
G-S	:	Gradient of S

G-RF : Gradient of RF
G-PT : Gradient of PT
I : Ionization rate (ions/cm^3 sec)
N : Number of Aitken nuclei (cm^{-3})
A : Incremental exchange coefficient ($g\ cm^{-1}\ sec^{-1}$)
D : Diffusion coefficient ($cm^2\ sec^{-1}$)

Definition of sign of gradients:

The gradients are positive when:

T : decreases with height
PT : increases with height
E : increases with height
S : increases with height
RF : increases with height

The meanings of the letters and gradients should be born in mind when later the Tables and graphs are discussed.

IV. STATISTICAL RESULTS

1. Preliminary Remarks; Kind of Relations Studied; Principles of Selection

Our basic idea in the statistical analyses was to find significant relations between the fine structure characteristics of the meteorological parameters, on the one hand, and the respective value of the incremental vertical exchange coefficient A_i on the same vertical interval, on the other hand. There are numerous possibilities of doing so. After preliminary tests, the following relations appeared sufficiently promising to be numerically investigated (for legend see above).

a) $A_i = f$ (G-T) Inversions
b) $A_i = f$ (G-PT)

c) $A_i = f\ (G\text{-}E)$ Inversions and other barring layers
d) $A_i = f\ (G\text{-}\Gamma T)$ General relation,

There was no question, from the outset, that all values from the computer tables were not suitable to be "blindly" used for differentiation of the structure of these relations. The definition of the principles of selection, however, is a tentative one and may be varied or supplemented by other, additional ones in subsequent, more exhaustive investigations. In regard to the above defined relations, the following principles of selection were applied in the following:

a) Data of such vertical intervals only were used (no matter whether bounded by main or special levels) containing distinct temperature inversions (G-T negative). These inversion layers were required to have settled both in time and position; cases with a marked vertical movement of the inversion level were excluded, likewise such with a sudden formation or disintegration of the inversion structure. That pair of values was used at that vertical interval where the steepest negative gradient of T was reached.

b) Same definition as a).

c) Again, data of only <u>one</u> vertical interval were used per run, with the following conditions applied: if there was no negative G-T value anywhere that vertical interval having the lowest positive value was selected; if there was a vertical interval with - G-T, the latter was used; if there were several such the highest negative G-T value was used as criterion of selection. At the same time, G-E was required to show a maximum.

d) Almost all existing pairs of values were used, except such, derived from periods or layers where the structure was subject to rapid changes in time, a transformation of the local meteorological conditions was in progress, or where fog or

precipitations were traversed during a run. Likewise, values from layers with distinct inversions have not been included; they belong under b).

In the following part of this we show the distribution of the individual pairs of values as dots in the graphs, on the one hand, and each time a respective statistical evaluation, on the other. The latter was made with our Hewlett Packard computer which, in the meantime, has been equipped with an extended memory. The pairs of values were keyed into the computer. The latter then separated them according to A-values. To this end, each A decade was subdivided into 10 equal intervals. The computer automatically determined the 40 mean values between $A_i = 0.1$ and $A_i = 1000$, plus the pertinent criteria of significance

$$\sigma_M = \pm \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{(n-1)\,2n}}$$

The results of these statistical investigations are presented in the form of "stepped graphs". In the discussion of the graphs below the above listed criteria of selection should be born in mind, as appropriate.

2. Relation $A_i = f$ (G-T), Inversions

Fig. 2 shows the scattering of the individual pairs of values for the relation $A_i = f$ (G-T) in the case of a typical inversion (see Section IV.1.a). The study covers the period of 28 July 1970 through 17 February 1971 with a total of 388 pairs of values. The graph is analogous to Fig. 23 in (1). A comparison of the result depicted in said graph with that in Fig. 2 reveals this: In principle the earlier result agrees quite well with the more recent one except that the relation $A_i = f$ (G-T) is now much more pronounced, the scattering of the values is narrower.

Fig. 3 shows the analogous result of a statistical analysis with statement of scatter σ_M. This graph clearly shows: There is

a strict, significant relation between an incremental exchange coefficient in the range of A_i = 0.1 through 300, and the temperature gradient in the range of - 0.1 through -10 °C/100 m, provided that the inversion in the vertical interval under consideration is a genuine, stable and largely motionless one to which the A_i and G-T values apply. The relation is independent of season or time of day.

Hence, the function presented in Fig. 3 is already ripe for practical application.

3. Relation A_i = f (G-PT), Inversions

Fig. 4 shows the scattering of the individual pairs of values for the relation A_i = f (G-PT). It, again, applies to cases of typical inversions. The principle of selection is defined in Section IV.1. a) and b). The period of the study, again, stretches from 28 July 1970 through 17 February 1971 and covers a total of 289 pairs of values.

With the scattering of values not too wide a surprisingly clearly defined logarithmic relation is found between incremental exchange coefficient A_i and potential temperature gradient G-PT:

If in a defined vertical interval with an inversion the potential temperature gradient increases, the intensity of exchange in the same layer is decreased. The following rule may be stated: Per 1 °C/100 m increase of G-T, A_i is decreased by one decimal power.

Fig. 5 shows the analogous result of a statistical analysis with statement of scatter σ_M. True it is greater than in Fig. 3, nevertheless between A_i = 100 and A_i = 0.8 the relation may be considered well established. The volume of data material is to be further increased in order to make the relation come out even more clearly. This particularly applies to the value range of $> A_i$ = 150 and $< A_i$ = 1.

Aside from these statements we feel justified in claiming that this function $A_i = f(G-PT)$, too, may already be practically applied.

We consider the statement important that now we have two criteria, independent from each other, to quantitatively state the barring effect of an inversion, viz. the function in Fig. 5 and that in Fig. 3. From now on, the layer having the strongest barring effect may immediately be determined from the aerological data: negative temperature gradient and positive potential temperature gradient must be at maximum values.

4. Relation $A_i = f(G-E)$, Inversions and Other Barring Layers

In studying the relation between the incremental exchange coefficient A_i and the gradient of water vapor pressure (G-E) we have dropped the demand that a genuine, stable and stationary inversion must exist. With the aid of the gradients of temperature and potential temperature we have merely searched for a barring layer in general (for definition of principle of selection see Section IV.1.c). For the layers thus defined we then studied the above described relation, using data from the period of 28 July 1970 through 17 February 1971. The graph containing the individual pairs of values is shown in Fig. 6; the results of the statistical analysis is presented in Fig. 7. Between $A_i = 100$ and $A_i = 1$ we find a significant logarithmic function having a relatively narrow scatter with only 263 pairs of values. It appears desirable to increase the data, particularly in the limiting zones. The rule has been established that A_i will be increased by one decimal power when the negative value of G-E is increased by 1 mb/100 m - and vice versa. This is comprehensible in principle since the vertical exchange of water vapor, too, is controlled by the amount of the A_i value. Nevertheless, it is probable that the graphs 6 and 7, for the first time, convey a tangible picture of the function as such as it is actually applicable in the atmosphere.

With this function, now, we have an independent third criterion by which to locate layers having a barring effect, and to determine the degree of their barring effect.

5. Relation $A_i = f$ (G-PT), General Cases Other tan Inversions

Within the scope of the previous studies we had limited ourselves to either typical inversions (Sections 2 and 3) or, at least, layers of such aerologic structure as to permit the inference of a barring effect, including inversions (Section 4). To the extent that criteria of selection were applicable at all, the values of one layer, at maximum two layers, per run were, in this manner, to be taken into consideration. The study now being discussed, however, covers all layers (any number per run) except such containing an inversion. As explained in Section IV.1.d), the following have also been left outside of consideration: cases with a rapid transformation of the weather condition, with precipitations, or runs entirely or partly through clouds.

Preliminary studies have revealed that above all the potential temperature gradient is very well suited for this kind of a general statistics.

In order to determine whether seasonal differences might play a part in this we have subdivided the entire period from which values are available, into 28 July 1970 through 12 November 1970, and 13 November 1970 through 17 February 1971. We shall here dispense with a presentation of the distribution of individual pairs of values, even more so as, in view of the large volume of data, this kind of evaluation would have been too expensive.

The results of the statistical investigations are shown in Figs. 8 and 9, with statements as to the respective scatters. From both figures a clear and strict relation becomes apparent ($A_i = f$ (G-PT)), scattering only insignificantly in the range between $A_i = 1000$ through $A_i = 1$. At $A_i < 1$ the relation becomes

uncertain. As demonstrated by Fig. 10 the results from both periods of time are in good agreement with one another, hence there is no seasonal impact.

The relation depicted in Figs. 8 through 10 applying to those atmospheric layers which are not of the nature of an actual inversion, clearly deviates from that deduced for typical inversions (Fig.5). The reason for this deviation is yet to be clarified.

The function $A_i = f$ (G-PT) resulting from Figs. 8 through 10 is suited for deducing, in practical work, from G-PT values the strength of vertical exchange, unless typical inversions are being delt with in which case the function pursuant to Fig. 5 is to be applied.

V. DETAILED CASE STUDIES

1. Preliminary Remarks

The following case studies are partly based upon the original recordings by cable car telemetry system and pertinent parameter data tables supplied by the computer. The wind profiles are not yet taken into consideration. The graphs and tables are compiled in SECTION X, APPENDIX, 3. They, at the same time, afford a glimpse into our "Analysis Workshop". The numbers of the levels in the recordings correspond to the numbers of levels in the tables. On the other hand, the case studies are based upon a study of changes in time of certain structural elements at the inversion level and pertinent numeric values of functions: $A_i = f$ (G-T), $A_i = f$ (G-E) and $A_i = f$ (G-PT). Separate graphs which are given consecutive figure numbers serve this purpose (SECTION X, APPENDIX,1). In the graphs on which the values of the aforesaid 3 functions are entered, we have also plotted the "normal progress" of each respective function, in the form of dotted areas, which also, based upon Figs. 3, 5, 7,

indicate the mean scatter. The examples to be discussed hereinafter, are marked with identification letters in alphabetical order. These letters have been transferred to all graphs, recordings and tables (also those in SECTION X, APPENDIX, 3,) so no doubts may arise as to their correlation.

The runs of one and the same day bear encircled numbers in chronological sequence. These, too, are also found on all recordings, graphs and tables, hence the variations of all data in the course of time are readily recognized.

Following are some necessary remarks on the problem of equilibrium. An aerological structure, e.g. the variation of temperature across an inversion layer, and the vertical aerosol profile across the same vertical interval can be in lawful correlation to one another (as shown, e.g. in Figs, 3, 5, 7) only if there had been enough time for the setting of some stationary condition. There are two possibilities:

a) A temperature inversion is created, very rapidly, say in less than 1 or 2 hours, through some processes which are known in principle. At the moment of its formation, the aerosol profile cannot, as yet, have been accommodated by this inversion to the instantaneous barring effect. The adaptation process requires a few hours; for instance, by evacuation or coagulation of aerosol particles above the inversion and concentration below, until equilibrium has been set based upon the mere eddy diffusion process. Not until then can a lawful correlation exist, and parameters be within the normal ranges of the functions per Figs. 3, 5, 7.

b) With the barring effect of an already existing inversion being constant in time, the source strength of the aerosol in the layer below the inversion may change, or aerosol may be brought in or drawn off, through advective processes. In this case, again, the equilibrium of diffusion

is temporarily disturbed and time is required for readjustment.

c) It may happen that aerosol fluxes from some a source into the lower atmospheric layers, where it will spread for the time being. At the upper boundary of the thus developed haze layer, an exradiation of heat begins. This causes continuous cooling and formation of vertical temperature structures which react back upon the vertical aerosol distribution. In this instance, again, the result may be a disturbance of the eddy diffusion equlibrium of long duration.

Other processes are possible which shall not be discussed in this context. The following studies are to show the meteorological conditions under which an equilibrium of diffusion is, as a rule, encountered, or not encountered, and what numeric relations will be found in each respective case.

2. Example A, 5 Oct 1970, Figs 11 through 14
Spontaneous formation in the medium altitude zone of a most sharply defined inversion, which from noon on descends.
Equilibrium of diffusion set from the beginning.

Looking, to begin with, at the original soundings (APPENDIX) we find that at around 1100 CET (run 0) neither T nor TF show any distinctive structure, and this is true of the entire vertical interval. The temperature gradient, however, is weak, and humidity is decreasing with height. The polar conductivities +L and -L are steadily increasing from level 11 to level 5. The causes of their variations above level 5 do not concern us in this report. At 1157 CET (run 1) already, a sharply defined inversion exists immediately below level 6, with humidity decreasing with increasing height, which is clearly reflected in the behavior of +L/-L. In the course of the day the picture of a typical temperature inversion with humidity break

becomes more and more distinct. At the same time the abruptness of the break of +L and -L keeps increasing, and the aerosol concentration below the layer of the break is continually growing (the values of +L and -L are decreasing). Thus the gradient of the aerosol concentration across the layer of the break is getting steeper and steeper. From noon until night the level of the inversion is continuously descending.

Let us now take a look at the detailed analyses in Figs. 11 through 14. Fig. 11 shows changes in regard to altitude and time for:

a) the layer where the inversion is located ($-G-T_{max}$);
b) the level with a minimum value; and
c) a maximum value of the equivalent potential temperature EPT.

With regard to b) and c) the following must be added: in case of well defined, stable inversions scarcely variable in time or space, or other barring layers, a minimum of EPT is encountered above the barring layer, with a maximum within or below its level. In the absence of barring layers EPT, as a rule, decreases evently with decreasing height. Thus barring layers normally also identify themselves by an "inversion" in the course of EPT, which, however, proceeds inversely to T. The fact that this EPT inversion (signs: - and = in Fig. 11) is convected together with the temperature inversions proper (sign: ⌊⌋) is clearly apparent from Fig. 11. This figure also reflects the time slope of A_i. During the descent, to begin with, A_i increases. In the evening, when the inversion has settled, A_i drops to a minimum value of only 0.3.

In Fig. 12 we study the variations with time in the range of the function $A_i = f(G-T)$ within the inversion layer of runs 1 through 4. The variation of the pairs of values occurs exclusively inside the (dotted) normal range. Thus, A during

the descent (run 1 after 2 to 3) increases, it is true, but G-T, too, changes by a corresponding amount as the function shows. Hence, structure of inversion, and control of the vertical aerosol distribution by it are in a true-to-function relation to each other. We arrive at an analogous result if we study Fig. 13 (A_i = f(G-PT). Except for run 1 the pairs of values are within the normal range of the function. Hence, the behaviour of G-PT and the pattern of the vertical aerosol structure correspond to each other. From these finding we may deduce that equilibrium or diffusion has practically existed from the beginning. No analogous conclusion may be drawn in regard to the relation A_i = f(G-E), as illustrated by Fig. 14. In this instance all pairs of values are exclusively outside of the normal range. The E-gradients are much greater than would be permissible with regard to the A_i values. Hence, a change must have occurred in absolute humidity (e.g. caused by advection) above or below the barring layer, which was not related, across the barring layer, to the eddy diffusion process, whereas by contrast the aerosol distribution did obviously correspond to the barring effect of the layer.

Conclusions drawn from this example:

Even in case of spontaneous formation of a very sharply defined inversion, and during a slow and constant descent of the same, the discovered "normal relations" between A_i and G-T or G-PT, respectively, are being retained. Thus they adequately describe the vertical distribution of aerosol; the state of equilibrium prevailed. A deviation of the values outside of the normal range of A_i = (G-E) reveals an advective change of humitidity. This emphasizes the high value of such detailed analyses. The rule that there has to be a minimum of EPT above the barring layer, and a maximum within its level, is met at all times. It may additionaly serve as an indicator of the barring layer.

We are here dealing with a case where rapid formation of an inversion and the transformation of the vertical aerosol structure

went hand in hand together in such a manner, that the condition of equilibrium for the eddy diffusion was met at all times. Conditions for the occurence of this situation remain yet to be defined.

3. Example B, 18 Nov 1970, Figs. 15 through 19.

Well-defined, spontaneously formed inversion, with height of barring layer and intensity of barring effect varying, Equilibriumof diffusion retained.

The soundings (for a selection pertaining to Example B see X., APPENDIX 3) already show that we are here dealing with a (spontaneously formed) inversion and barring layer which is subject to considerable fluctuations in time as to its structure and height. As demonstrated by Fig. 3 the maxima of -G-T and -G-E are located at the same respective altitude, which level, however, fluctuates considerably. A maximum of EPT above the inversion level and a minimum within the same cannot be found. A_i, too, fluctuates considerably from run to run, and the rule is confirmed: If the inversion level descends the barring effect of the inversion is temporarily reduced (A_i is increased), as is demonstrated by runs 3 and 6.

As is recognized from Figs. 16 and 17 the values are fluctuating precisely within the normal range of the function $A_i = f\ (G-T)$ and $A_i = f(G-PT)$. So, with the exception of runs 2 through 4, diffusion equilibrium prevails as in Example A. The change from run 2 via 3 to 4 is indeed striking. Whereas A_i is changed considerably, G-T and G-PT remain practically constant, the full "normal" scatter of the function is traversed. This means that during the vertical movement of the inversion from 2 via 3 to 4 the aerological structure of T and PT is retained whereas the permeability of the barring layer is reduced temporarily. A local perforation of the layer by turbulences in the early afternoon with relatively extensive insolation, is likely to be the main cause thereof. This example indicates how, by means of such a detailed analysis interfering factors may be isolated.

Considering Fig. 18 we observe that the normal range is considerably exceeded in both directions. The values are not, however, all shifted in one direction as in Example A. This rules out progressive changes of absolute humidity due to advection. Turbulence caused, forced vertical transportation of water vapor is, much rather, to be considered as a cause (transitions from 4 to 5, from 5 to 6). It is, however, a striking observation that the transition 2-3-4 again appears to be out of place: While the water vapor gradient remains constant, A_i varies considerably. This means again that here a variation of the inversion had temporarily been forced, pointing toward interference with the system from the outside (e.g. heat irradiation). It is interesting that in this case a variation of the vertical aerosol structure was triggered (as a consequence whereof a higher A-value resulted for run 3), not however one of the aerological structure and of the vertical distribution of water vapor.

For the present example we have plotted the vertical profile of the incremental exchange coefficients A_i and of the water vapor from run to run as a special representation in Fig. 19. This representation does not only show very impressively the variation in the fine structure of the A_i profiles but also the vertical displacement of the layers having maximum barring effect (A_i minima). What we want to demonstrate, however, is that just these sometimes very thin layers of highest resistance to eddy diffusion are indicated in the E profile by a peak-like dip of water vapor concentration. This is true even in the case of a splitting into two barring layers with a small difference in height (run 6). At the same time we recognize a problem in the E profile for run 3: Here it is not so much a dip but much rather a sharply confined increase of E with height that is characteristic. Such findings with the aid if detailed analyses are conductive to understanding deviations from normal behavior observed from time to time.

The gathering of such exceptions and the investigation of the conditions under which they occur is important for the following reason: In order to reduce, on a pertinent basis, the scatter in the statistical investigations it is necessary to introduce a more detailed subdivision. Most of all, the complex causal nexus of the various parameters may gradually be cleared up in this manner.

Conclusions drawn from the example:

In the case of spontaneous formation of an inversion and intensive vertical movement of the same, the discovered "normal relations" between A_i and G-T or G-PT, respectively, are retained and depict the vertical aerosol distribution which corresponds to a stationary setting of equilibrium. A "breaking out" of the values from their normal distribution, insignificant for G-T and G-PT, and quite considerable for G-E, points to a convectively forced variation in the vertical aerosol distribution, which can no longer be lawfully related to the aerological structure. The vertical water vapor gradient, in this case, behaves differently from the vertical aerosol gradient. With the barring layer sharply descending, A_i is temporarily increased. Barring layers are always indicated by conspicuous deviations of the E profile across very small vertical intervals.

4. Example C, 14 October 1970, Figs. 20 through 23

Sharply defined inversion with predominantly insignificant vertical variations but considerably fluctuating barring effect. Vertical aerosol gradient in stationary equilibrium on basis of aerological structure.

Example C concludes, for the time being, those cases of inversions which are distinguished by the vertical aerosol gradient being in equilibrium on the basis of the given aerological structure, in other words, where the normal relations of our function are fully or largely met.

As is shown by the original recordings in APPENDIX, 3 we are, from run 1, dealing with a sharply defined inversion the strong barring effect of which is clearly expressed by the profile of the air conductivities. Only early in the morning (run 0) an inversion is just slightly indicated, with only a very weak barring effect. The vertical movements can be clearly recognized on the original recordings, e,g. by comparison of run 6 with run 8.

To begin with, the variation as a function of time and altitude is shown in Fig. 20. In the forenoon we find that the ascent of the inversion layer from run 1 through run 3 results in a weakening of its barring effect (increase A_i; in Examples A and B we had found a weakening with a descent of the inversion), whereas later in the afternoon the opposite relation is found. Hence, vertical movement, no matter in which direction, may lead to either a weakening or a strengthening of the barring effect. We are thus compelled to restrict our statement to the more generalized form: Vertical movement of a barring layer results in a change to its barring effect. The nature of the individual relation is certainly depending upon the causative reasons for the movement of the inversion (advective processes, anticyclonic descent). In order to determine these, further detailed analyses will be needed. In the context of this discussion of the examples the implications of microscale and mesoscale meteorological conditions and processes are not to be discussed in any detail. A deepening of the detailed analyses in this direction is in process.

In the instant case we again find a minimum of EPT above the barring layer, but no marked maximum below.

Figure 21 shows the variations with time of our values relative to function $A_i = f(G-T)$. We notice that the fluctuations of the values largely remain inside the normal range. An insignificant breaking out (deviation from equilibrium) occurs from 5 through 6 to 7. This means that in Fig. 20, too, we must

consider the temporary descent of the inversion level (run 6) as the expression of an interfering process. At any rate, the fact is again conspicuous that A_i changes considerably, e.g. from run 5 to 6, although the aerological structure of T has been retained (G-T constant). The attenuation of the aerosol gradient encountered at the same time therefore must be due to an exterior cause, e.g. perforation of inversion by local turbulence. It is striking, however, that, as Fig. 22 indicates, the variation of the values is largely within the normal range of the function $A_i = f(G-E)$, at least the transition 5-6-7 is within. Again, aerosol and water vapor behave differently in the case on a disturbance of equilibrium. It is surprising, however, that (see Fig. 23) the values for $A_i = f(G-PT)$ are almost exclusively outside of the normal range of this function. What conclusions have to be drawn therefrom is yet to be investigated, using all available meteorological data.

Conclusions drawn from this example:

Vertical movements of the barring layer result in variations of their barring effect and a disturbance of the diffusion equilibrium. What direction such a variation may take cannot necessarily be predicted, until such time that the causative reasons for the interfering process are known. It appears certain that detailed analyses of the demonstrated kind will lead to recognition if the causes of interference of microscale and mesoscale meteorological conditions are included in future investigations. For because three basic function are available, based on G-T, G-E, and G-TE, it is, as a rule, possible from the agreement of the individual values with two of these to isolate the one which is most of all affected by the disturbance of equilibrium. This may later lead to isolation of the interfering cause.

5. Example D, 11 December 1970, Figs. 24 through 26.

Inversion at constant height. Vertical aerosol gradient not in equilibrium on basis of aerological structure.

In Figs. 24 through 26 we are studying the case of cyclic variations (runs 1 through 4) of the value obtained, in the range of functions $A_i = f(G-T)$, $A_i = f(G-E)$, and $A_i = f(G-PT)$. All data obtained from these runs are far outside the normal ranges of the three functions. Vertical movements of the barring layer did not occur. Convective interference, also, must be excluded. To what extent persistet advective processes were determining in this case in the formation of this exception remains to be investigated. For it is striking that this low-lying inversion has been formed through the inflow of near-ground polluted cold air. But although this near-ground cold air layer was soon settled a state of equilibrium did not come about.

To begin with, our example shows that even with inversions at rest and seeming freedom from interferences we must be prepared for extraordinary results. If it were not possible to recognize and isolate these (e.g. on the basis of detailed analysis) such values would result in a considerable scattering within the data material. However, the investigation of the causative relations must not be neglected, particularly in such unclear cases. Exactly these may supply valuable insights.

6. Example E, 17 October 1970, Figs. 27 through 30.

Case of two simultaneously existing inversions one of which is suddenly formed newly and the other disintegrated. State of equilibrium is not attained.

Here we are dealing with a relatively complex case. It is remarkable for the only one initially existing inversion and barring layer descending and disintegrating. Prior to its disappearance, however, a second inversion and barring layer

was forming about 400 m above which also descends and goes on existing to the end - if with a weak barring effect. From the picture of the original recordings (X., APPENDIX, 3), layer I ows its formation to a layer of haze actively conveyed to the spot at little short of 1500 m a.s.l. (minima of +L and -L during run 1). In the following we consider the original recordings along with Fig. 27. This initially striking aerosol structure is reduced to a mere trace during run 2, but during run 3 it is suddenly sharply defined again at 1200 m a.s.l. During runs 3 through 6 layer I is disintegrating or hazily merging with layer II which has meanwhile descended and whose existence was first hinted at during runs 3 and 4. Presumably the transition was as indicated with dots in Fig. 27. As is apparent considerable instability prevails in the present case, impeding the setting of a stationary equilibrium of diffusion, as will also be seen from Figs. 28 through 30. First we cast a glance at the variation with time of A_i in Fig. 27. We note that with a rapid descent of both I and II the barring effect is reduced (A_i is steeply increased, runs 2 and 3 for layer I; runs 3 through 5 for layer II). A regeneration of the barring effect for both layers occurs when the descent has come to rest (runs 4 through 6 for layer I; runs 7 and 8 for layer II).

We now consider the position of the data relative to the normal ranges of our three basic functions. In doing so we go from the following sequence of values:

Runs 1 through 6 at level of layer I; runs 7 and 8 at level of II, pursuant to the merger of both layers as indicated (dotted) in Fig. 27.

The poorest agreement is found relative to function $A_i = f(G-PT)$ in Fig. 28. With regard to the G-PT values the exchange coefficients are too low. i.e. the barring effect appears "too strong". This above all applies to runs 5-6-7. But this is the very vague transition phase from I to II with disintegration of II. It is not surprising, then, if during this time interval

an equilibrium situation does not prevail. The positioning of the individual values relative to the normal distribution is already notably better in Fig. 29 ($A_i = f(G-E)$). Surprisingly, the above mentioned transition phase of runs 5-6-7, of all things, is not out of line here: water vapor gradient and aerosol gradient are here apparently triggered by the same atmospheric process. By contrast, the values of runs 1 through 3, i.e. during the descent of layer I, are outside of normal distribution: The barring effect of the layer appears to be stronger, during this time interval, for the aerosol than for the water vapor. With regard to function $A_i = f(G-T)$, however, - see Fig. 30 - all values of our example (excepting run 5) are within its normal range. From this it would be concluded that with regard to vertical aerosol distribution, approximate diffusion equilibrium must have temporarily prevailed, after all.

Conclusions drawn from this example:

Descent movements of barring layers are coupled with a temporary reduction of their barring effect. The latter is regenerated when the vertical movement has come to rest. In case of a double inversion with disintegration of the lower layer and the suggestion of merger with the descending upper one, the diffusion equilibrium is temporarily disturbed. A discrepancy develops between vertical water vapor and aerosol distribution. A minimum of the equivalent potential temperature above the barring layers, and a maximum near the barring layers were not found which also points toward disturbed equilibrium conditions.

7. Example F, 30 September 1970, Figs. 31 through 34

Clearly defined inversion descents slightly, remains at constant level for some time, finally ascents steeply with simultaneous disintegration. Largely set equilibrium of diffusion.

Interest is particularly held by the phases of ascent and disintegration of the inversion or barring layer. For this reason,

we have represented only runs 4 through 7 by their originals and tables in X. APPENDIX,3. As with the previous runs (from which a descending movement of the inversion is recognized), an increase of temperature and decrease of humidity with height within the inversion zone is also very distinct with run 4. Just one hour later (run 5), however, the T-inversion has temporarily disappeared whereas the humidity decrease was retained, although this structural detail has risen somewhat. During run 6, a T inversion with humidity decrease is again recognized, if at a considerably higher level than before. Hardly any structures are left for recognition during run 7, traces are derived from the tables.

In Fig. 31 we consider the variations with altitude and time. In the morning the well defined inversion descends by about 10 0 m. During this descending movement the A_i values are relatively high. With the barring layer becoming stationary, however, A_i reaches minimum values between no more than 0.6 and 1.5. At 1300 hours an ascent commences, immediately triggering a steep increase in the A_i values which persists until disintegration of the layer. It is remarkable that in instant case, again, a minimum of the equivalent potential temperature is found above the barring layer (100 m - 200 m vertical interval), with a maximum approximately at the level of the barring layer as such. Only in the case of vertical movements of the barring layer, the EPT maximum, too, is above the barring layer (runs 2 and 7).

Fig. 32 shows that the individual values (2 through 4) are in just barely satisfactory relation to the normal range of function $A_i = f(G-T)$ only during the time that barring layer has nearly or fully settled. But during the vertical movement they are far outside thereof (1 to 2; 4 to 6).

The two pairs of values for a very low-lying near-ground inversion in the morning ("low"), which rapidly disintegrates thereafter, are within the normal range. The values of our example

are quite satisfactory with regard to the normal distribution of $A_i = f(G-E)$, according to Fig. 33. However, we notice a contrast to Fig. 32: While the inversion has become stationary the values fall insignificantly outside of the normal distribution. The vertical aerosol gradient turns steeper, temporarily, than would correspond to the vapor pressure gradient, whereas agrement prevails during the vertical movements. The values in Fig. 34 are completely outside of the normal distribution of $A_i = f(G-PT)$. We find a cyclic sequence with extreme deviation during the stationary phase of the barring layer. No explanation can be offered therefor, as yet.

Conclusions drawn from this example:

It was confirmed again: Vertical movement (no matter whether up or down) of the barring layer results in an increase of its permeability, its becoming stationary results in a strengthening of the barring effect. The A_i values of the example are in satisfactory agreement with functions $A_i = f(G-T)$ and $A_i = f(G-E)$, slight deviations from the former are found during the vertical movement, from the latter during the stationary phase. The superpositioned minima or maxima, respectively, of EPT are found to exist throughout, even during the vertical movements.

8. Example G, 28 September 1970, Figs. 35 through 38.

Considerable vertical and structural variations of an inversion. Equilibrium of diffusion is not attained.

This example concludes our discussion of cases with vigorous vertical movements of barring layers. The original runs in APPENDIX, 3 already show that not only does a distinctive vertical unrest prevail but also the pattern of the structures is changing rapidly. We immediately pass on to Fig. 35. The variations with time of A_i are particularly remarkable. Steep increases of A_i are invariably found when - in accordance with our earlier experience - the level of the barring layer

is rapidly changed. This is very drastically demonstrated by the transition from run 2 to 3: A_i is increased by two orders of magnitude and remains persistently high during the subsequent ascent movement (3 to 4). Not until the stationary condition of the barring layer exists during runs 6 and 7, does A_i arrive at a minimum. Renewed disquiet from runs 7 through 10 causes A_i to increase again.

The vertical displacements of the various structural elements, according to Fig. 35, present an almost confusing picture: True, minimum and maximum of EPT are still always found and in not too great vertical distance from the inversion level (as a maximum a few 100 m, as an average 200 m), but the maximum is sometimes above, sometimes below the barring layer. Even the respective strongest gradients of T and E are not - as usual - close to each other. Vertical differences up to 150 m are encountered. Besides, maximum G-T is sometimes above, sometimes below maximum G-E.

Due to the sometimes extremely poorly developed temperature gradients Fig. 36 contains only very few individual values. As was to be expected, they are far from the normal distribution of function $A_i = f(G-T)$.

It is all the more surprising that, in Fig. 37, the individual values fit very well into the normal distribution of $A_i = f(G-E)$. Although most certainly the setting of an eddy diffusion equilibrium was not possible in our instance the variations with time of the aerosol gradient (expressed in terms of the behavior of A_i) and of the water vapor gradient (G-E) are in good agreement with each other. The interferences, apparent from the continuous structural changes of the aerological pattern and from the vertical variations, thus took effect, in Example G, upon aerosol and water vapor distribution analogous to and on the basis of, the normal relation of $A_i = f(G-E)$. In Fig. 38, the individual values of our example are far from the normal distribution of $A_i = f(G-PT)$: We find a cyclic sequence for runs

2 through 7 and another one from 7 through 10. We find it interesting that the first cycle, if defined only from 2 through 6, comprises exactly the first ascent, the second cycle from 7 through 10 the second ascent. It appears to be possible to describe, with the aid of these cyclic "movement graphs", the structural variations connected with processes of ascent or general vertical displacement, and later to improve our understanding of them functionally. At any rate, in retrospect we may say that the cycles in the following earlier figures were connected with vertical movements of the barring layer: Fig. 34 (runs 2 through 6, initial lingering, then rapid ascent with disintegration of the inversion); Fig. 30 (runs 4 through 8, initial descent, then merger with lower disintegrating inversion). An exception relative to all three normal functions is formed by Example D with its cycles. True, there is no vertical movement here, but a clearly cyclic loosening up of the inversion structure (runs 1 through 5) by turbulences in the course of the day. So it will be necessary to pay still more attention to such graphs with a cyclic pattern, in the future, along with further meteorological parameters.

Conclusions drawn from this example:

In the case of violent structural and vertical changes of the barring layer eddy diffusion equilibrium cannot come about. It is, however, possible that variations of the vertical aerosol profiles and water vapor profiles are running in conformity with each other and are jointly controlled by the interferences determining the complex pattern. Again it is shown that vertical movements of the barring layer are connected with a reduction of its barring effect. During vertical movements a cyclic sequence of the values is found relative to the normal distribution of the function $A_i = f(G-PT)$.

9. Example H, 26 September 1970. Figs. 39 through 43.

Analysis of (a) the upper boundary of the exchange layer, and (b) an ascending inversion located below.

With this example we leave the analysis exclusively of inversions or similar structures analogously belonging thereto. We consider parameters from the zone of the upper boundary of the exchange layer. However, in the present case there is also an inversion which we shall include in our considerations. The inverse temperature gradient is only rather poorly defined, however.

To begin with we go back to the original recordings in X. APPENDIX, 3. The position of the upper boundary of the exchange layer there has been marked with E, that of the inversion with I. In the profile of +L (partly also in that of -L) the increase by increments with height is recognized at the two levels so marked. Until evening (run 6), however, the structures disintegrate to a large extent. What clearly remains is the +L increment in the zone of the loosened-up structure of E.

In Fig. 39 we consider the variations in time and space of the two formations. From the value tables to Example H it is seen that the exchange layer is marked by a minimum and a subjacent maximum of the equivalent potential temperature EPT similar to what we had found with stationary inversions as a rule. The altitudes, of these structural details are enterred in Fig. 39. Whereas in the course of the day the upper boundary of the exchange layer perpetually descends, the - weakly defined - inversion ascends in increments, above all from run 5 to 6. The rule found confirmed for stationary inversions, according to which EPT shows a minimum above the inversion, and a maximum below it, applies in the present case, too. These EPT structure details follow suit with the vertical movement of the barring layer proper.

Now a few words on the variation with time of the A_i values, considering Fig. 39: The barring effect of the inversion is

the greatest in the morning, and steadily decreases in the course of the slow ascent of the layer (A_i is growing). Another deterioration of the barring effect occurs in the evening as the layer ascends again. By contrast, the diffusion resistance through the upper boundary of the exchange layer increases by increments (A_i decreases) as the latter descends. In conjunction with the commencing disintegration of both layers in the evening, consistently the A_i values increase.

Due to the very scantily developed inverse temperature gradient a study with respect to function $A_i = f(G-T)$ is foregone. Fig. 40 merely reflects the travelling times for the runs, and the symbols for the exchange layer (E) and inversion (I).

On Fig. 41 we note that the individual values for I are within the normal range of function $A_i = f(G-E)$, even so when G-E is positive (viz. when water vapor pressure is increased with height). The values of E, too, just barely meet these requirements, however, no dependence upon the water vapor gradient is apparent. The values for $A_i = f(G-PT)$ in Fig. 42 are entirely outside of the normal distribution for this function. This is independent of whether they pertain to the exchange layer or to the inversion.

In Fig. 43 we have plotted the vertical profiles of A_i for runs 3 and 6. These once more very clearly illustrate the following processes:

a) descent and increase of barring effect of the upper boundary of the exchange layer;

b) ascent and decrease of barring effect of the inversion. finally approximate mutual touching of the two layers.

Conclusions drawn from this example:

The upper boundary of the exchange layer, too, is characterized by a minimum of EPT plus a subjacent maximum of EPT. During descent of the upper boundary of the exchange layer its barring effect toward eddy diffusion is increased.

10. Example I, 17 September 1970, Figs. 44 through 48.

Upper boundary of an exchange layer. Slight vertical movement.

In conclusion, we shall discuss the case of an upper boundary of the exchange layer which was sharply defined throughout the day. The original runs in APPENDIX, 3 very convincingly demonstrate the following within the zone of this layer: (a) an increase in temperature; (b) a decrease in humidity; and (c) a sharp increase in conductivity, i.e. a decrease of the aerosol concentration. These vertical variations are very distinct during runs 1,3,4; during run 2 the structure are loosened up, and the level of the layer has descended somewhat. In the following figures we have plotted, for comparison, the values of the main levels separately from the values of the special levels.

In Fig. 44 we first consider the variations with time and with altitude. To begin with it is to be pointed out that this level, too, is distinct for sharply defined minima of EPT above it, and corresponding maxima within its level. These EPT structural details follow suit in the slight vertical movement of the upper boundary of the exchange layer. During the temporary descent of the layer (run 2) A_i arrives at a maximum, i.e. movement reduces barring effect as with a true inversion.

Fig. 45 shows that all individual values are outside of the normal range of function $A_i = f(G-T)$. If we concentrate on the main levels only, G-T changes in the course of the day, it is true, but this has little impact on A_i (maximum during 2, see above). If we consider the special levels we obtain a cyclic progress which is surely coming close to the true conditions and corresponds to our experience gathered so far on the occurrence of cyclic interrelations.

In Fig. 46, using the values from the special levels we find a time slope which, it is true, keeps to the border line of the normal range of our function $A_i = f(G-E)$ but in agreement with

the latter's direction. If we lean on the values from the main levels only, A_i remains unaffected by the variations of G-E.

An analogous conclusion is drawn from Fig. 47. If, however, we start from the values of the special levels we are again met with a cyclic pattern, although all the values are far from the normal distribution of function $A_i = f(G-PT)$.

In Fig. 48 we have plotted the vertical profiles of A_i for runs 2,3,4. The stepped curves are based upon the values from the main levels. The A_i values from the special levels within the barring layer level are indicated (solid) and identified by numerals in circles. It is seen how across 1000 m from the barring layer downwards, consistently high A_i values are encountered which is appropriate for an exchange layer. The loosening-up of the structure of the barring layer is clearly recognizable.

Conclusions drawn from this example:

Values derived from the special levels afford a much deeper insight into the true interrelations. The upper boundary of the exchange layer is again marked by EPT minima and maxima, one above the other with intervals of 150 m up to 300 m (EPT maximum within the levels of the layer). These structural details join in any vertical movements of the barring layer. Vertical movements lead to a weakening of the barring effect of the layer. The vertical movement is expressed in cyclic pattern or part of the values relative to the normal ranges of our main functions.

VI. THEORETICAL SUPPLEMENT FOR COMPUTATION OF EDDY DIFFUSION COEFFICIENTS

In (1.2) only the asymptote solution to the stationary combined diffusion (D) and coagulation (K) equation

$$D \frac{\partial^2 N(z)}{\partial z^2} - K N(z)^2 = 0 \qquad (1)$$

was used for the calculation of the eddy diffusion coefficient D (pages 25 et sequ. of (1)), i.e. that solution which extends to infinity. This presupposition without which the equation (1) is not analytically solvable applies strictly speaking only in that case where D does not vary with height. Where diffusion coefficient D_i differ from layer to layer, the partial solutions $N_i(z)$ to (1) must, for reasons of continuity, be so joined together that the diffusion current $J = - D\partial N/\partial z$ is a steady one. If N_i (z) and D_i designate the nuclei concentration and diffusion coefficient in the vertical interval from z_i through z_{i+1}, the following must then apply:

$$D_i \frac{\partial N_i}{\partial z}(Z = Z_i) = D_{i-1} \frac{\partial N_{i-1}}{\partial z}(Z = Z_i) \qquad (2)$$

to all i's.

Under these premises the equation (1) is no longer analytically solvable. The general solution or its inverse function, respectively, has the following form:

$$Z - Z_0 = \pm \int_{N_0}^{N} \frac{dx}{\sqrt{(N_0')^2 + \frac{2K}{3D}(x^3 - N_0^3)}} \qquad (3)$$

wherein N_0 and N_0' designate the nuclei concentration and its derivative at position z_0. In the source-free stationary case, N must decrease with height, and the minus sign on the right side of (3) applies.

Solution (3) represents an elliptic integral which is solvable only through methods of approximation. In addition, this is a variation problem. Therein, D in the integrand must be selected so that both members of the equation (3) are in agreement with each other. The derivative N'(z) needed for the joining condition (2) are easily obtained from the inverse function z(N):

$$N' = \sqrt{(N_0')^2 + \frac{2K}{3D}(N - N_0)^3} \qquad (4)$$

The equations (2) through (4) must be solved by layers wherein it would be best to use, for the top layer, the asymptote solution, compute therefrom the diffusion current at the lower border, and use the latter to solve the equation (3) for the next lower interval. This operation is to be repeated as often as necessary.

It is true that in principle this problem is solvable with the aid of our Hewlett-Packard desk computer with extended memory. However, this procedure requires such a high expenditure of computation effort that it would hardly appear applicable to the routine analyses. At present, a computer program is being developed for this purpose, with the aid of which it is being studied on a few selected examples what size deviations are permissible from the results of the procedure now applied in a routine manner. It is noted that due to the wide range of variation of D it will not be necessary to strive for a maximum of exactitude.

The procedure can always be used on any cases of particular interest in order to obtain more exact results.

The results of such comparisons will be reported and discussed in the next report.

VII. CONCLUSIONS

So much is certain that it would not have been possible to carry out either the statistical investigations or the detailed analyses on individual examples, without the preceding change-over of the routine evaluations and data processing to a largely electronic basis. It was only this measure that resulted in a sufficiently comprehensive mass of homogenous data from all available soundings for statistical purposes, on the one hand, and in a complete stock of all necessary parameters of the most varied kind per sounding for the detailed analyses, on the other. In practical processing of the electronically obtained data it was revealed that the most recently developed procedure of electronic data processing fully meets requirements.

The statistical analyses in logical continuation of the earlier research work revealed that there is a significant relation between the highest inverse temperature gradient and the incremental exchange coefficient, providing that there are stationary inversions with a set eddy diffusion equilibrium. The scatter of this relation is unimportant. The relation applies to an A_i range from 0.1 to 300. Under the same conditions (stationary situations, barring layers)a significant relation may be derived, too, between the highest positive gradient of potential temperature and the incremental exchange coefficient. It applies to the A_i range from 0.8 to 100. The scatter is not great, more data must be added.

The third of the three derived main functions for describing the behavior of A_i in structural zones (inversions, barring layers, upper exchange boundary), is based upon the vertical gradient of water vapor pressure. Again, a significant relation

was found with relatively insignificant scatter of values. It is valid for the A_i range from 1 through 100.

Finally it was attempted to discover more general interrelations which would apply quite generally, independently of structural details (inversions, barring layers). In doing so, another relation was found to stand the test: $A_i = f(G\text{-}PT)$ whose scatter is surprisingly small and whose range of applicability is between $A_i = 1$ and 1000.

Such main functions which are to have more general validity can be derived only if certain criteria of selection are applied. Such criteria, however, can grow only from sufficient experience. With increasing experience, however, the criteria must be improved, supplemented or, if need be, essentially changed, each of which means a reprocessing of the data material. This work, this is understood, can be performed only in a step-by-step manner.

In developing criteria of classification and selection, the detailed analyses proved to be especially helpful. Systematic work according to this method has only just begun. It already resulted in a series of valuable results. Some of these are: A minimum of the equivalent potential temperature is found 100 m or not more than 300 m above an inversion or barring layer resting in eddy diffusion equilibrium, and a maximum is found within the level of the layer proper. Within the zone of the barring layer proper the gradient of potential temperature reaches a maximum, likewise the negative gradient of the vapor pressure. If the temperature gradient is positive, it assumes a minimum, if it is negative, a maximum. As a rule, a minimum of the vapor pressure, narrowly limited in space, is also found within the level of a barring layer. If barring layers get into vertical movement their barring effect is reduced for the duration of such movement. After the barring layer becoming stationary its barring effect may be regenerated. Temporary interferences leading e.g. to a vertical movement of the barring layer or

triggering a loosening-up of its structure due to locally limited convection are usually expressed in cyclic patterns of the time slope of the essential parameters in the level of the barring layer.

The above discussed detailed analyses which, in the form presented, represent only an initial step, are calling, in order to be fecundated, for the use of all available microscale and mesoscale meteorological parameters (radiation, wind profiles, cloudiness) and their variations with time.

Although it is absolutely necessary to further increase the data material, to further develop and improve the scientific procedures of analysis, still some results are available even today which are possible of practical application by the meteorologist. This applies most of all where it is necessary, from the profiles of aerological data as supplied by radiosondes, to draw conclusions, quickly and directly, upon the conditions of vertical propagation of suspended matter.

VIII. OUTLOOK ON ADVANCED STUDIES IN THE NEAR FUTURE

1. General

Since the methodism for recording the exchange conditions up to 3000 m a.s.l. is now completely commanded and fully developed, it would be the obvious next step to expand the investigations at least up to and including the tropopause level. This expansion is further encouraged by another fact:

A program is being carried under contract with US AEC at our institute, for the investigation of stratospheric-tropospheric exchange using the tracers Be7, P32, S35 plus fall-out heavy-metals, the concentration of which is recorded at Zugspitze station for 24 hours at a time (see (3)). The tropopause structures are analyzed with the aid of radio-sonde data from the

Atlantic Ocean and Europe, and attempts are made to calculate the trajectories.

So the following situation exists:

a) With the aid of cable-car telemetry systems we gain a precise insight into the exchange conditions obtaining between 0.7 and 3 km a.s.l.

b) With the aid of the above-mentioned tracers we can survey transportation processes from the stratosphere down to the upper troposphere.

If it were possible, now, by means of appropriate additional methods to also cover the exchange conditions between upper troposphere or, even better, between lower stratosphere and 3 km a.s.l., we would have the chance to completely investigate the overall exchange from the stratospheric deposits at 10 or 20 km down to the surface of the earth at 0.7 km a.s.l. Such an expansion of our research program would increase our yield of findings by a multiple in regard to the vital problem of the atmospheric aerosol exchange.

2. Procedures to be applied

a) Lower Troposphere

The procedures per 1) - 5) will be applied without restriction during the continuation period.

b) 3 km a.s.l. up to lower stratosphere

The only one but the most effective and useful method to present itself is a combination of Rawinsonde with Lidar. Under good weather conditions and with a powerful Lidar, aerosol structures as far as the Junge layer at approx. 15 km may be covered and observed in time. The aerological data necessary for the scientific analysis of the aerosol movements are supplied by a special Rawinsonde of our own. The technical requirements for

such an essential and methodic expansion are presently being reviewed. Already now, some preparations are being made, such as the construction of a balloon filling hall adjacent to the new institute building (for radiosonde balloons), the construction of which has just begun, and the erection of a Lidar observation and set-up room on the roof platform of the institute. Negotiations with suppliers have been conducted and technical details agreed on.

IX. REFERENCES

1) Reiter, R., R. Sládkovič and W. Carnuth:
Atmospheric Aerosols between 700 and 3000 m a.s.l.,
Part IV., Contract DAJA-37-690-1357, July 1970.

2) Reiter, R., R. Sládkovič and W. Carnuth:
On Fine Structures and Control of Vertical Aerosol Exchange between 700 and 3000 m a.s.l.
Arch. Met. Geophys. Bioklim. Ser. A (in print).

3) Reiter, R., R. Sládkovič; K. Pötzl, W. Carnuth and H.-J. Kanter:
Measurement of Airborne Radioactivity and its Meteorological Application.
Contract AT (30-1)-4061, Oct. 1970,
Arch. Met. Geophys. Bioklim. Ser. A (in print).

X. APPENDIX

1. Figures 1 - 48

2. Legends to the Figures 1 - 48

3. Individual Runs and Data Tables
   Examples A - J

4. Tables I - XII

   RaB concentration measured on the Zugspitze (Z), the Wank (W) and in Garmisch-Partenkirchen from July 1970 to June 1971

5. The Computer Program

   for computation of all necessary values from the original runs. Tables of results as examples, see 3.

1. Figures 1 - 48

Fig. 1

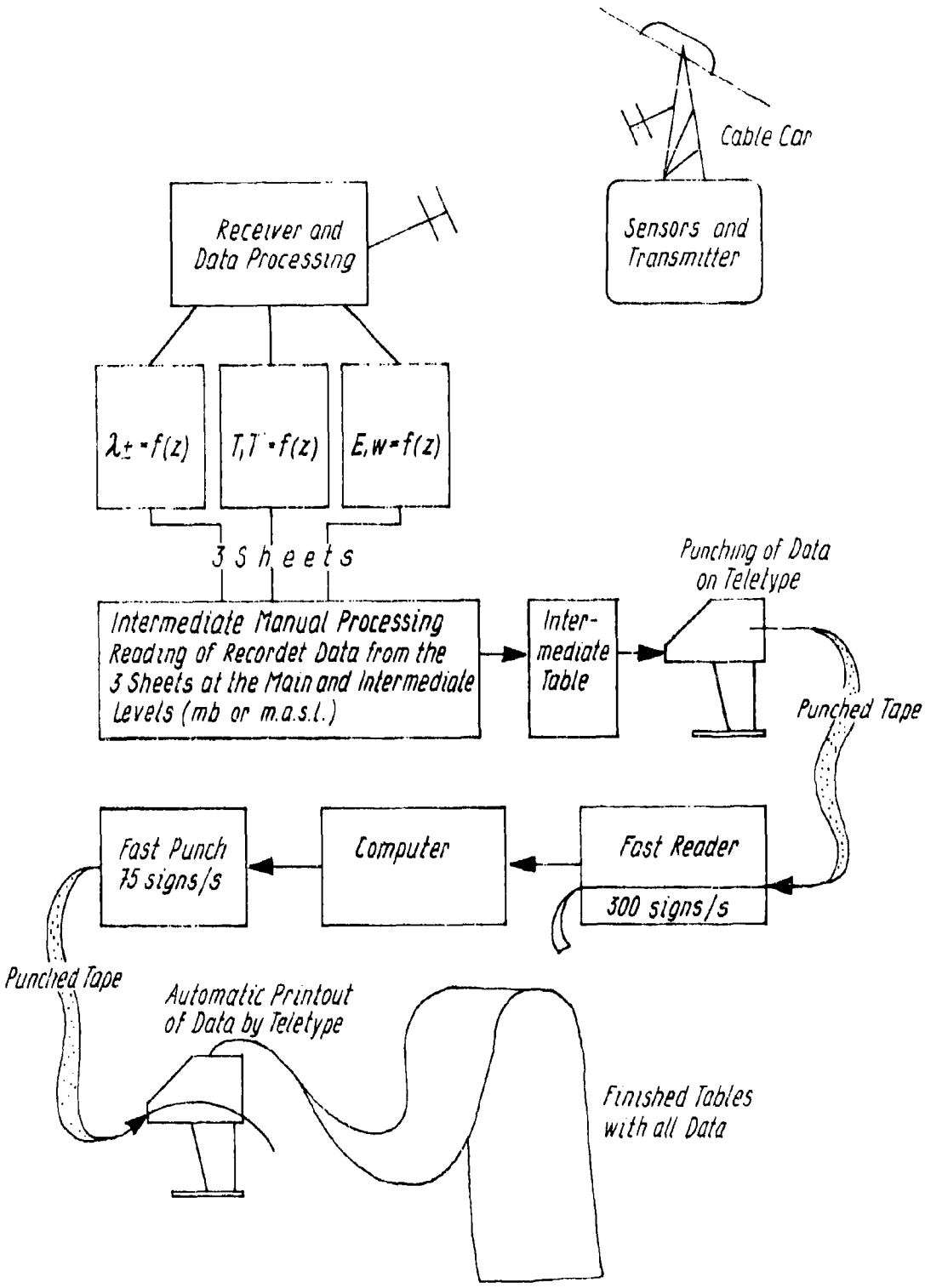

Cable Car
Sensors and Transmitter
Receiver and Data Processing
λ± = f(z)
T, T' = f(z)
E, w = f(z)
3 Sheets
Intermediate Manual Processing Reading of Recordet Data from the 3 Sheets at the Main and Intermediate Levels (mb or m.a.s.l.)
Inter-mediate Table
Punching of Data on Teletype
Punched Tape
Fast Reader
300 signs/s
Computer
Fast Punch 75 signs/s
Punched Tape
Automatic Printout of Data by Teletype
Finished Tables with all Data

Fig. 2

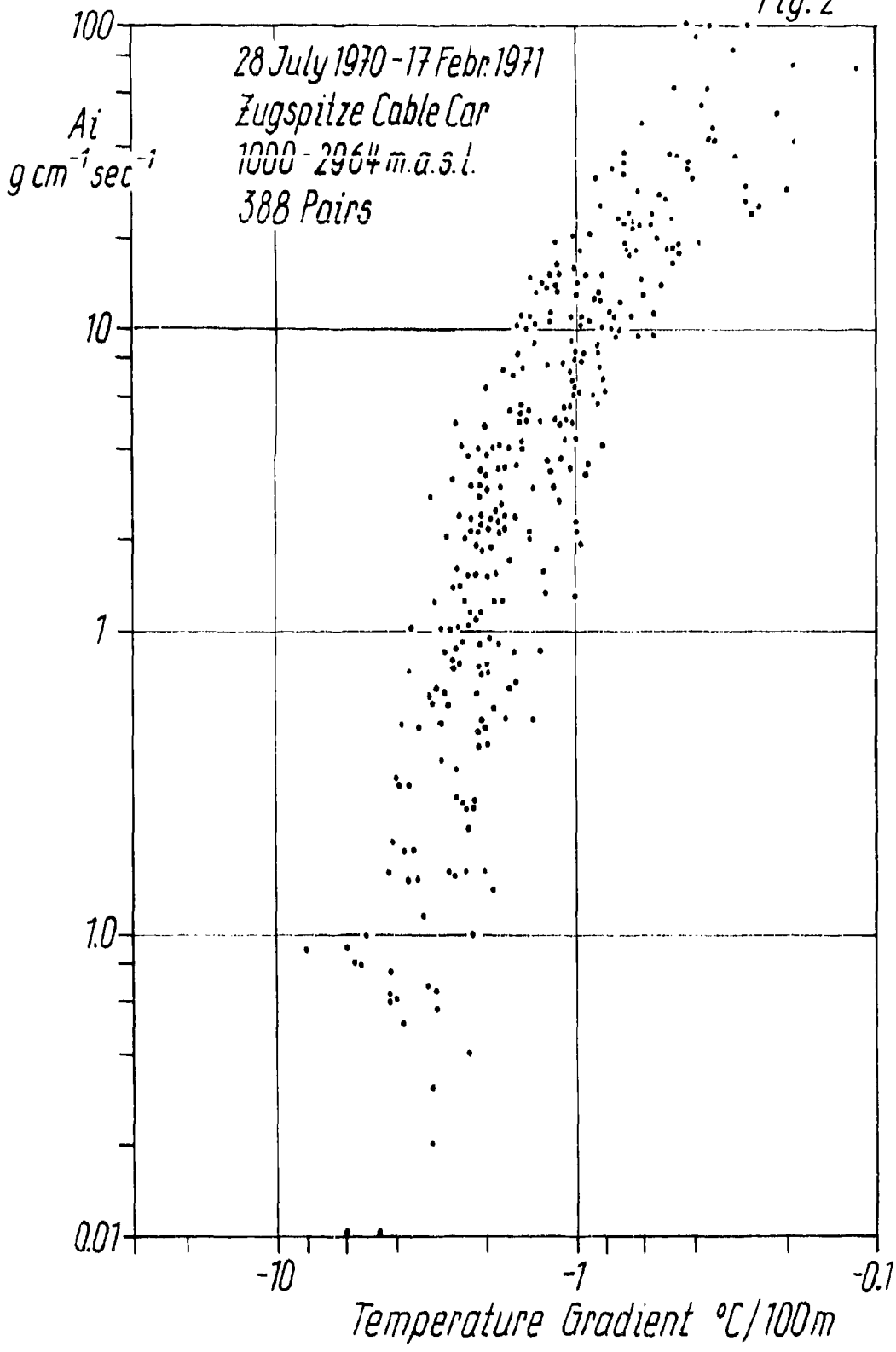

28 July 1970 - 17 Febr. 1971
Zugspitze Cable Car
1000 - 2964 m.a.s.l.
388 Pairs
Ai
g cm⁻¹ sec⁻¹
100
10
1
1.0
0.01
-10
-1
-0.1
Temperature Gradient °C/100m

Fig.3

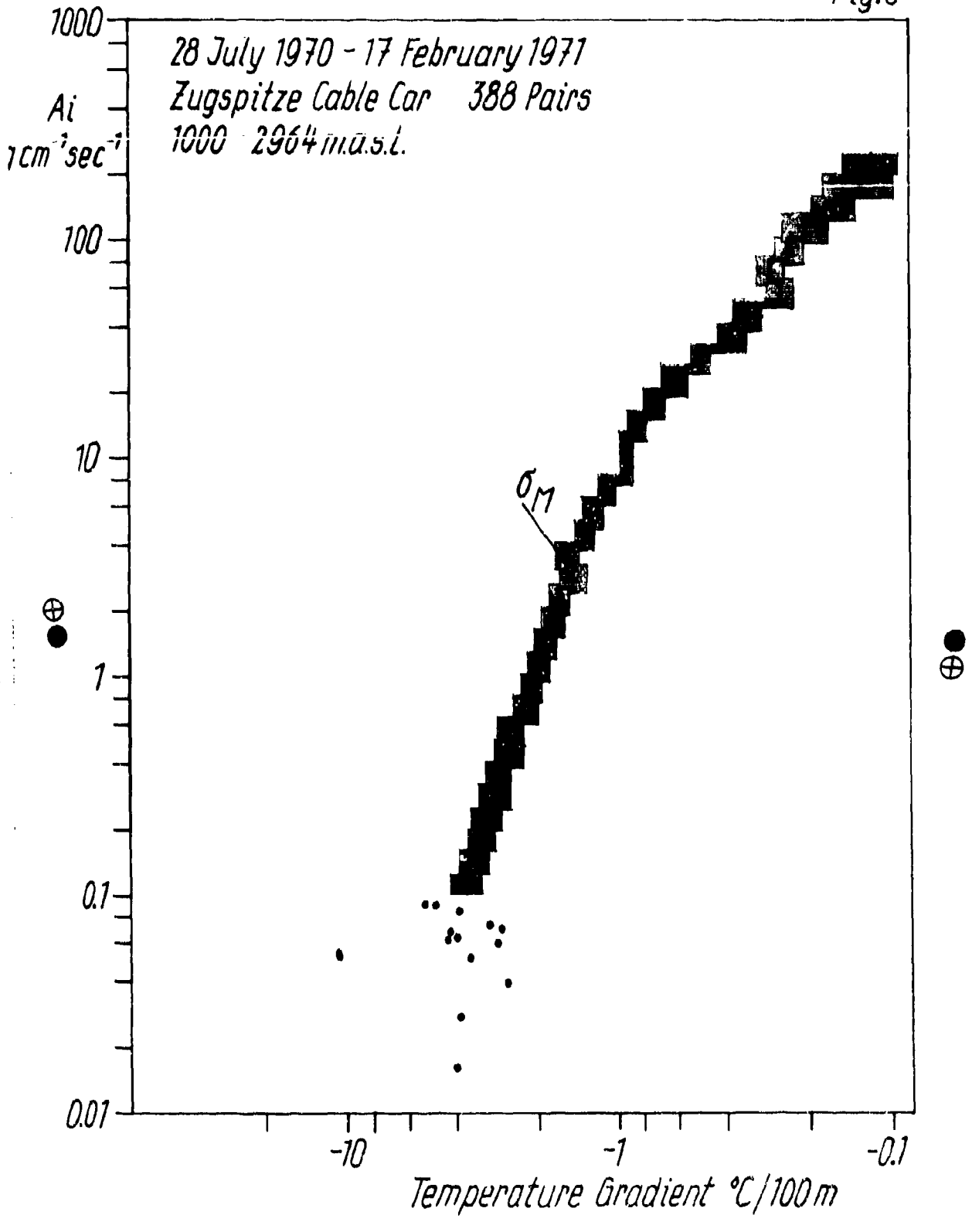

28 July 1970 - 17 February 1971
Zugspitze Cable Car 388 Pairs
1000 2964 m.a.s.l.
Ai
1 cm⁻¹ sec⁻¹
1000
100
10
1
0.1
0.01
σm
-10
-1
-0.1
Temperature Gradient °C/100 m

Fig.4

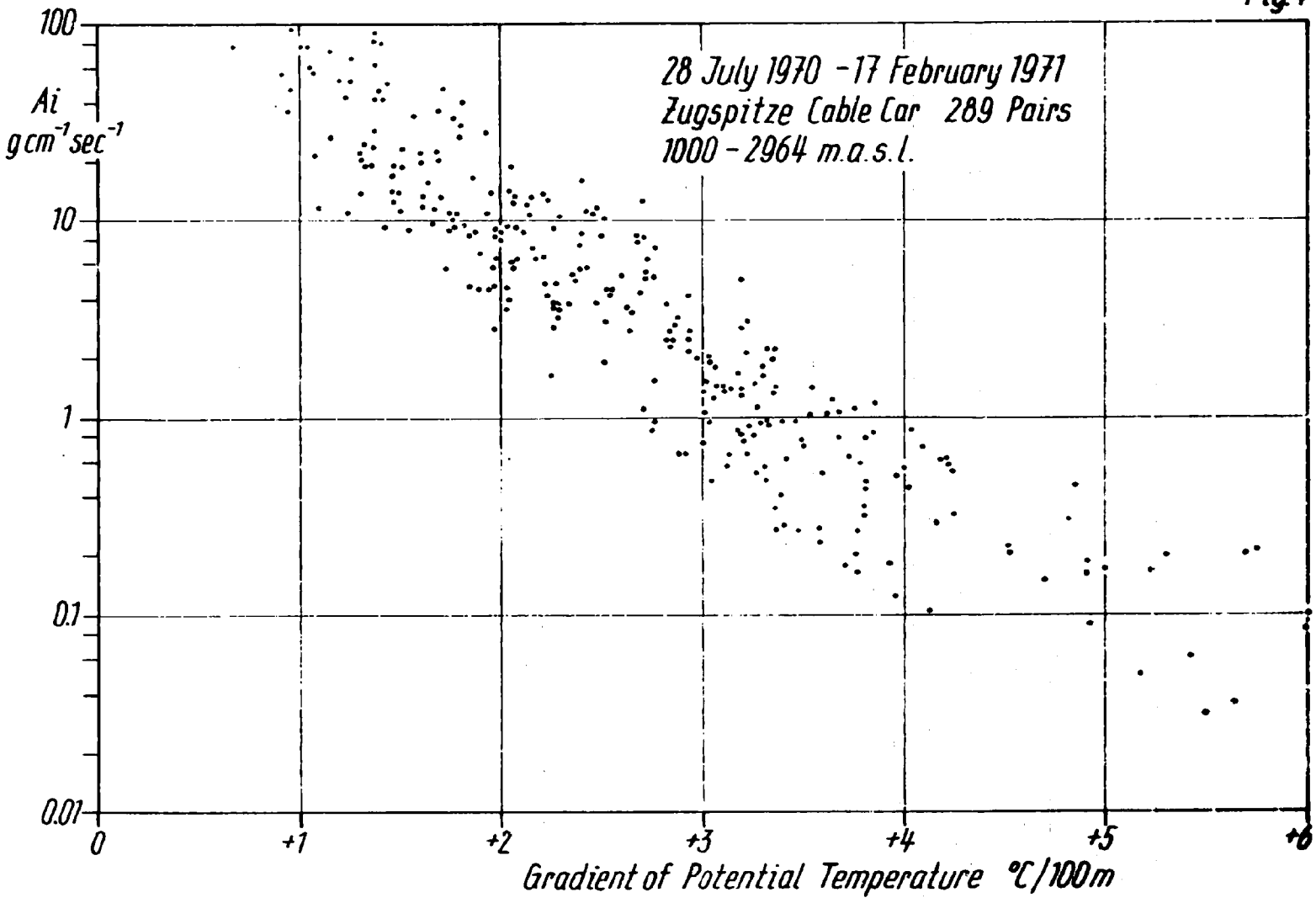

28 July 1970 - 17 February 1971
Zugspitze Cable Car 289 Pairs
1000 - 2964 m.a.s.l.
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature °C/100m

Fig. 5

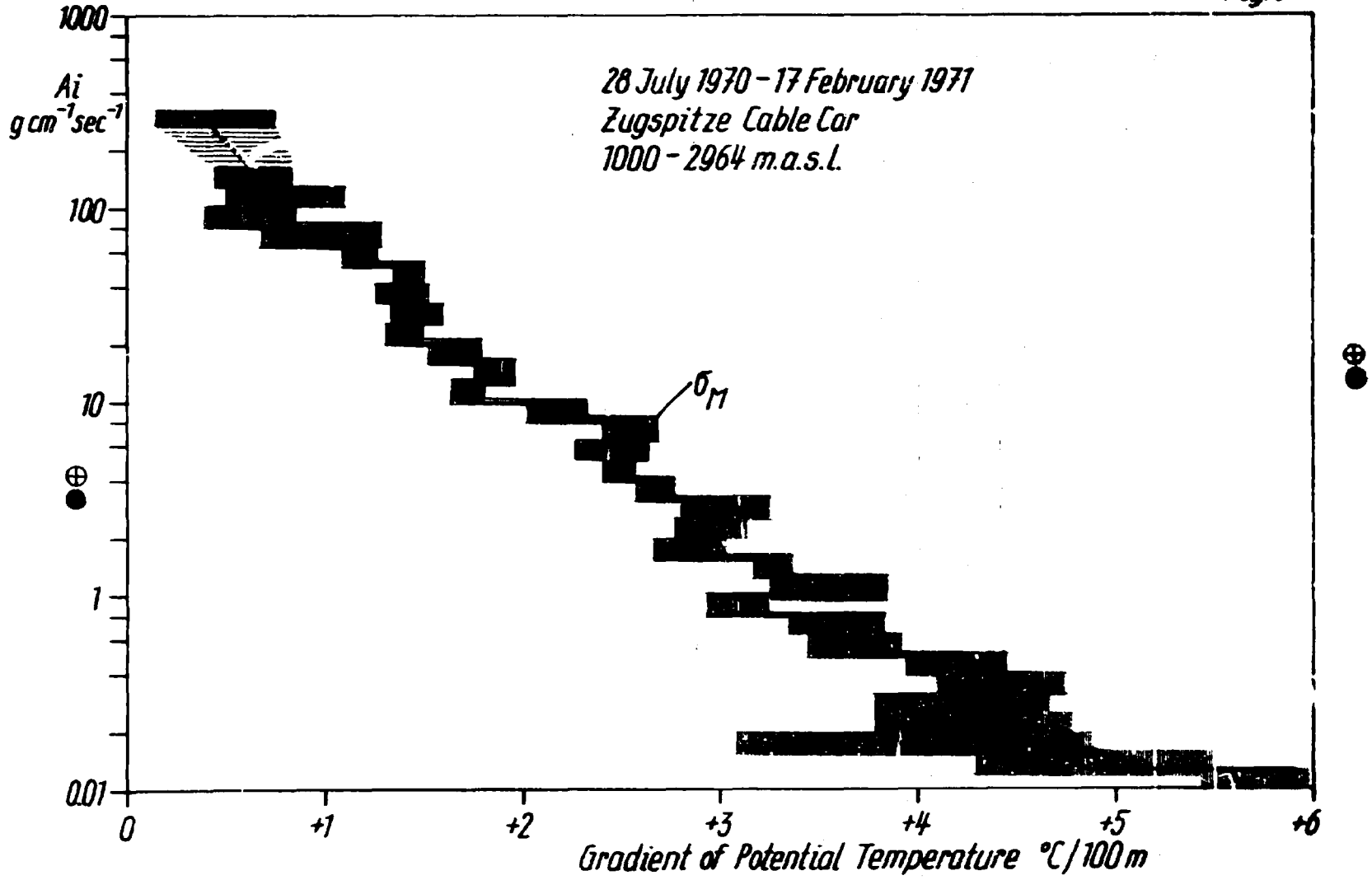

1000
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.01
28 July 1970 – 17 February 1971
Zugspitze Cable Car
1000 – 2964 m.a.s.l.
σ_M
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature °C/100 m

Fig.6

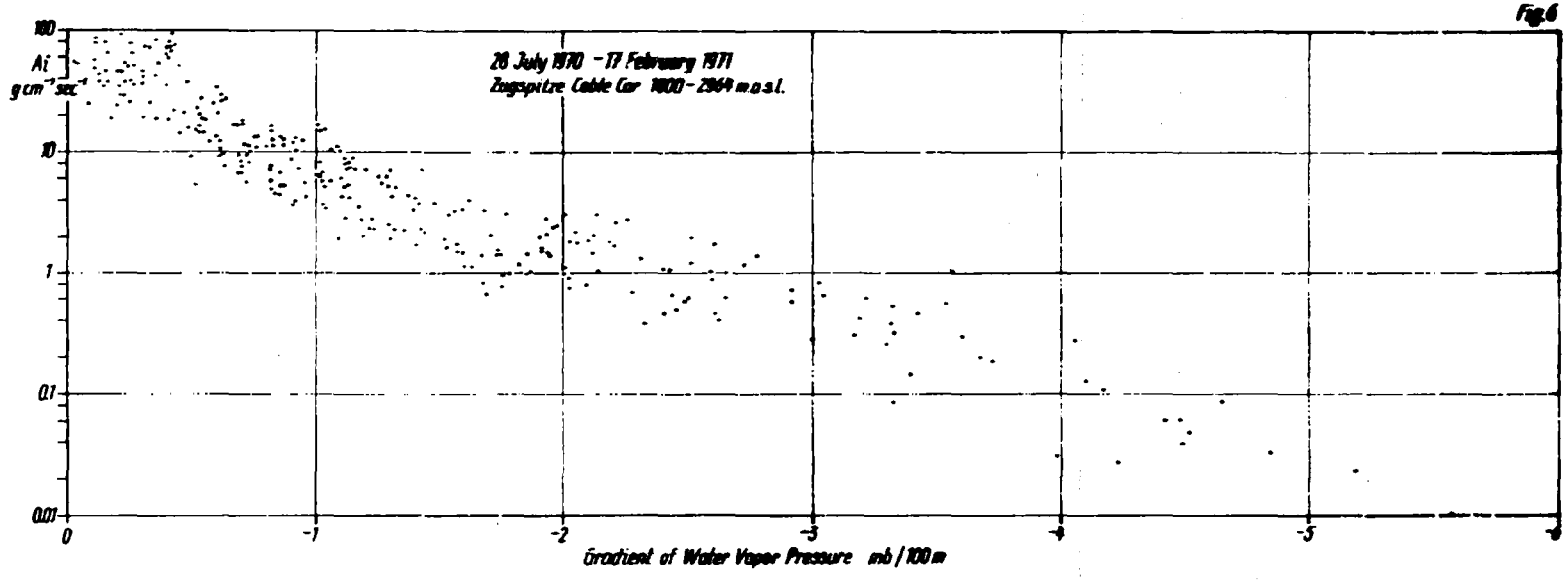

100
Ai
g cm⁻² sec⁻¹
10
1
0.1
0.01
0
-1
-2
-3
-4
-5
-6
28 July 1970 - 17 February 1971
Zugspitze Cable Car 1000 - 2964 m a.s.l.
Gradient of Water Vapor Pressure mb / 100 m

Fig. 2

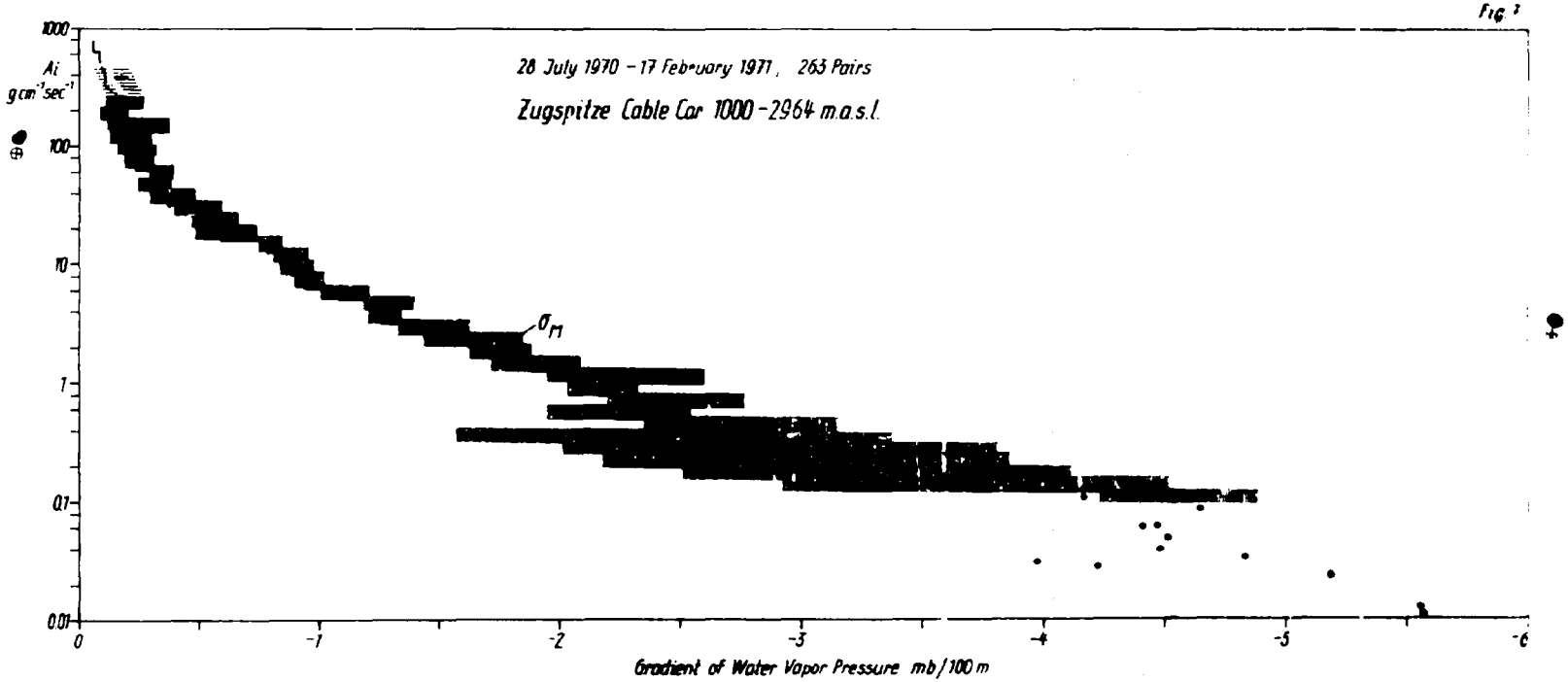

28 July 1970 – 17 February 1971, 263 Pairs
Zugspitze Cable Car 1000–2964 m.a.s.l.
Ai
g cm⁻¹ sec⁻¹
1000
100
10
1
0.1
0.01
σ_{m}
0
-1
-2
-3
-4
-5
-6
Gradient of Water Vapor Pressure mb/100 m

Fig. 8

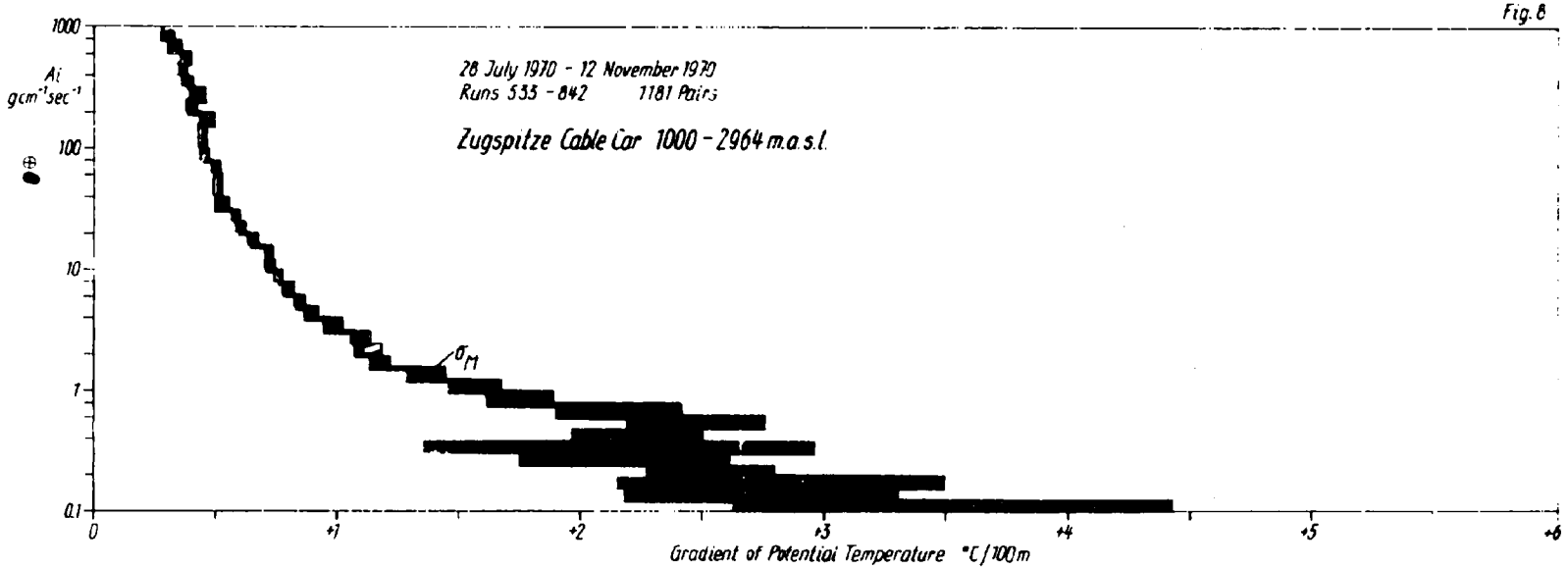

28 July 1970 - 12 November 1970
Runs 535 - 842 1181 Pairs
Zugspitze Cable Car 1000 - 2964 m.a.s.l.
Ai
gcm⁻¹sec⁻¹
1000
100
10
1
0.1
σ_M
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature °C/100m

Fig. 9

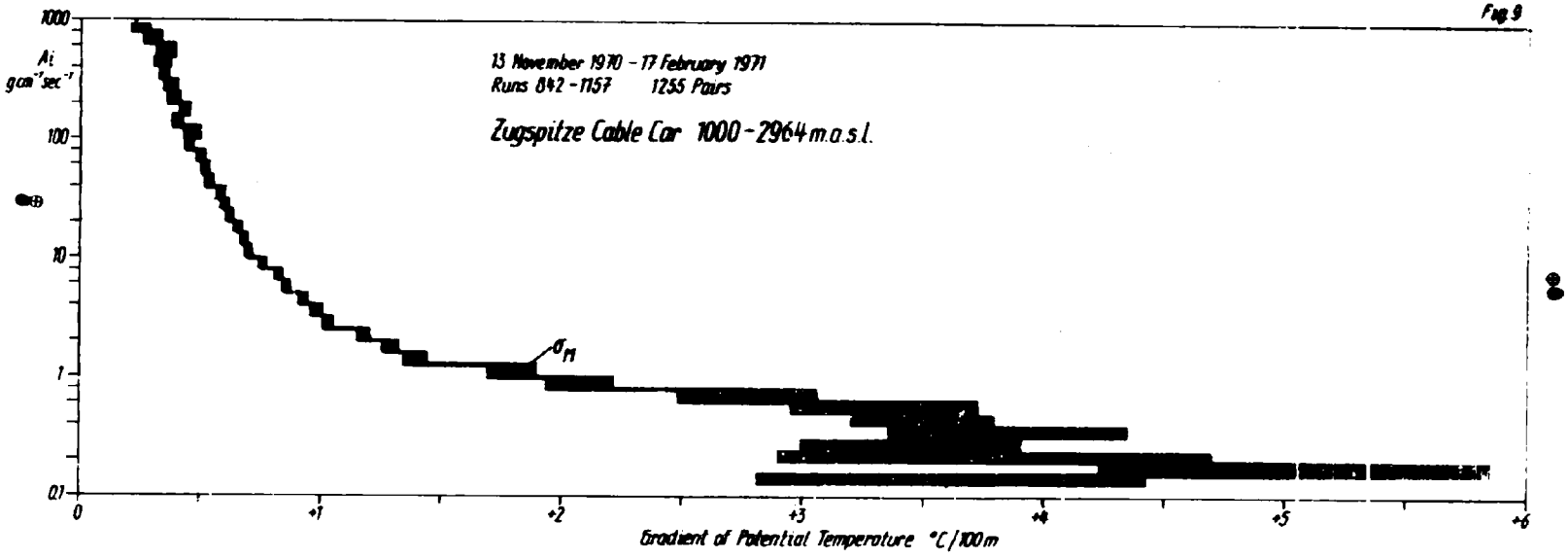
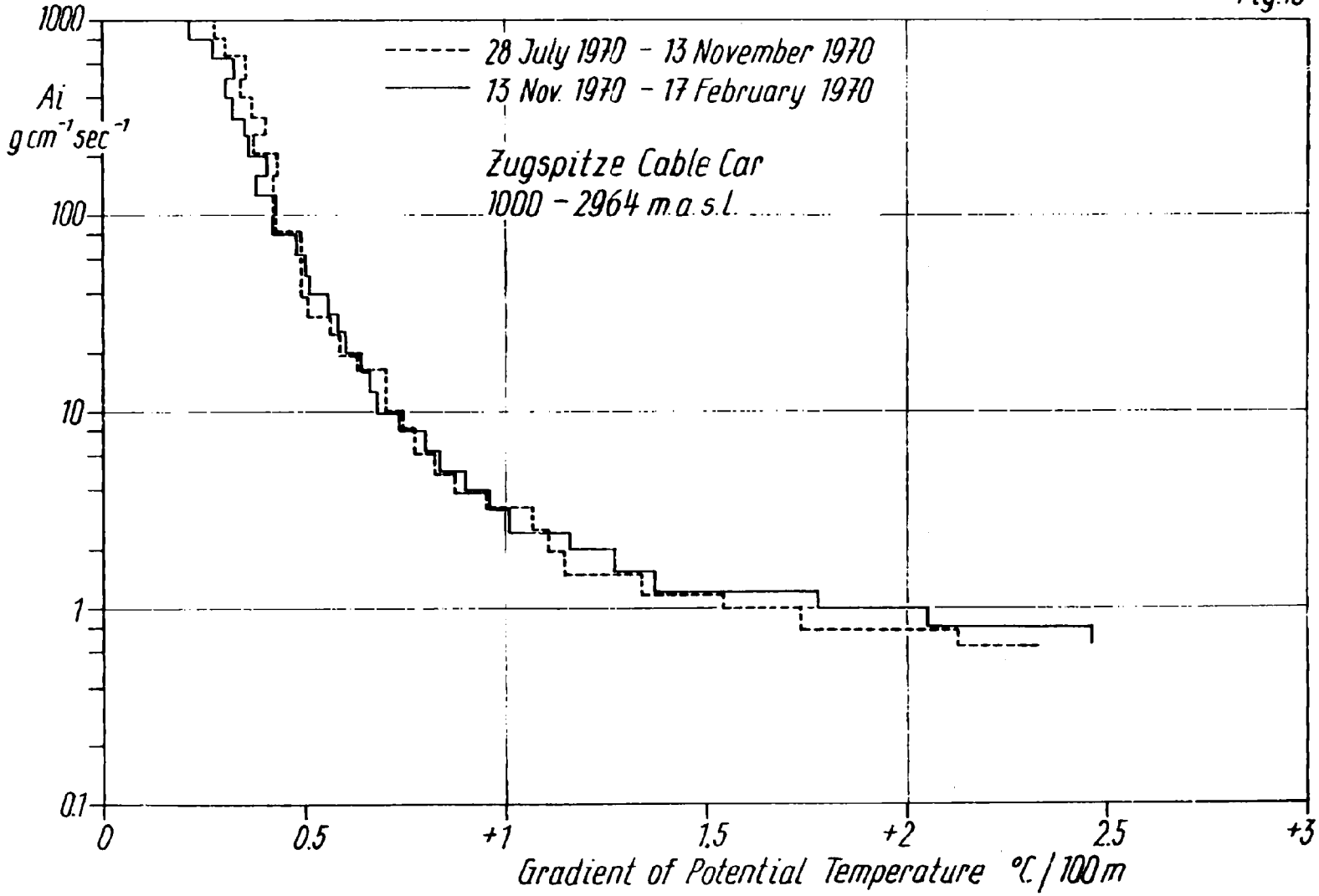
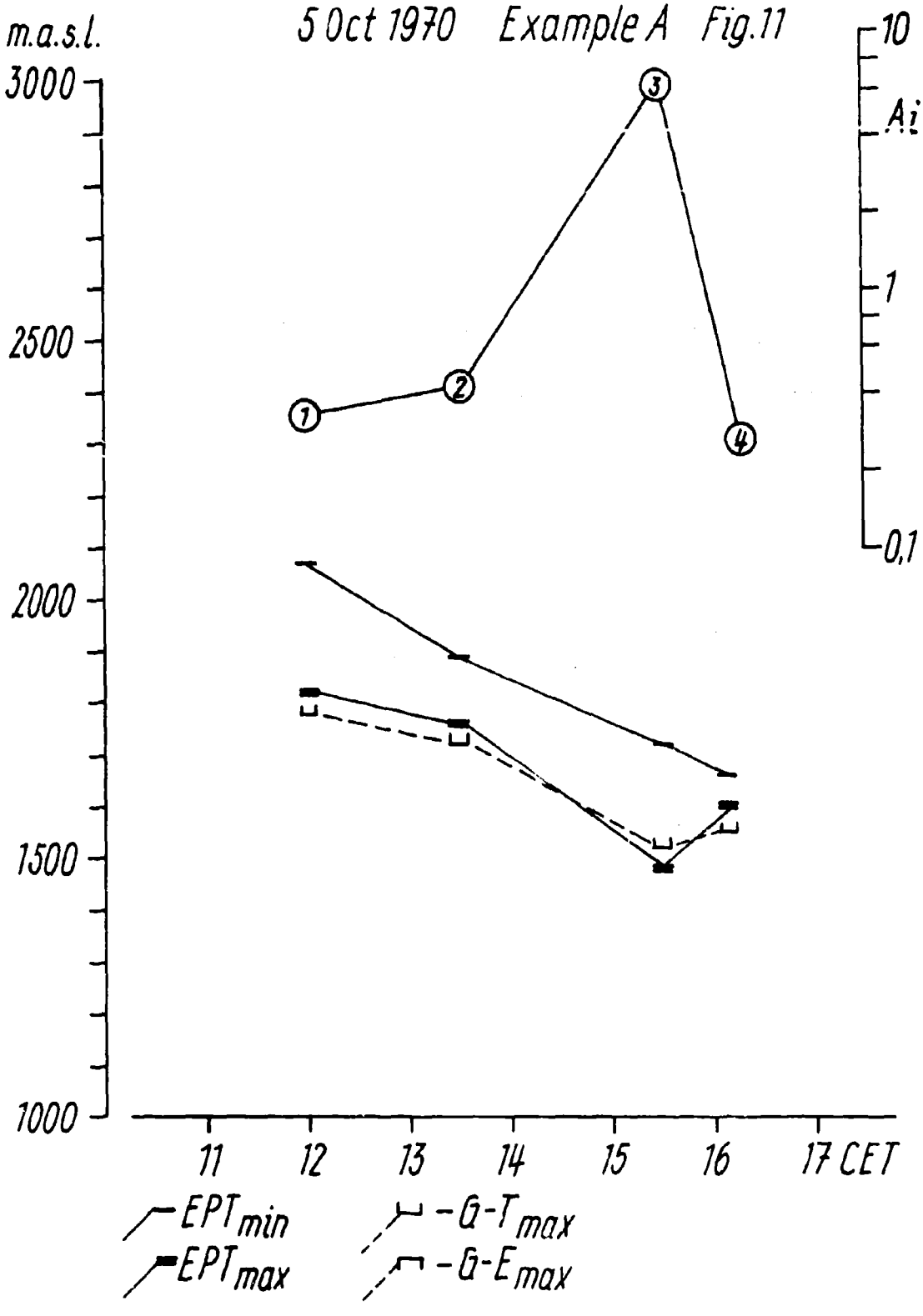
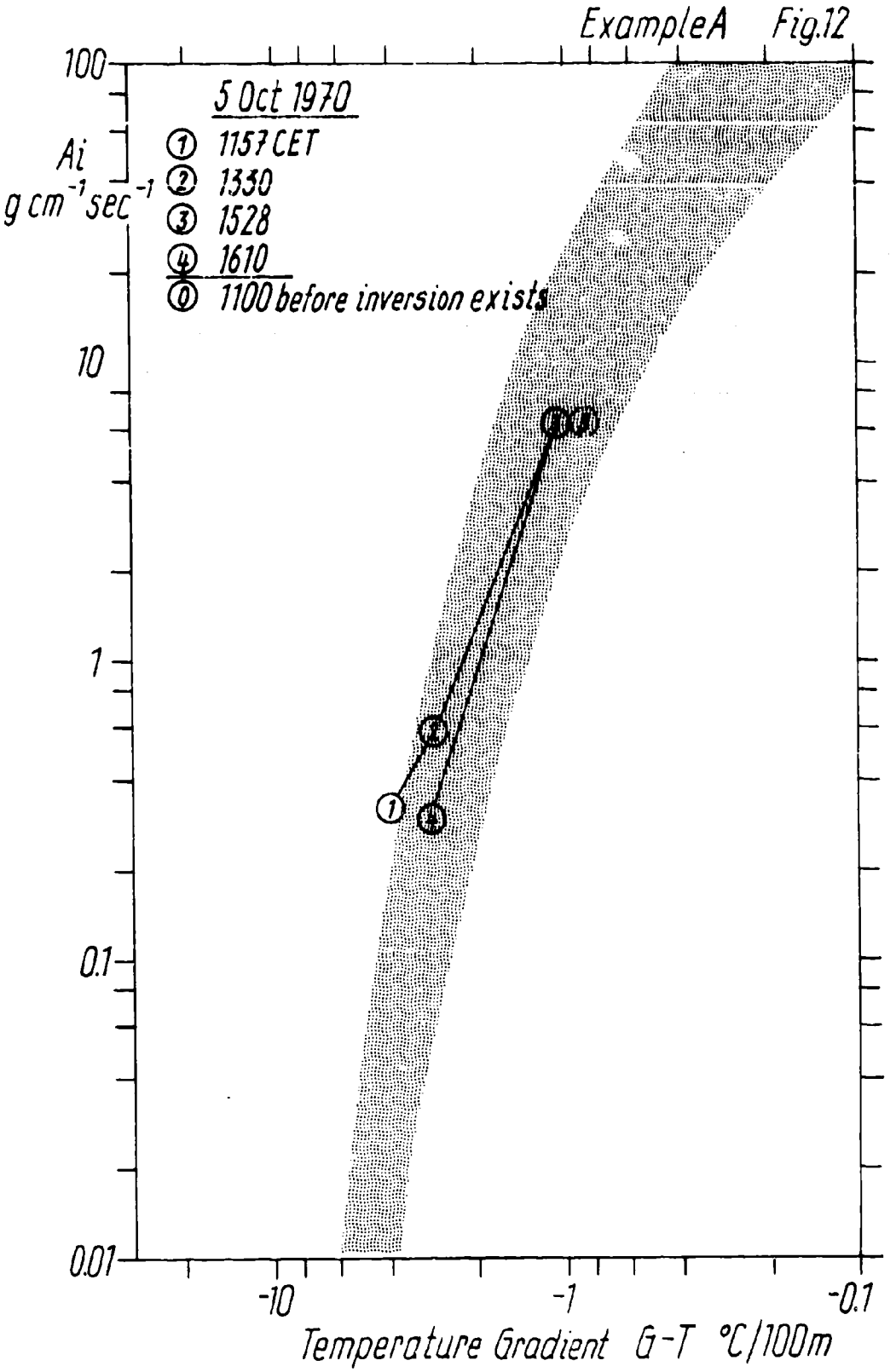
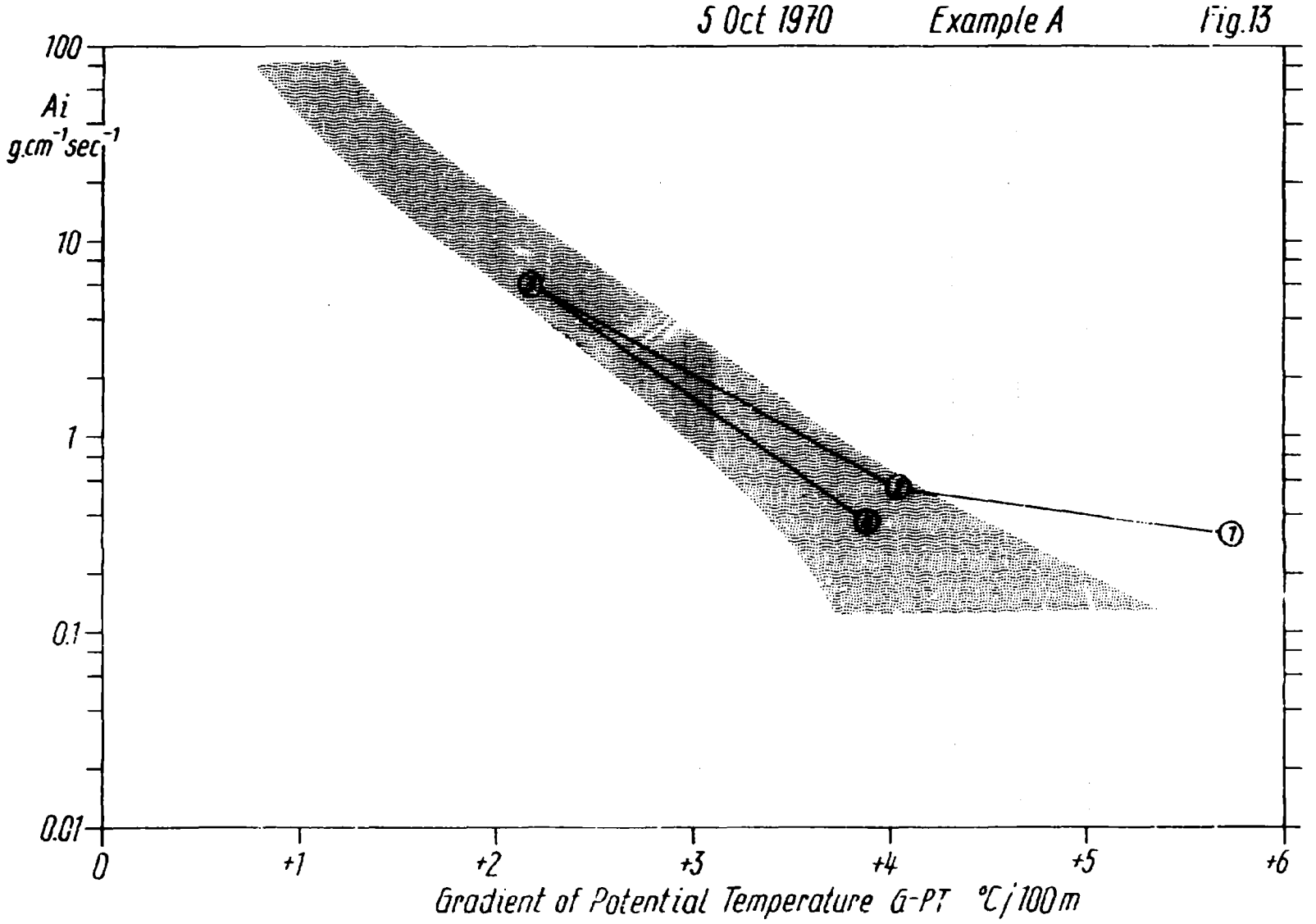

1000
Ai
g cm⁻² sec⁻¹
100
10
1
0.1
0
+1
+2
+3
+4
+5
+6
13 November 1970 - 17 February 1971
Runs 842 - 1157 1255 Pairs
Zugspitze Cable Car 1000 - 2964 m.a.s.l.
σ_Fl
Gradient of Potential Temperature °C/100m

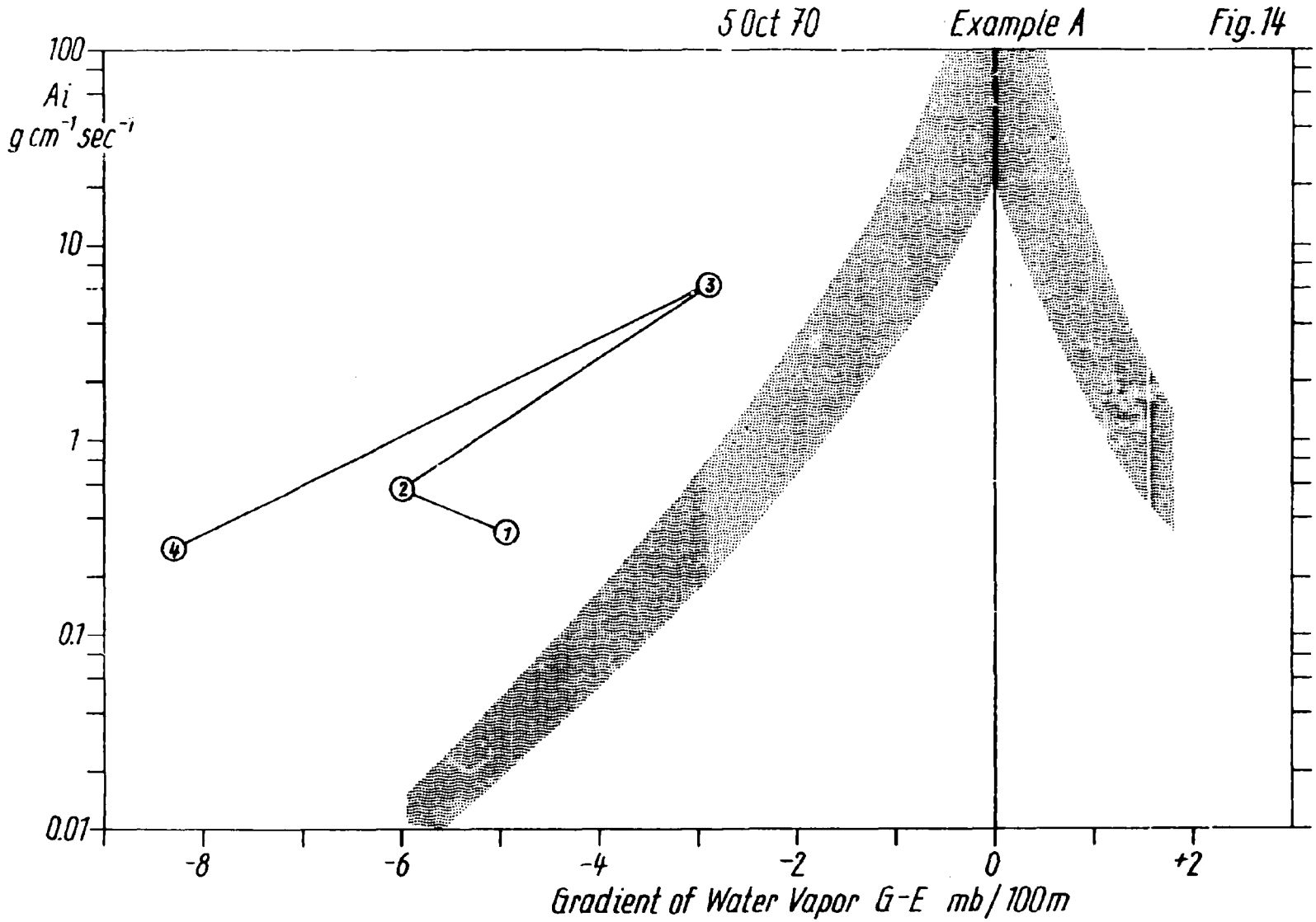
Fig.10


1000
100
10
1
0.1
Ai
g cm⁻¹ sec⁻¹
28 July 1970 - 13 November 1970
13 Nov. 1970 - 17 February 1970
Zugspitze Cable Car
1000 - 2964 m.a.s.l.
0
0.5
+1
1.5
+2
2.5
+3
Gradient of Potential Temperature °C / 100 m

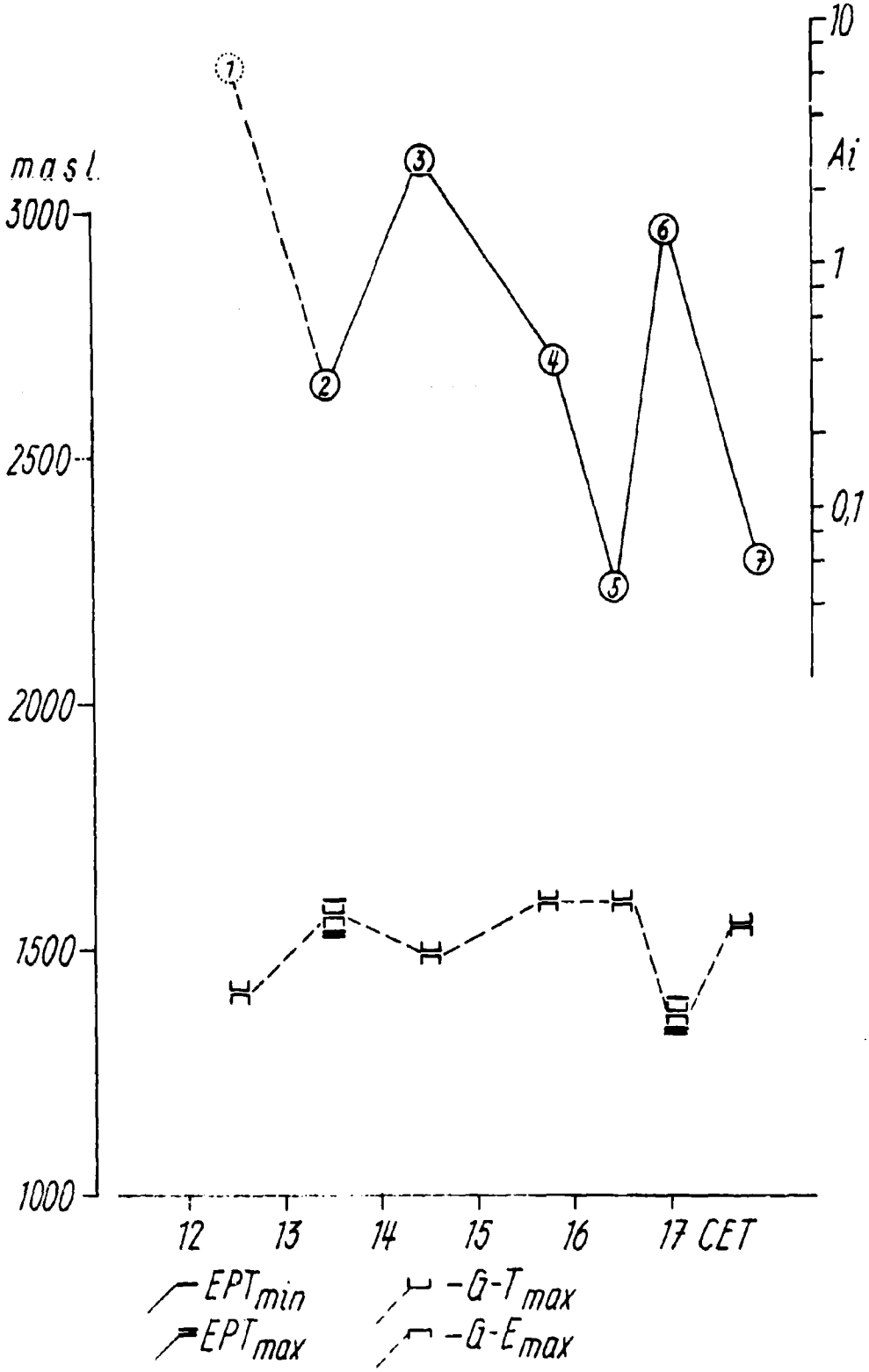

5 Oct 1970 Example A Fig.11
m.a.s.l.
3000
2500
2000
1500
1000
10
Ai
1
0,1
1
2
3
4
11
12
13
14
15
16
17 CET
EPT min
EPT max
G-T max
G-E max

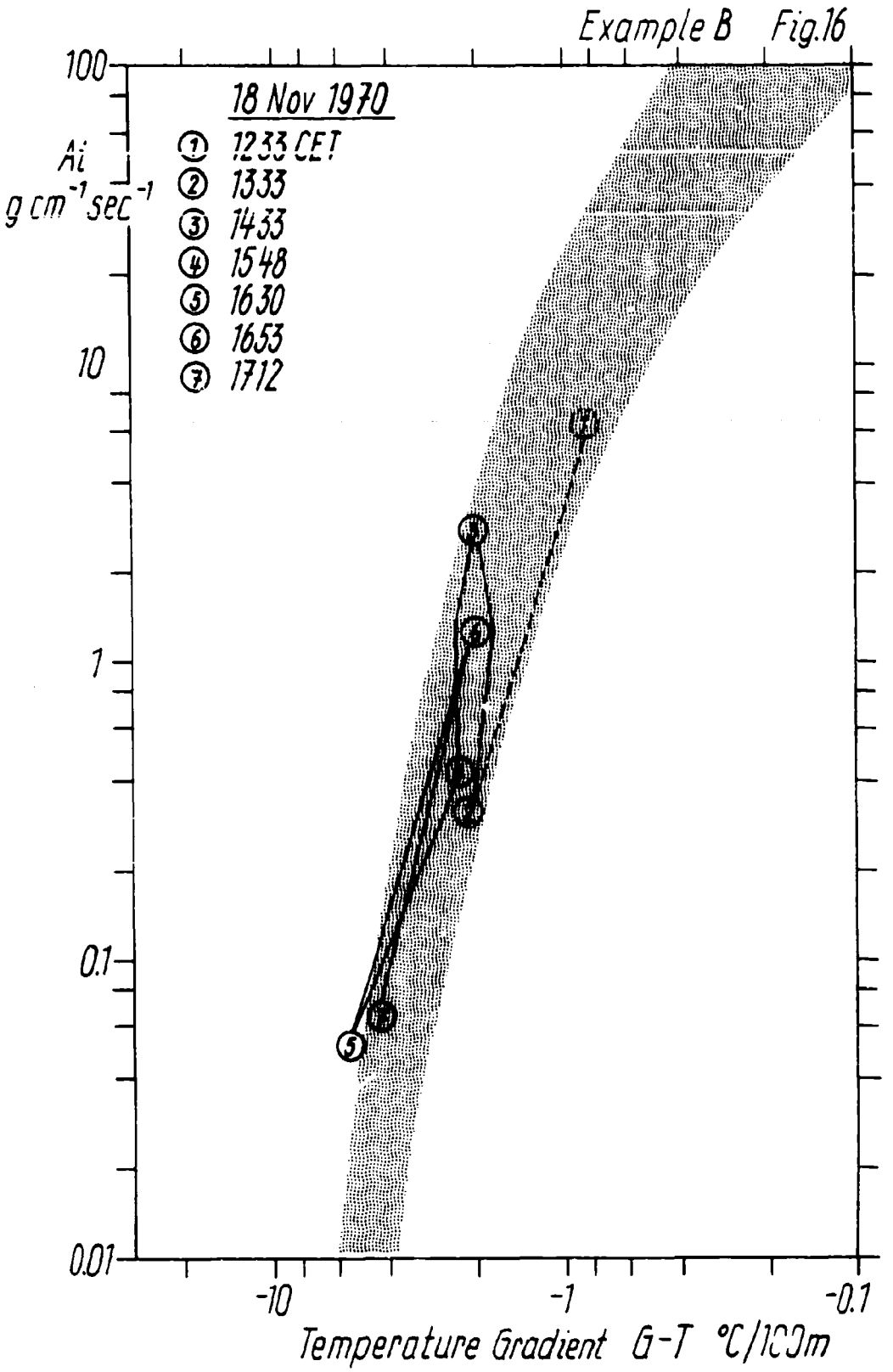

Example A Fig.12
100
10
1
0.1
0.01
Ai
g cm⁻¹ sec⁻¹
5 Oct 1970
① 1157 CET
② 1330
③ 1528
④ 1610
⓪ 1100 before inversion exists
-10
-1
-0.1
Temperature Gradient G-T °C/100m

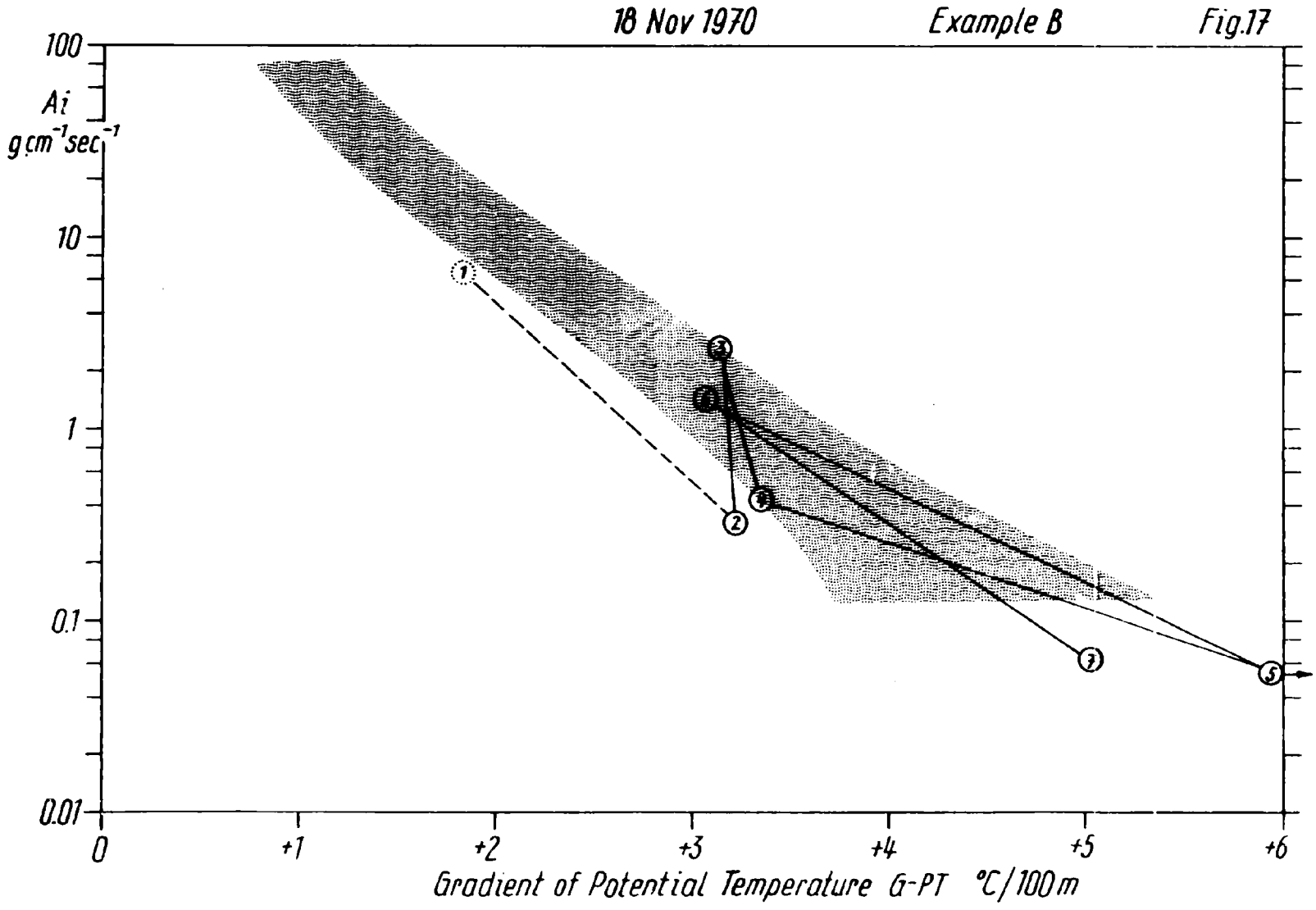

5 Oct 1970
Example A
Fig.13
100
Ai
g.cm⁻¹sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100m

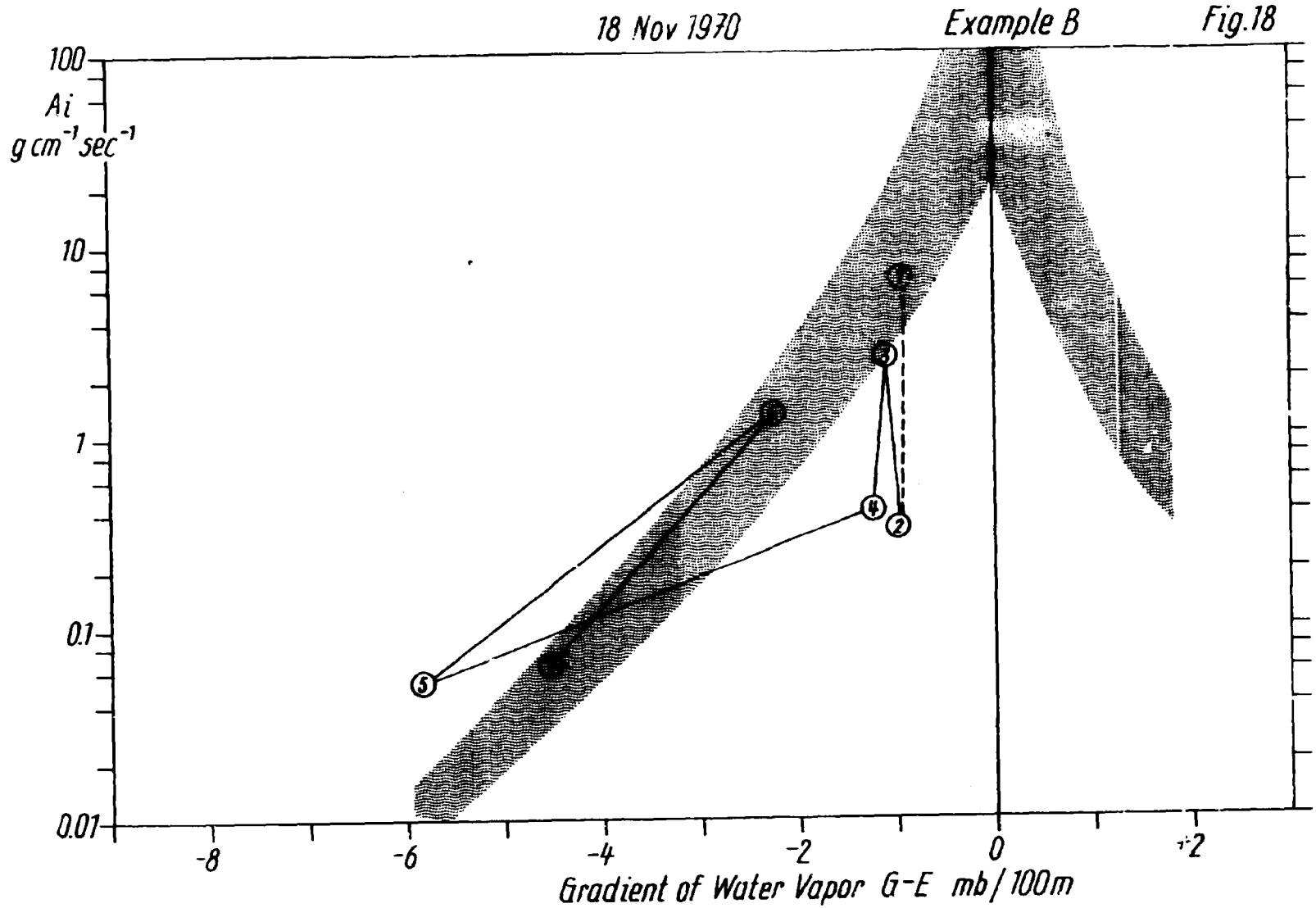

5 Oct 70
Example A
Fig. 14
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m
1
2
3
4

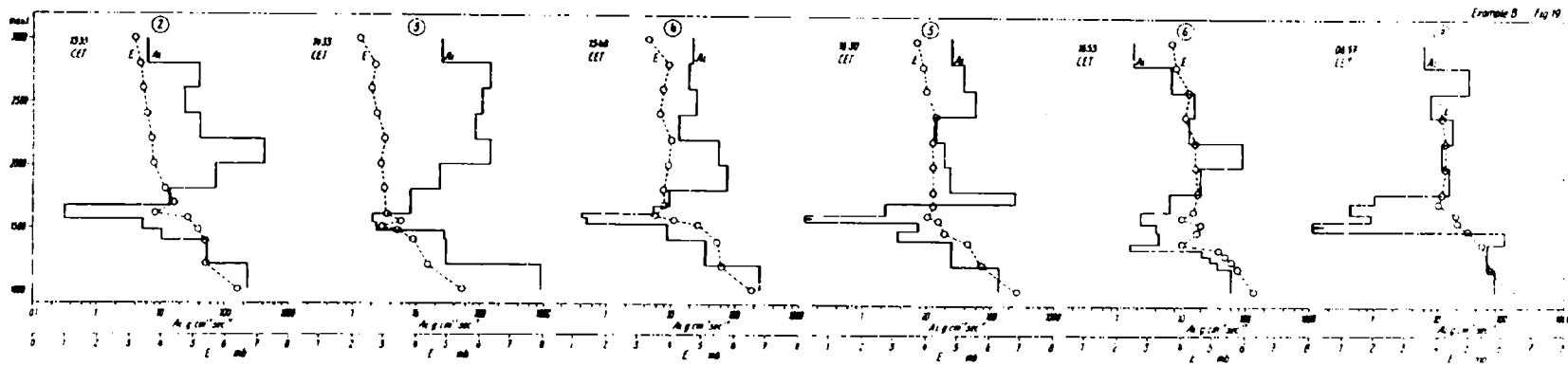
18 Nov 1970 Example B Fig. 15



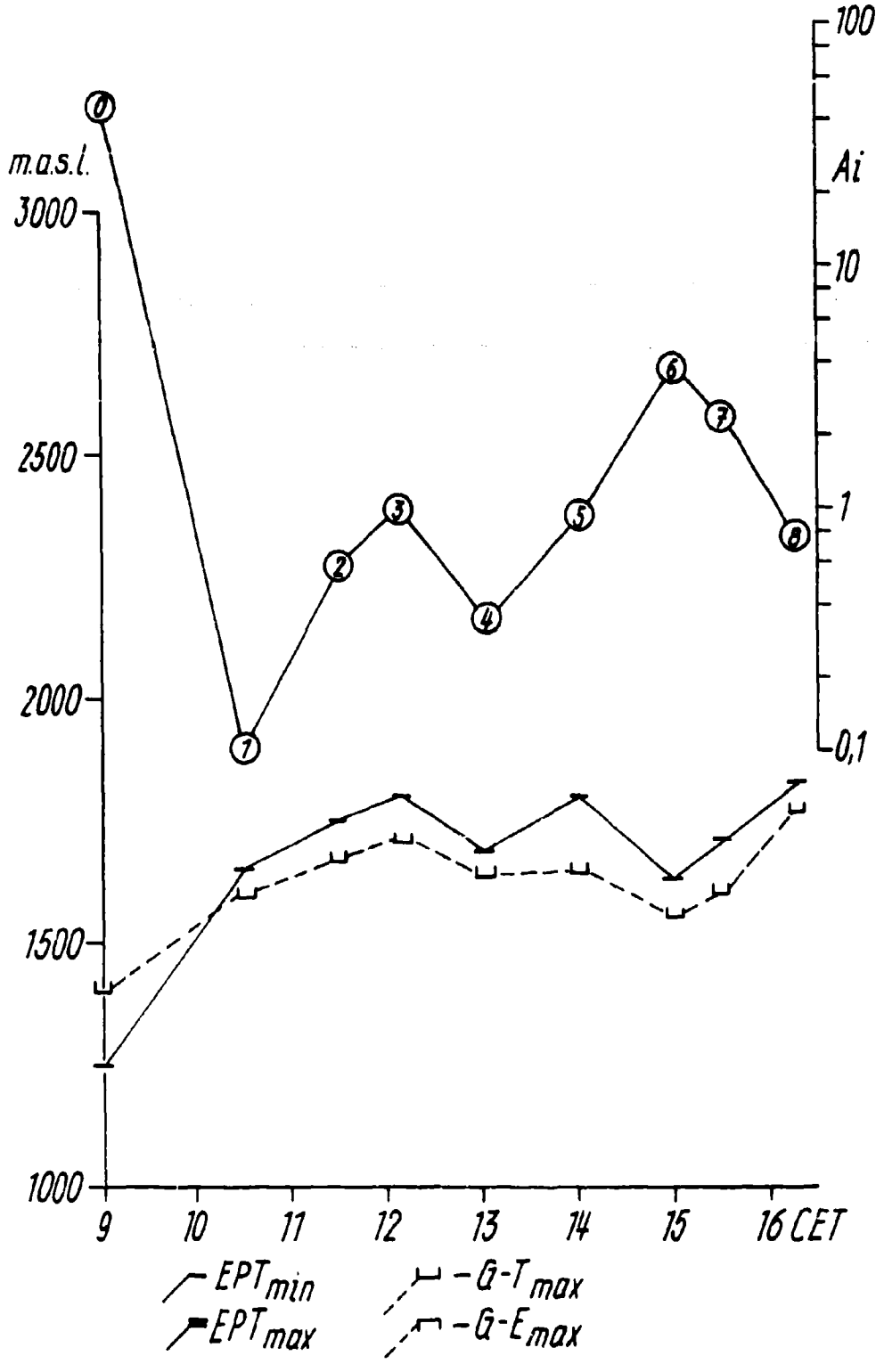

Example B Fig.16
18 Nov 1970
① 1233 CET
② 1333
③ 1433
④ 1548
⑤ 1630
⑥ 1653
⑦ 1712
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

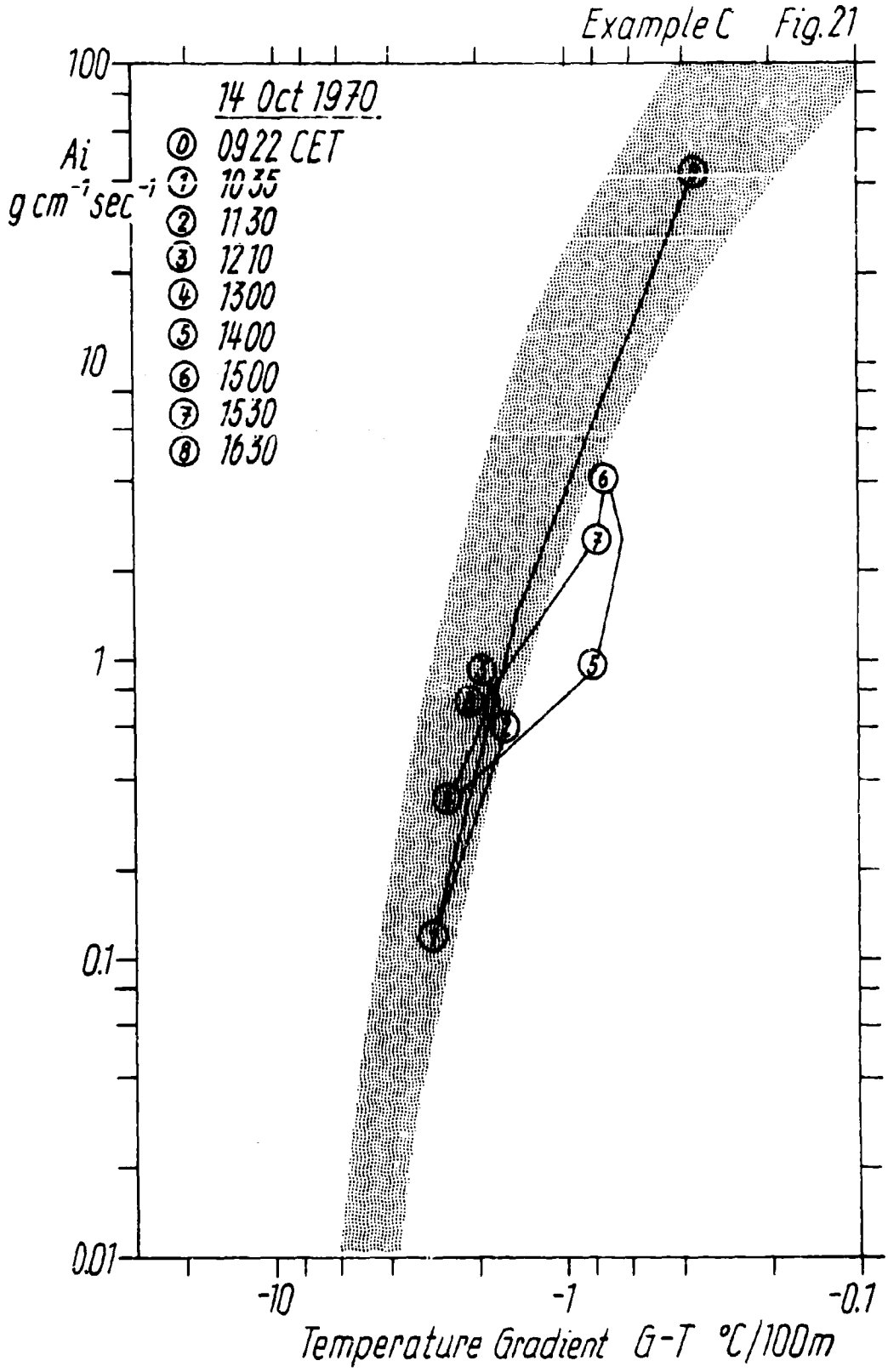

18 Nov 1970
Example B
Fig.17
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100m
1
2
3
4
5
6
7

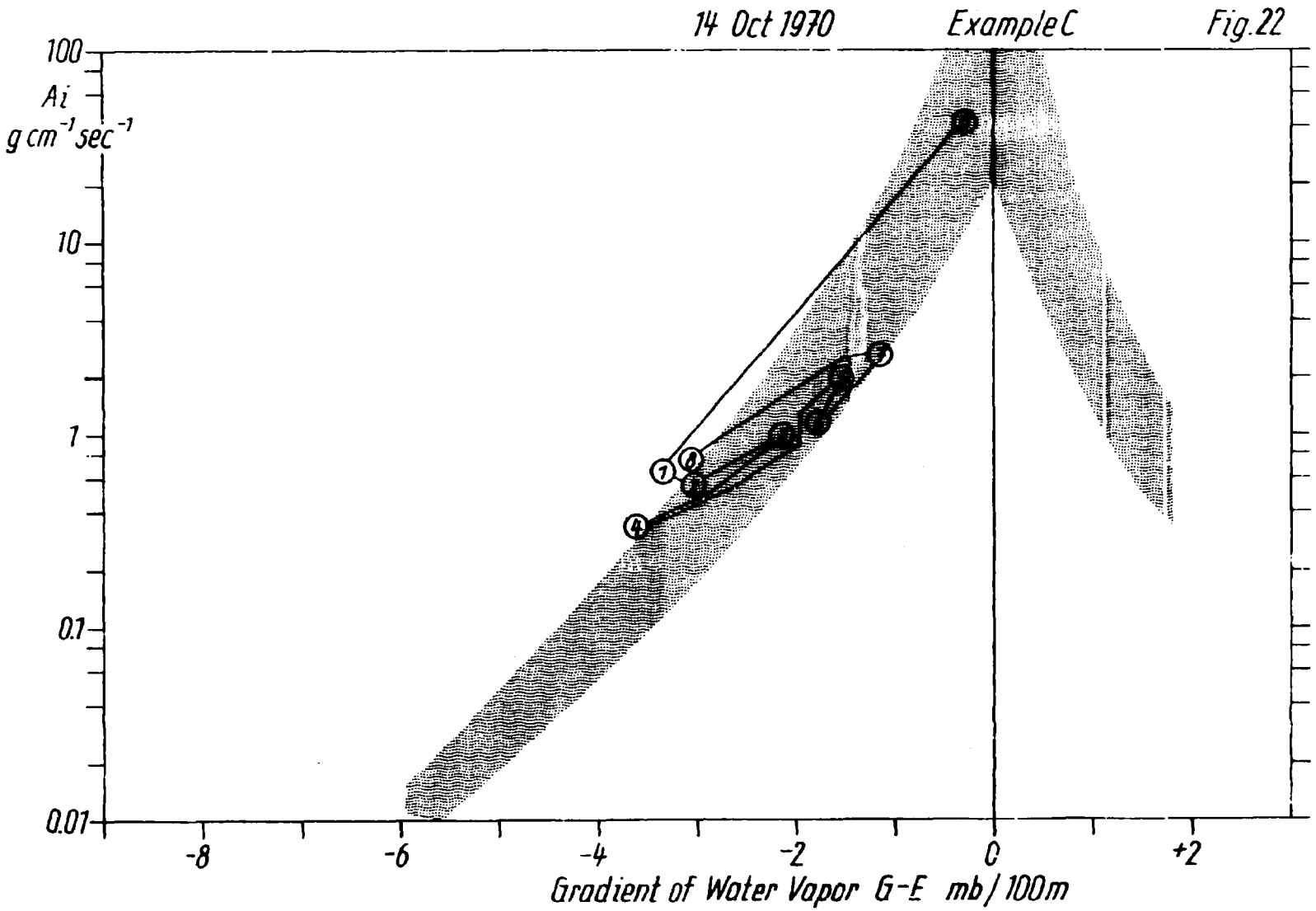

18 Nov 1970
Example B
Fig.18
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m
5
4
3
2



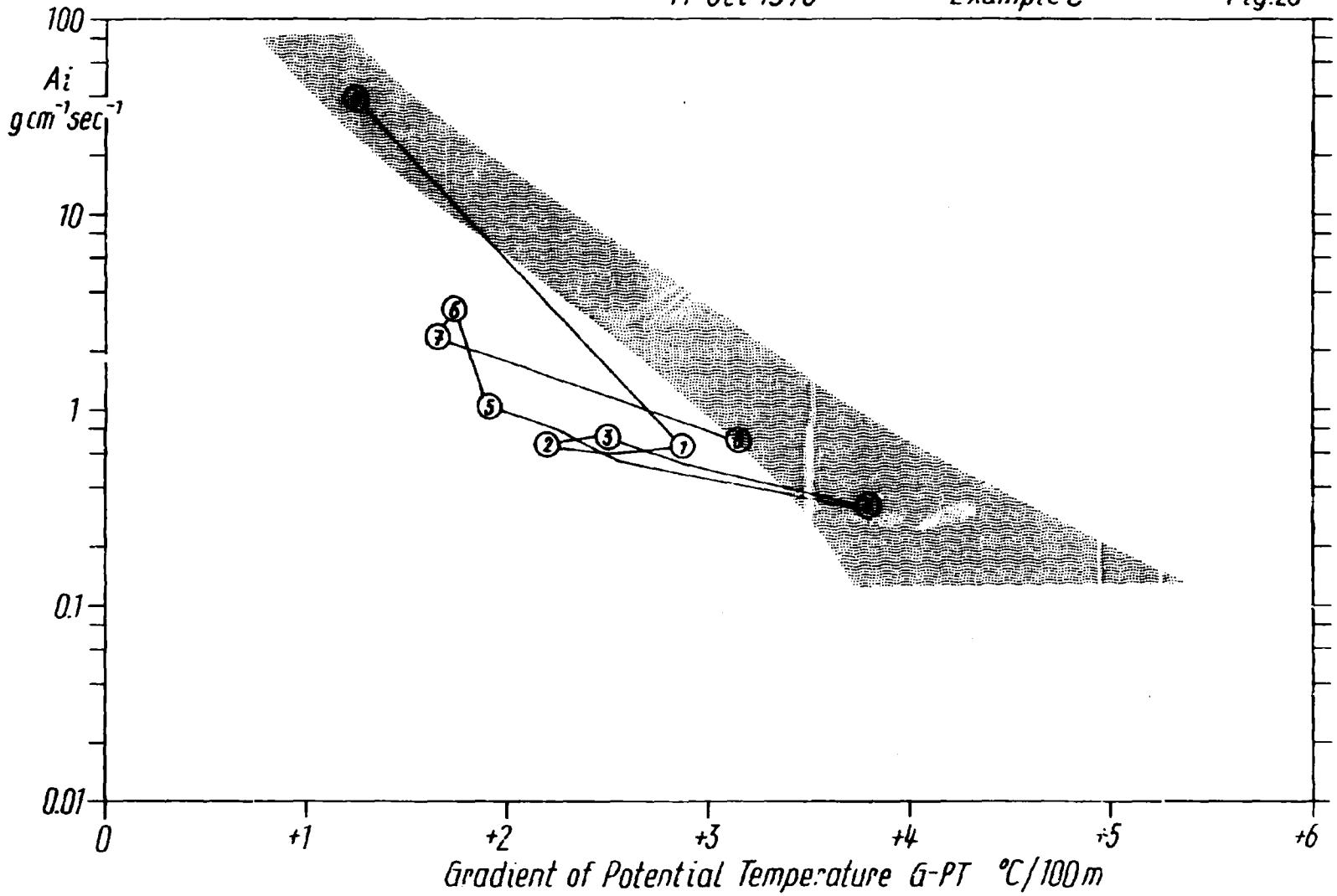
14 Oct 1970 Example C Fig. 20

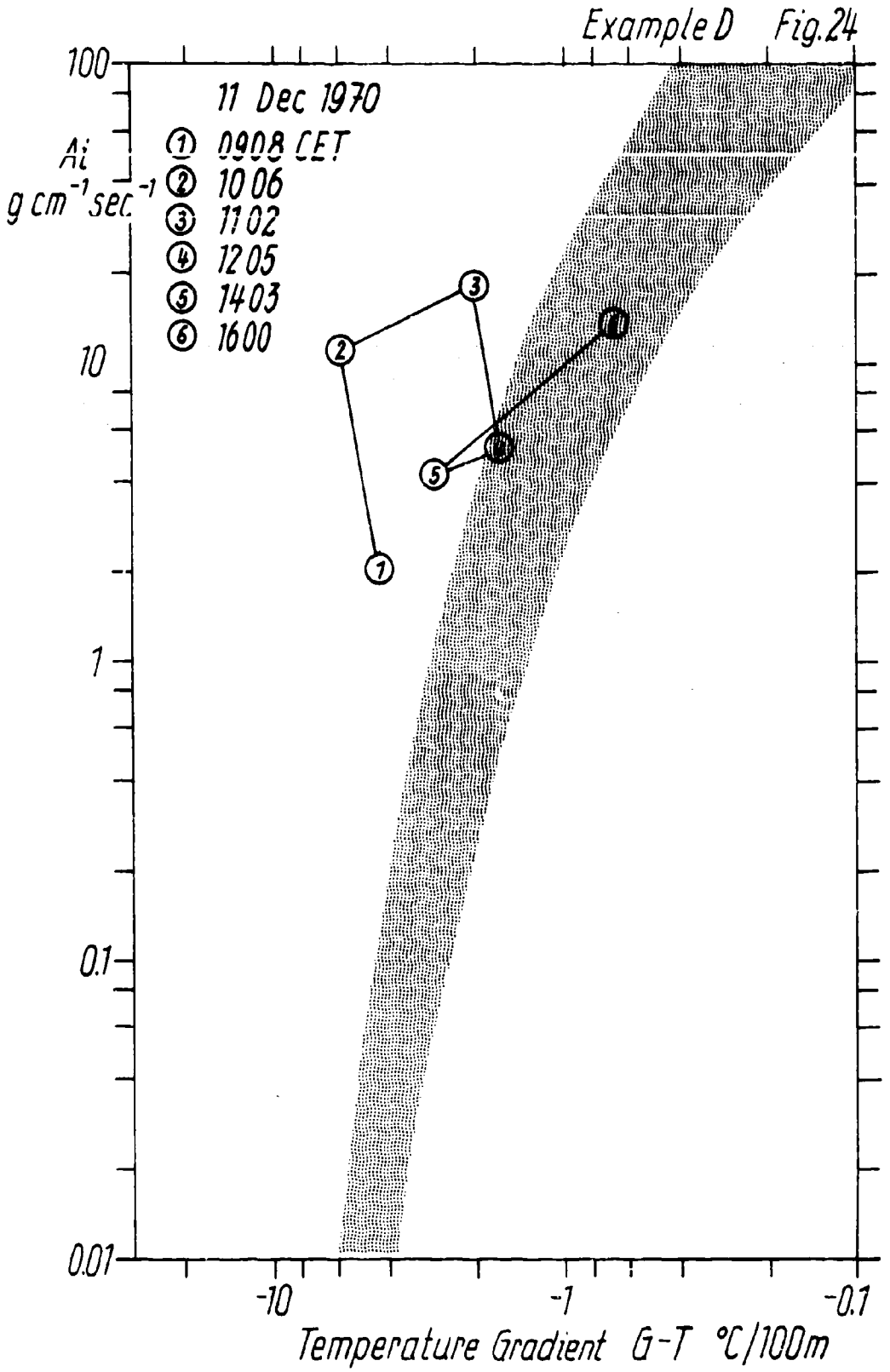


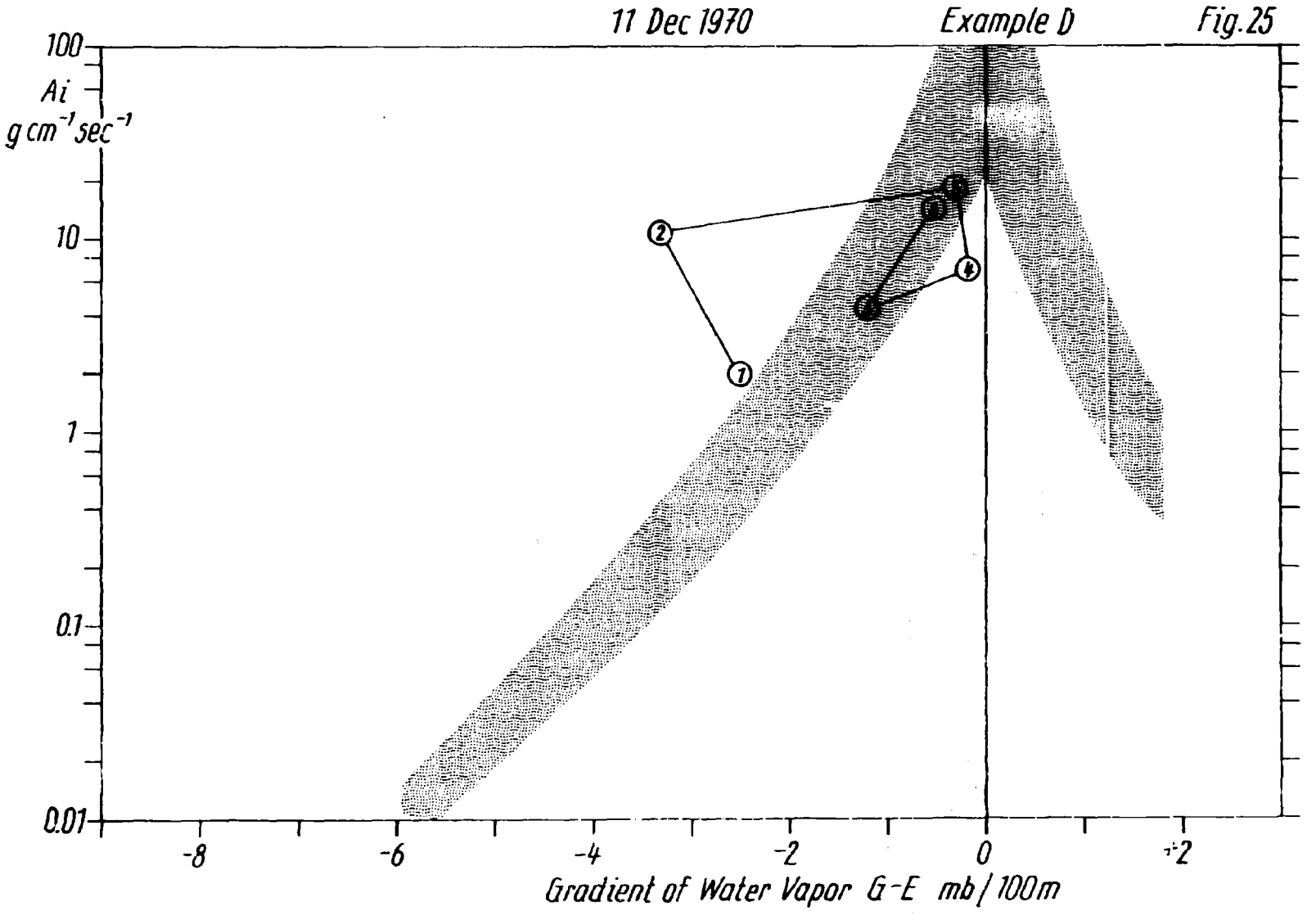

Example C Fig. 21
14 Oct 1970
0 0922 CET
1 1035
2 1130
3 1210
4 1300
5 1400
6 1500
7 1530
8 1630
Ai
g cm⁻ⁱ sec⁻ⁱ
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

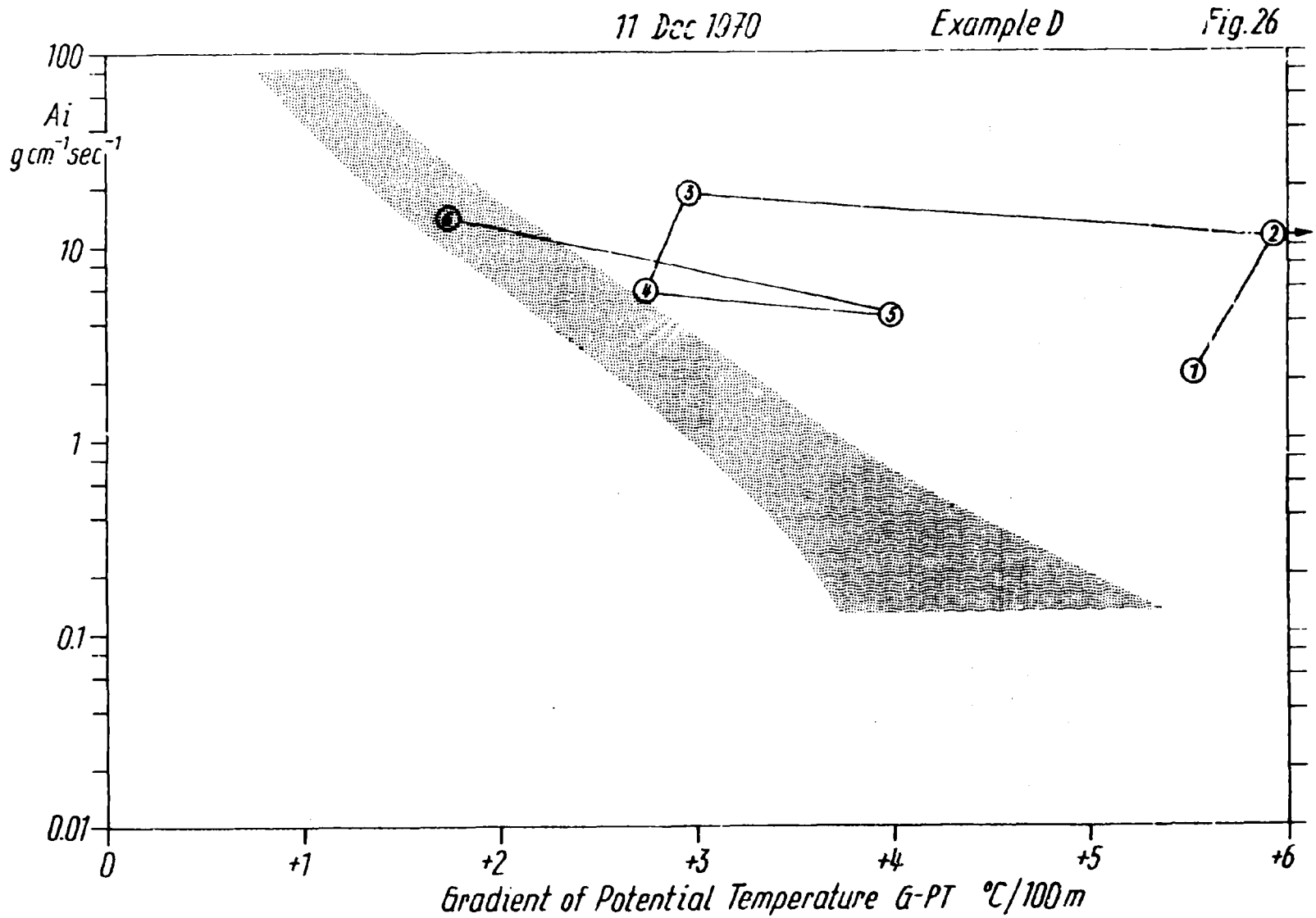

14 Oct 1970
Example C
Fig. 22
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m

14 Oct 1970 Example C Fig.23

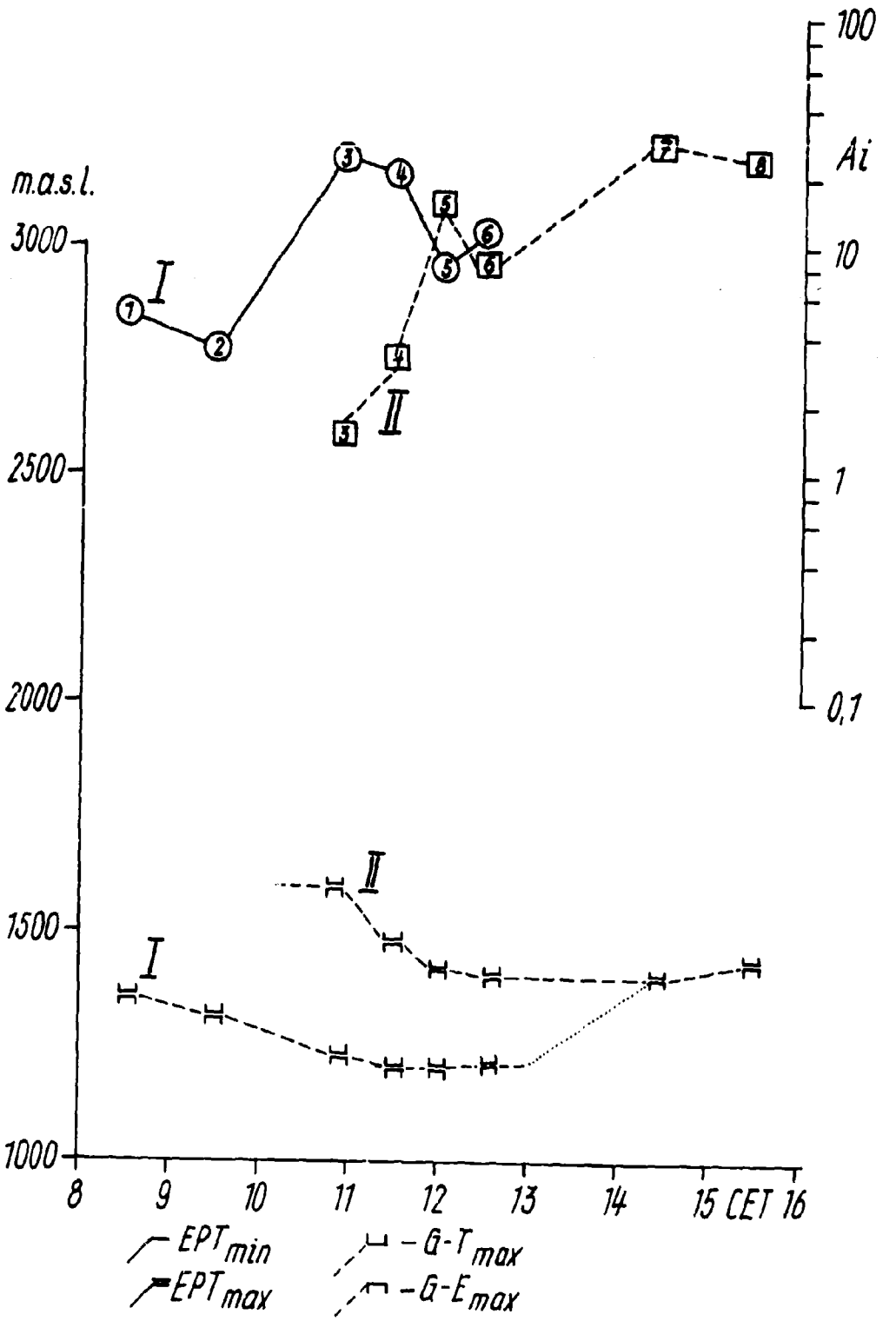


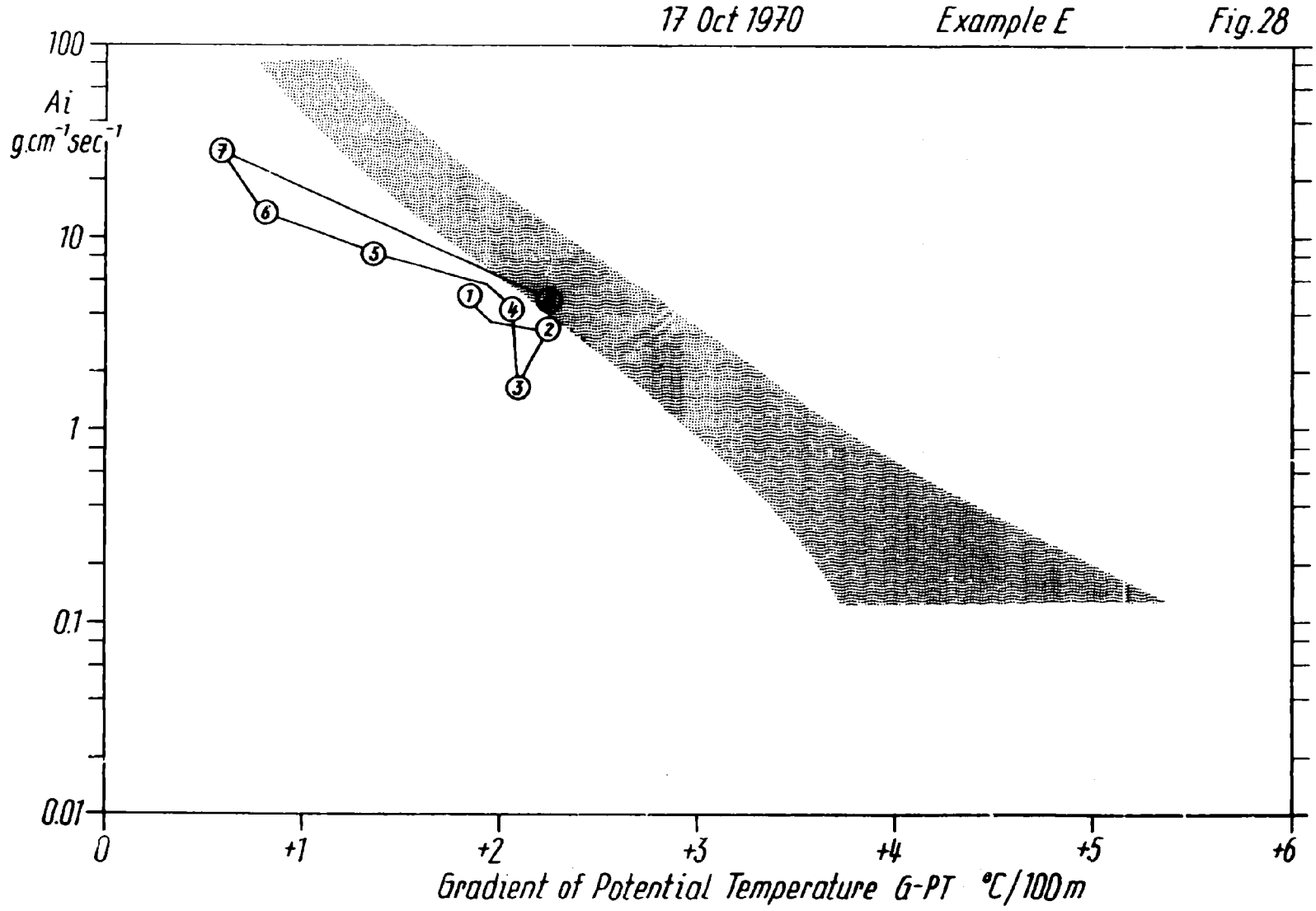

Example D Fig.24
11 Dec 1970
① 0908 CET
② 10 06
③ 11 02
④ 12 05
⑤ 1403
⑥ 1600
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

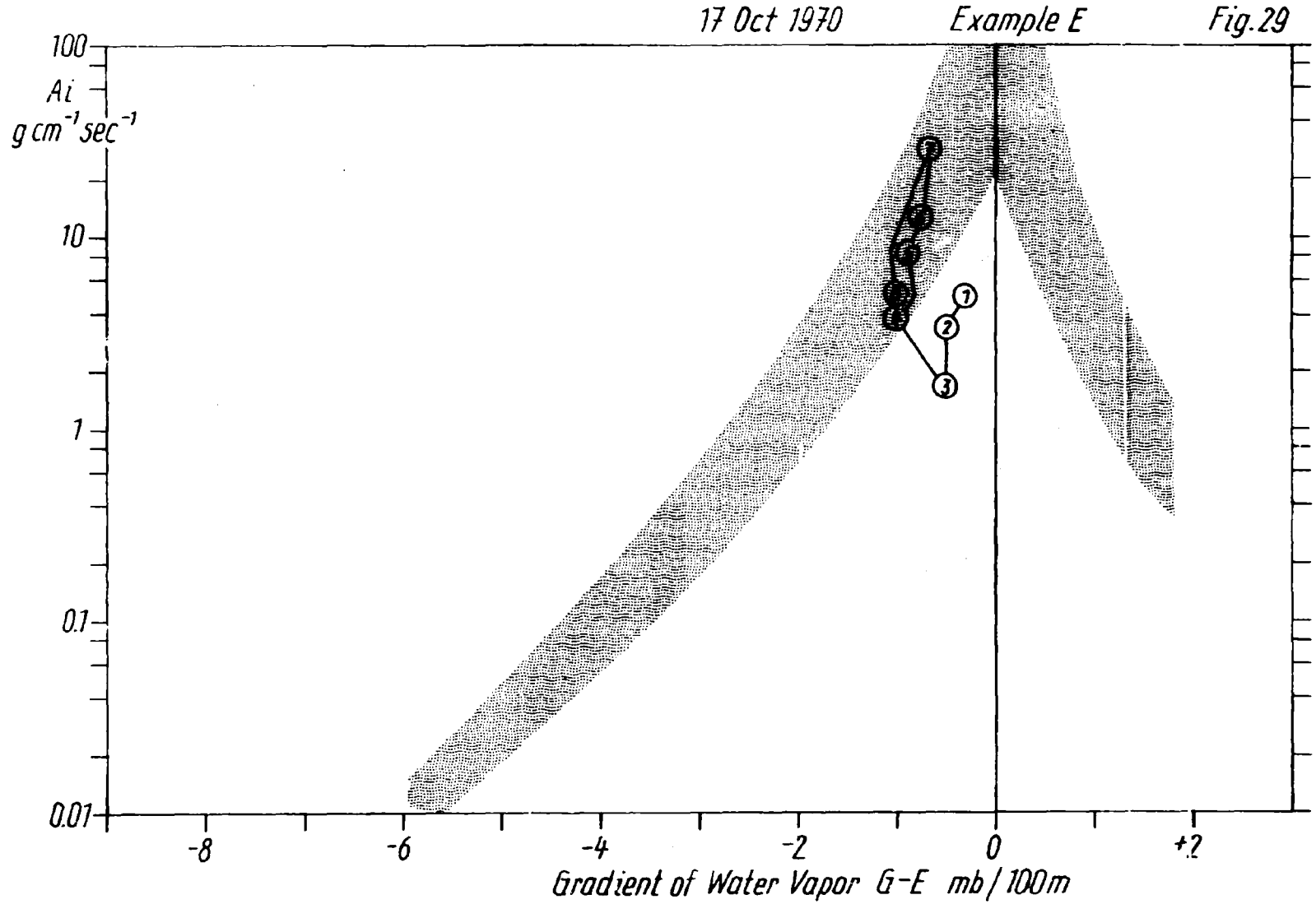

11 Dec 1970
Example D
Fig.25
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m
1
2
3
4

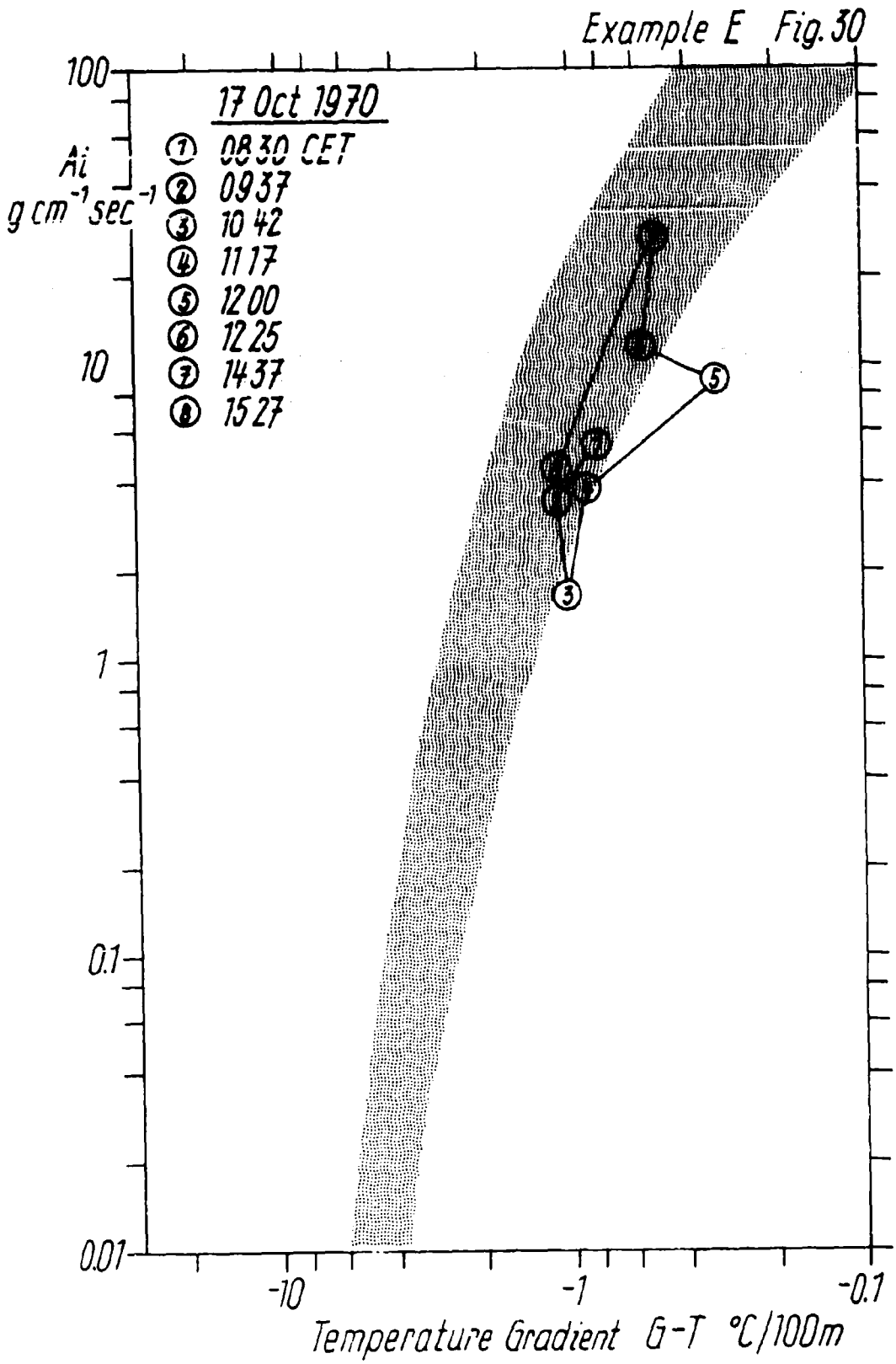

11 Dec 1970
Example D
Fig. 26
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100 m
1
2
3
4
5
7

17 Oct 1970 Example E Fig. 27

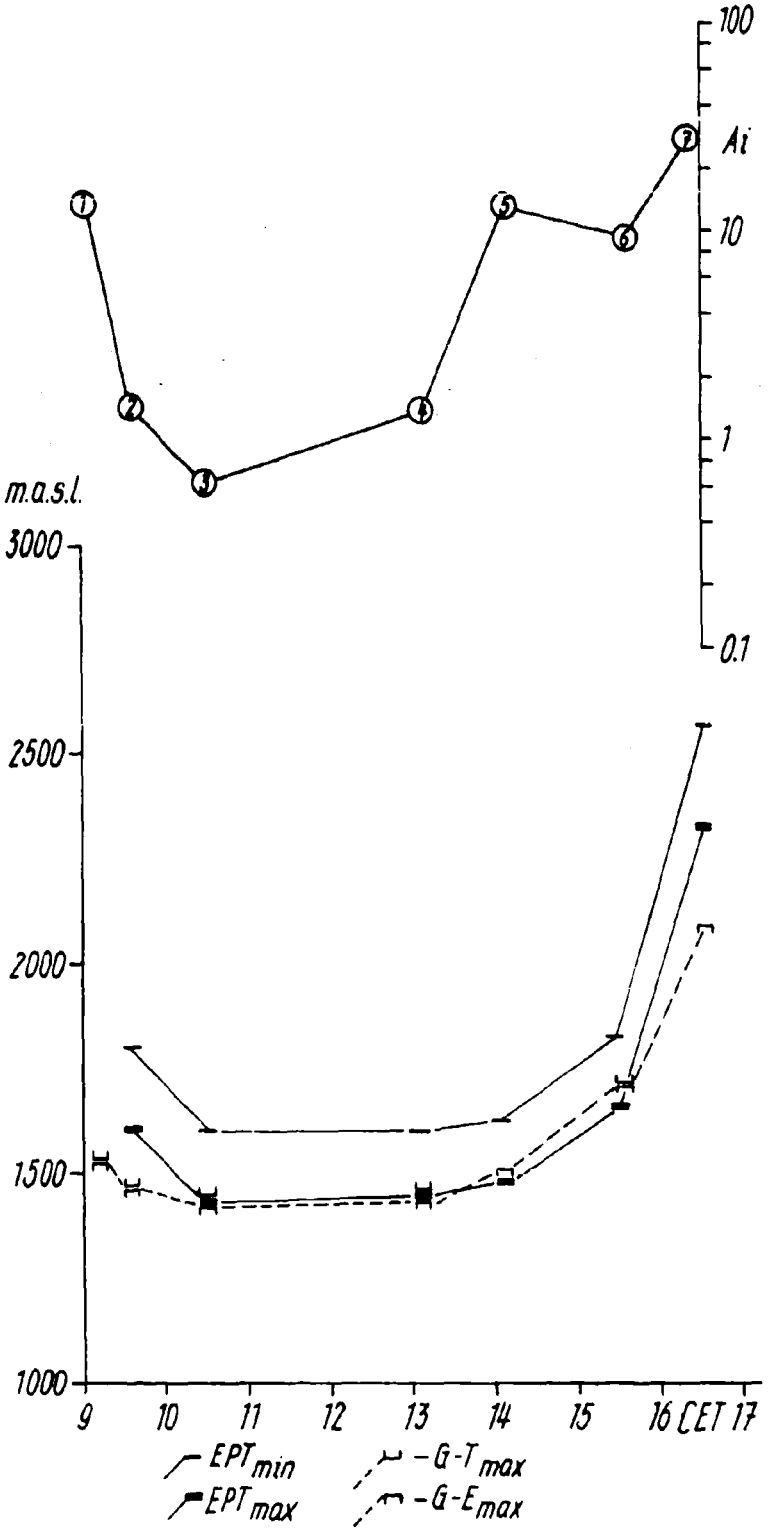


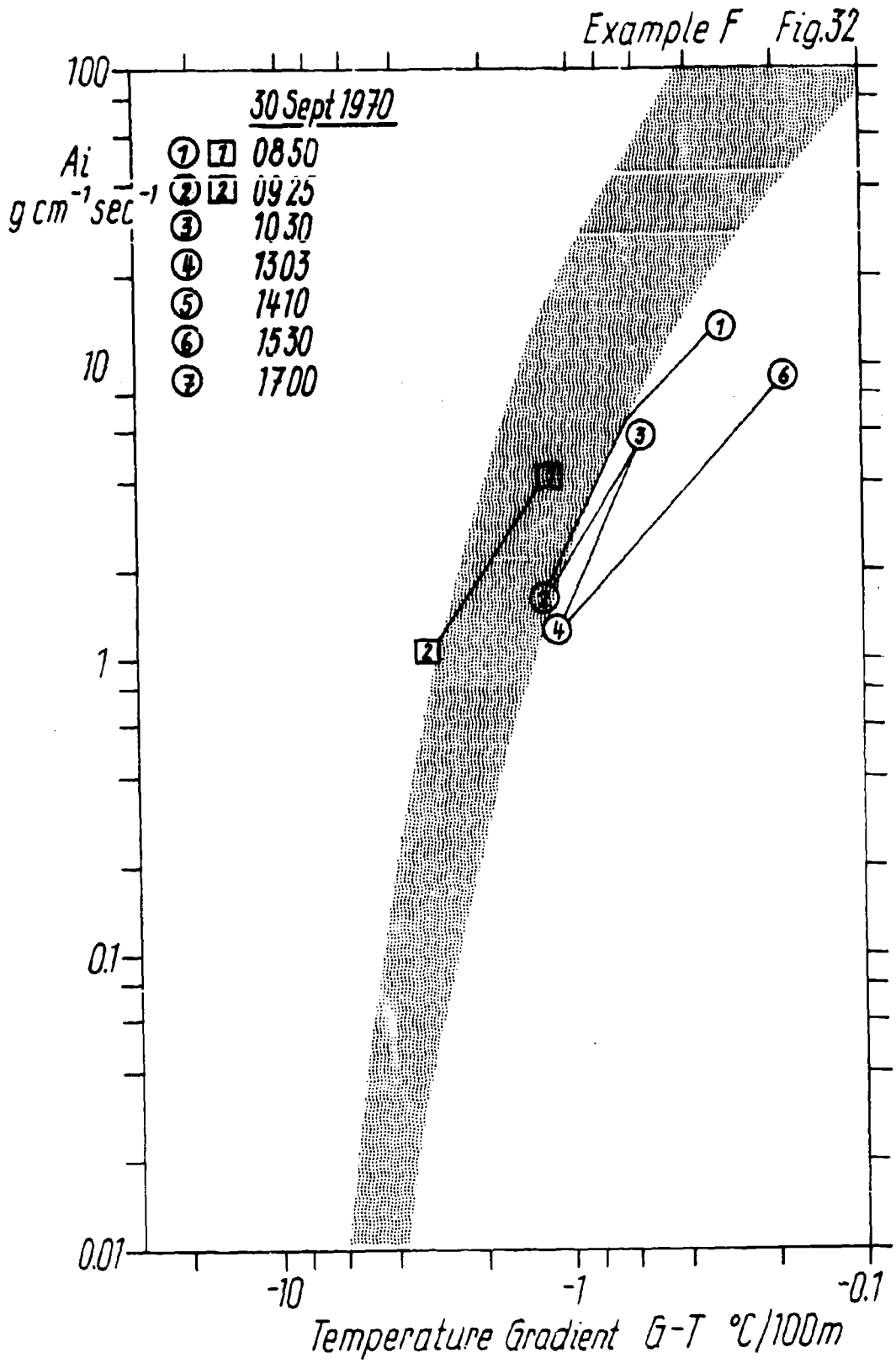

17 Oct 1970
Example E
Fig.28
100
Ai
g.cm⁻¹sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100m
7
6
5
1
4
2
3

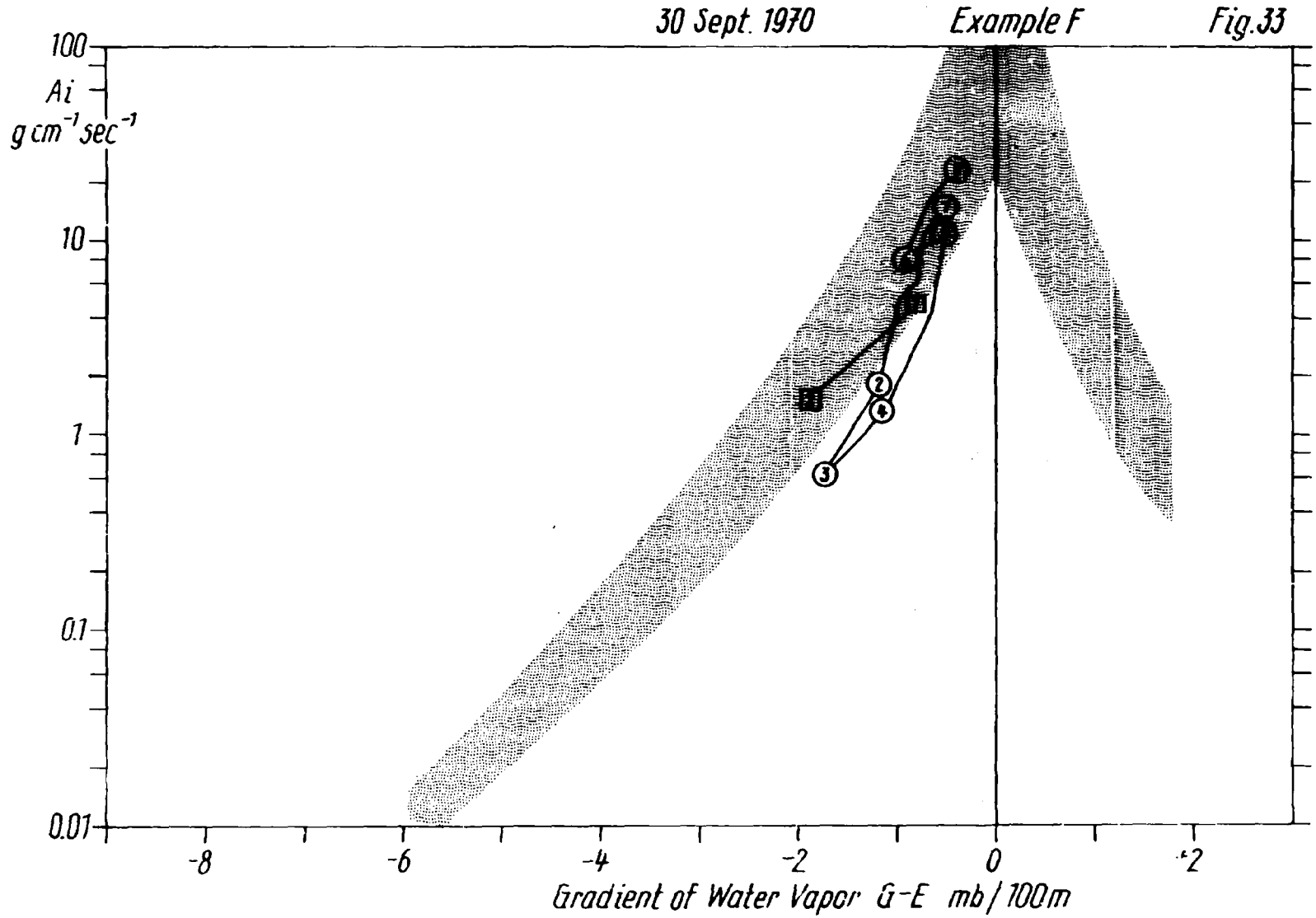

17 Oct 1970
Example E
Fig. 29
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m
1
2
3

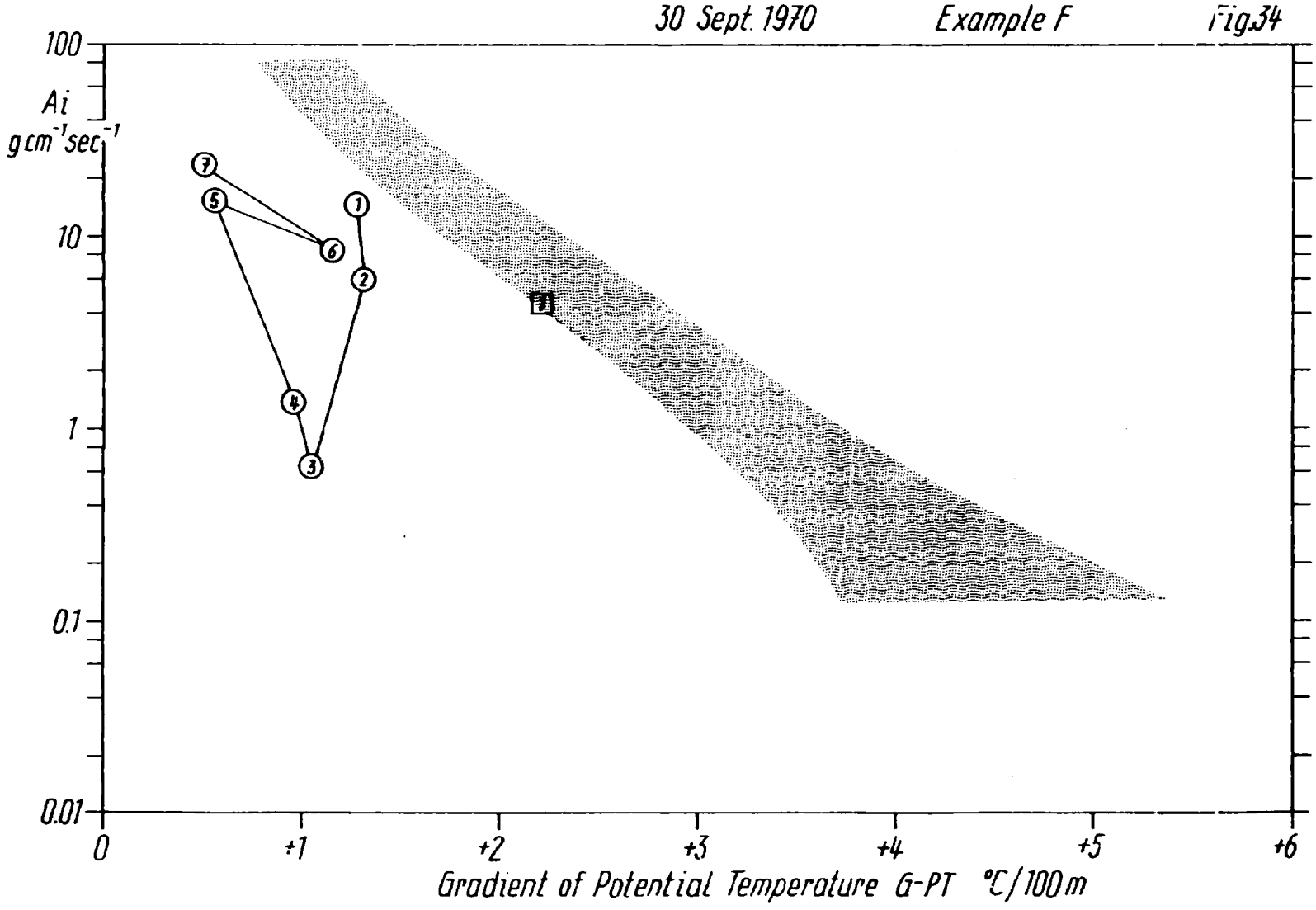

Example E Fig. 30
17 Oct 1970
① 08 30 CET
② 09 37
③ 10 42
④ 11 17
⑤ 12 00
⑥ 12 25
⑦ 14 37
⑧ 15 27
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

30 Sept. 1970 Example F Fig. 31

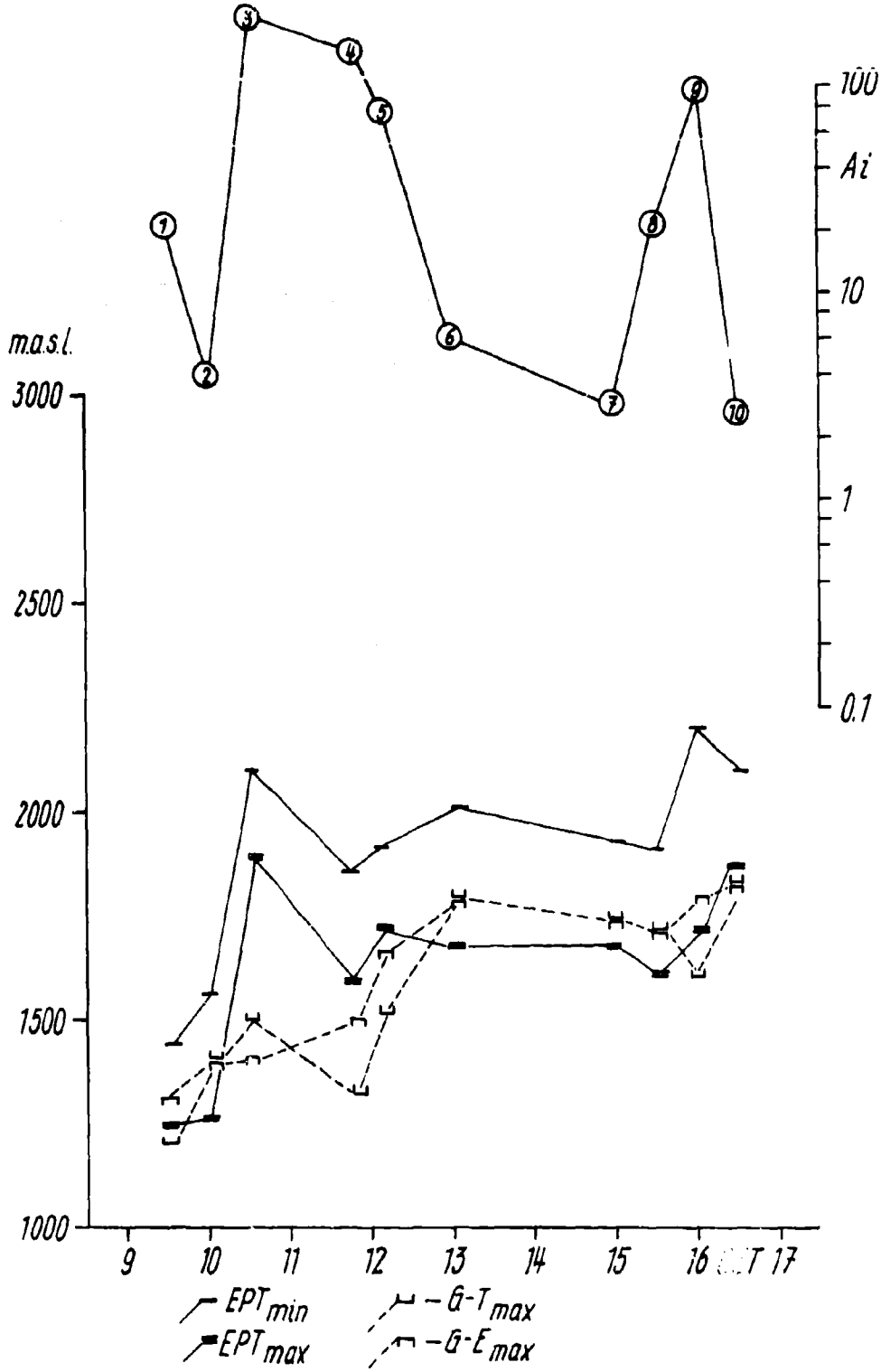


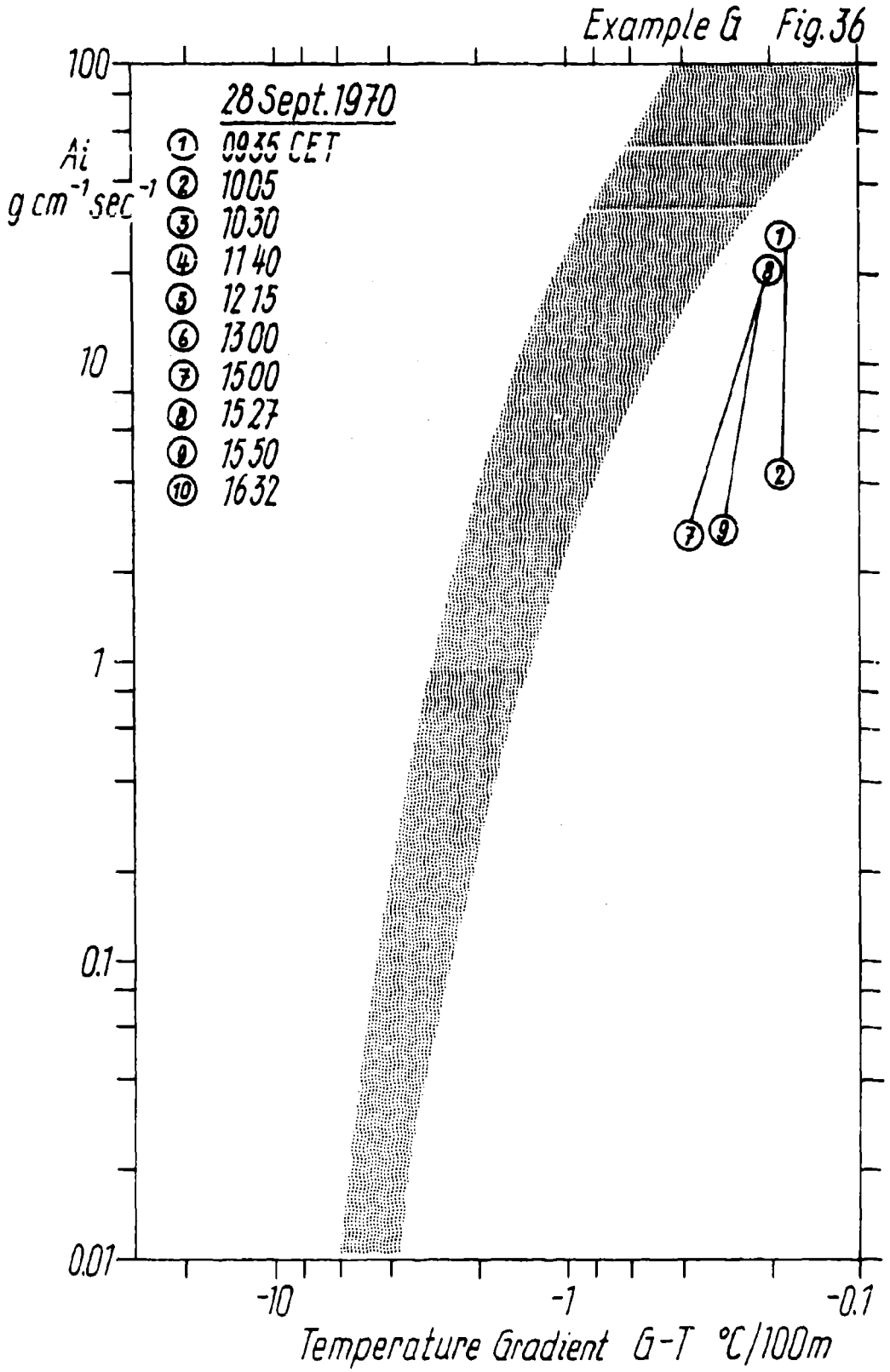

Example F Fig.32
30 Sept 1970
① 0850
② 0925
③ 1030
④ 1303
⑤ 1410
⑥ 1530
⑦ 1700
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

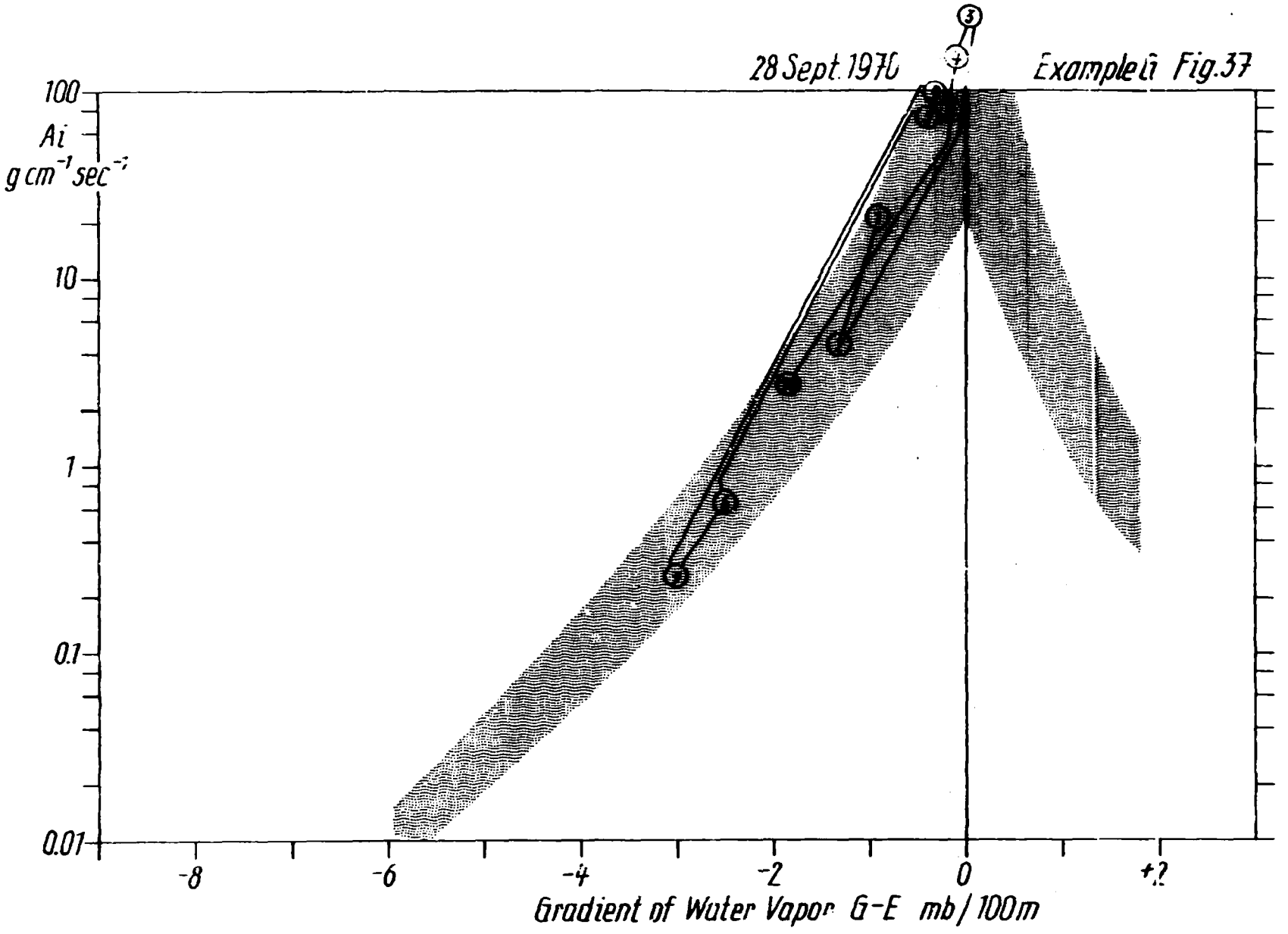

30 Sept. 1970
Example F
Fig.33
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m

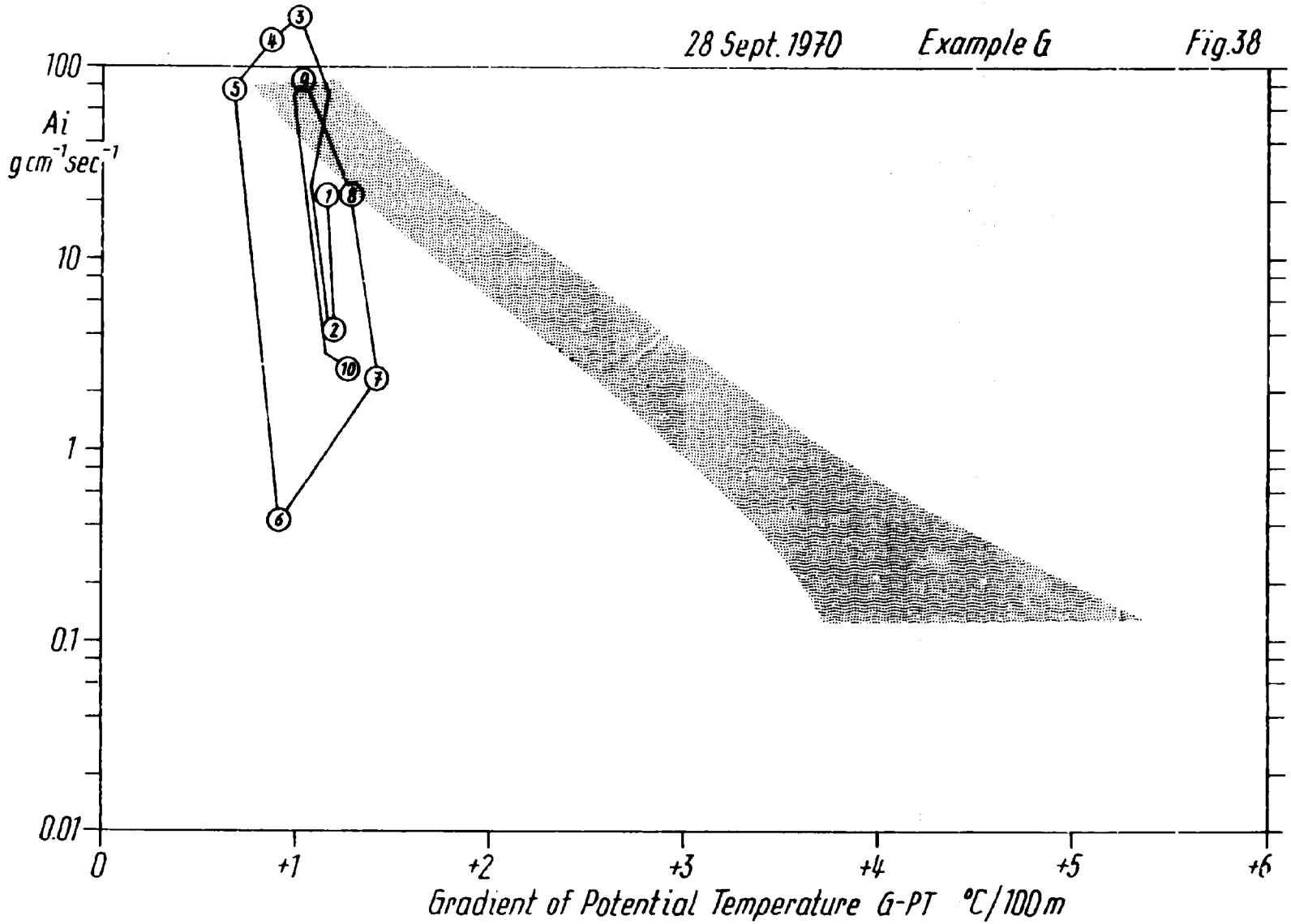

30 Sept. 1970
Example F
Fig.34
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100 m
1
2
3
4
5
6
7

28 Sept. 1970 Example G Fig. 35

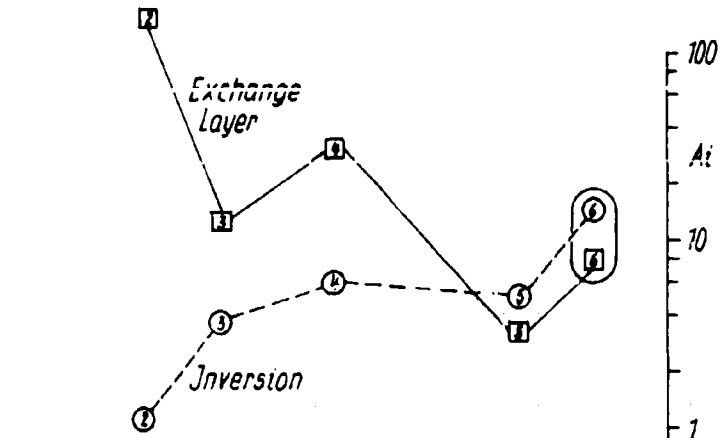


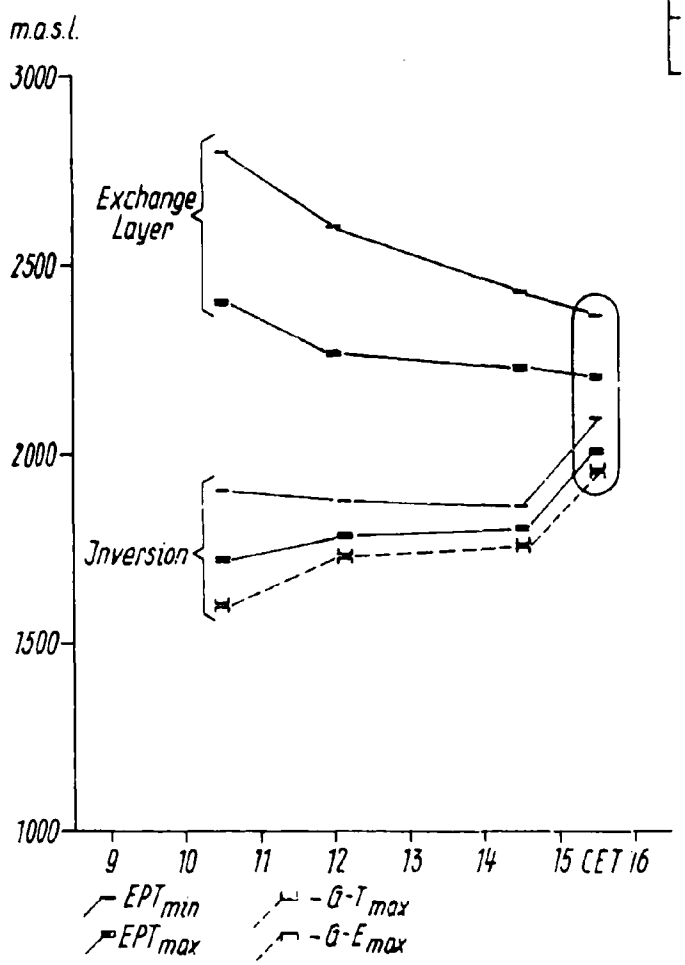

Example G Fig.36
28 Sept. 1970
① 0935 CET
② 1005
③ 1030
④ 1140
⑤ 1215
⑥ 1300
⑦ 1500
⑧ 1527
⑨ 1550
⑩ 1632
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m

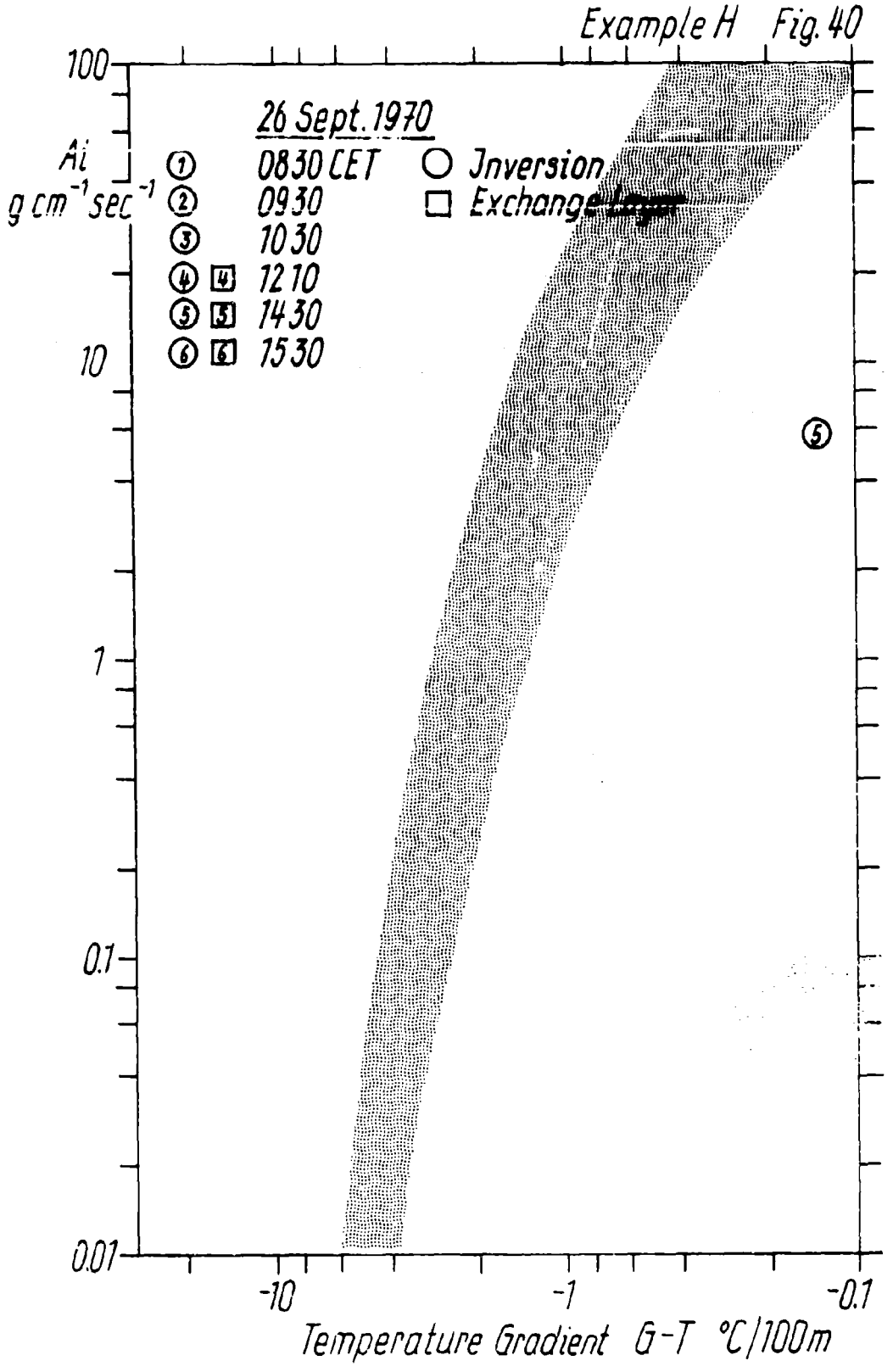

28 Sept. 1970
Example i Fig.37
100
Ai
g cm⁻¹ sec⁻²
10
1
0.1
0.01
-8
-6
-4
-2
0
+?
Gradient of Water Vapor G-E mb/100m

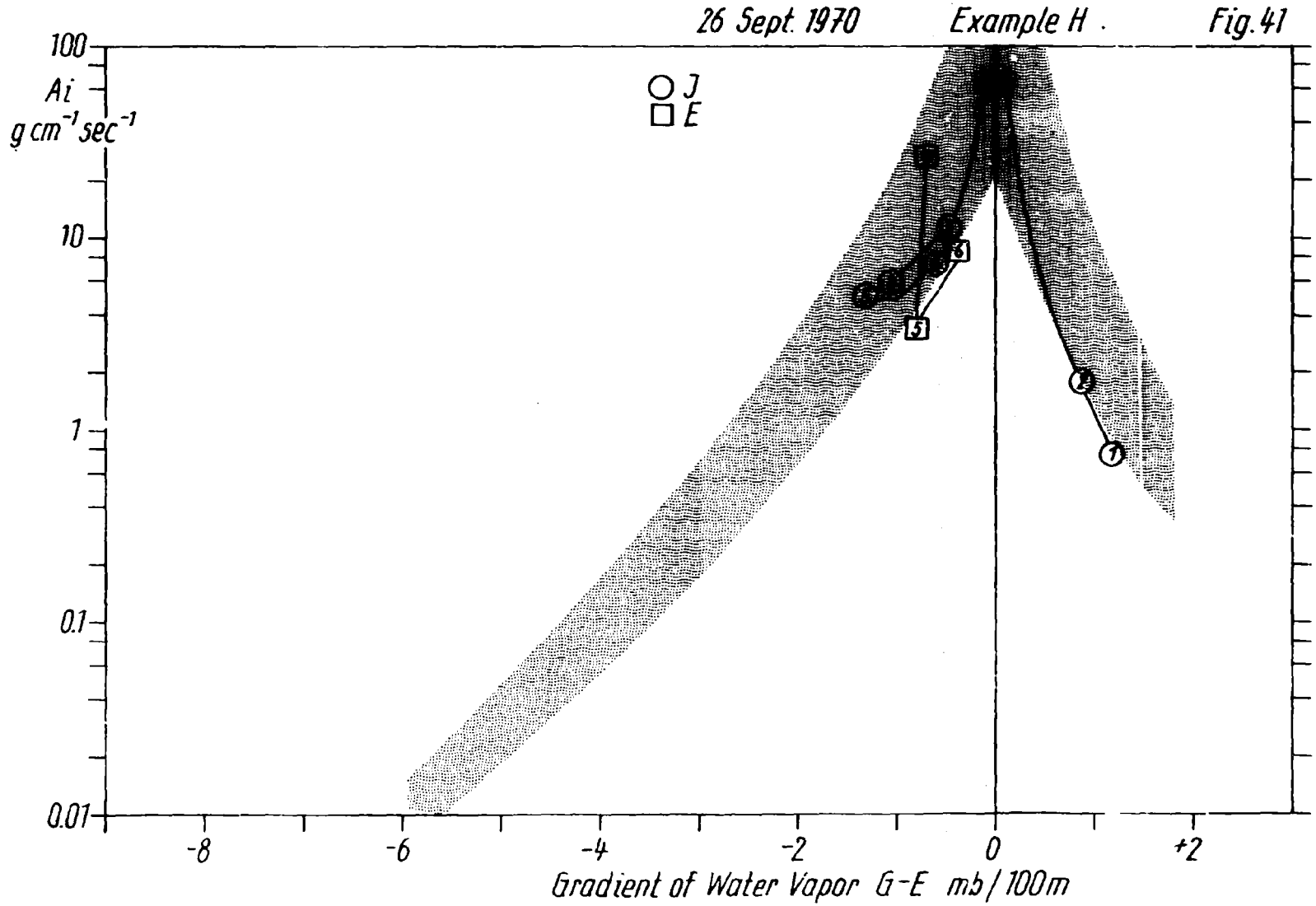

28 Sept. 1970
Example G
Fig.38
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100m
1
2
3
4
5
6
7
8
9
10

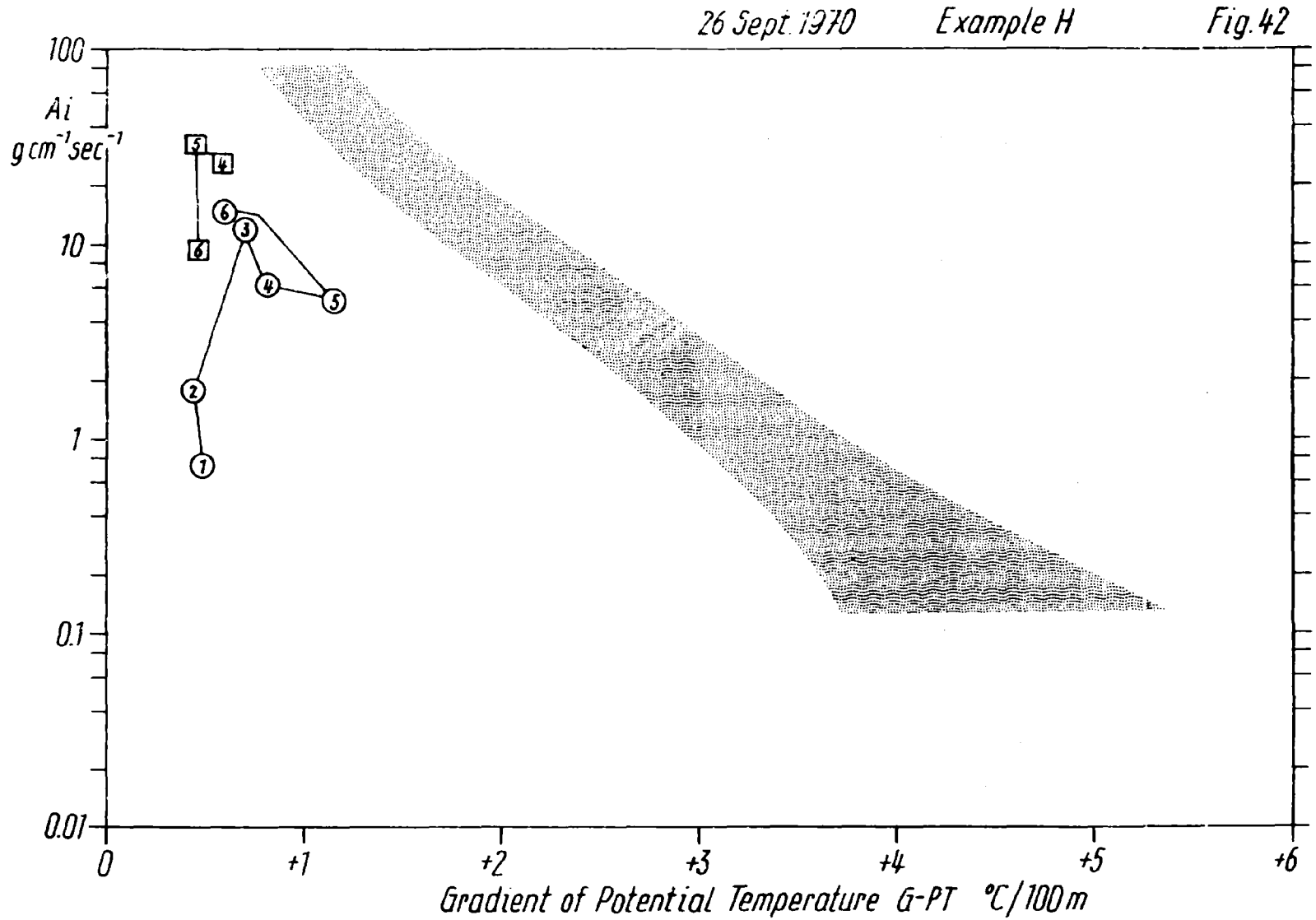
26 Sept. 1970 Exampie H Fig.39

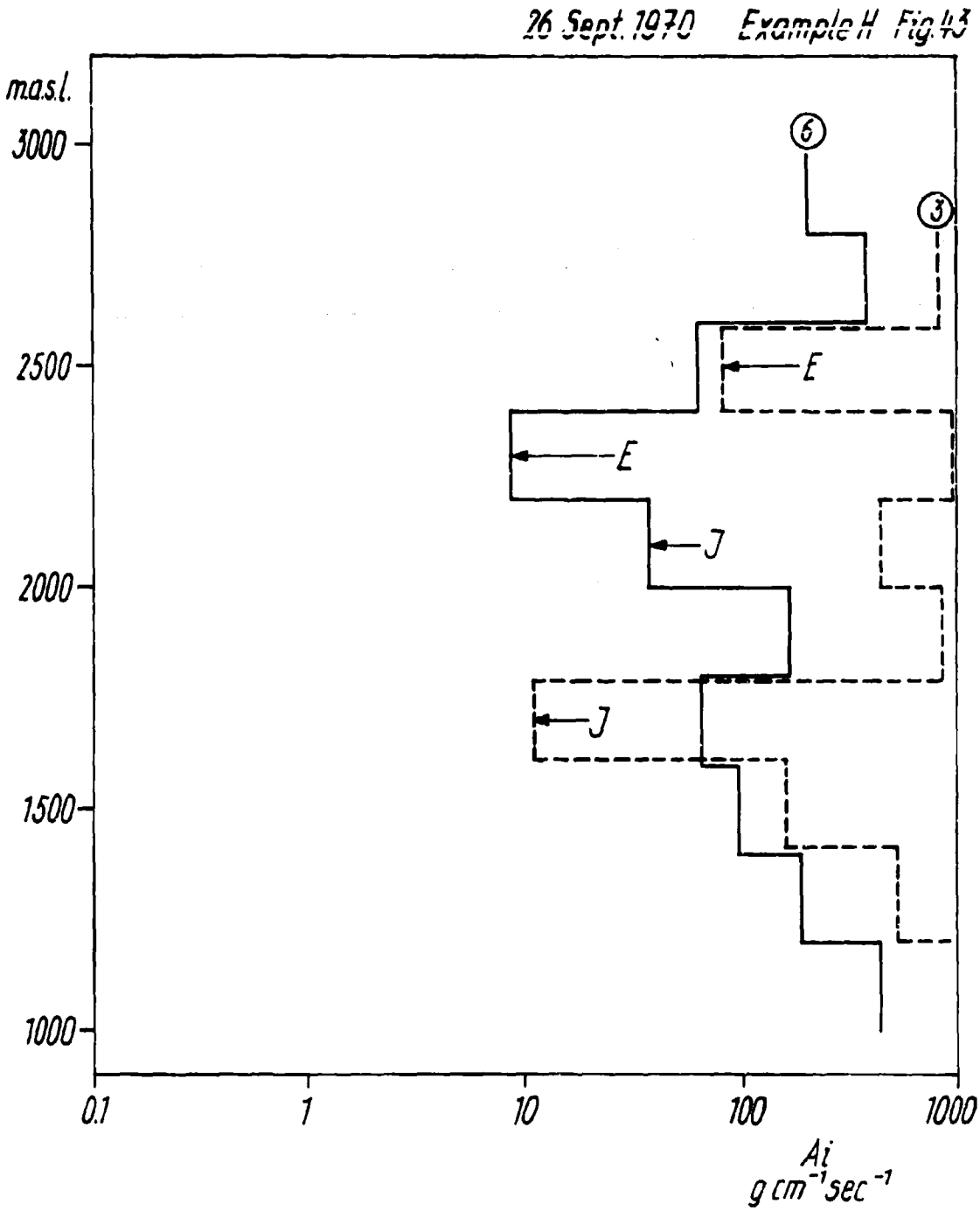


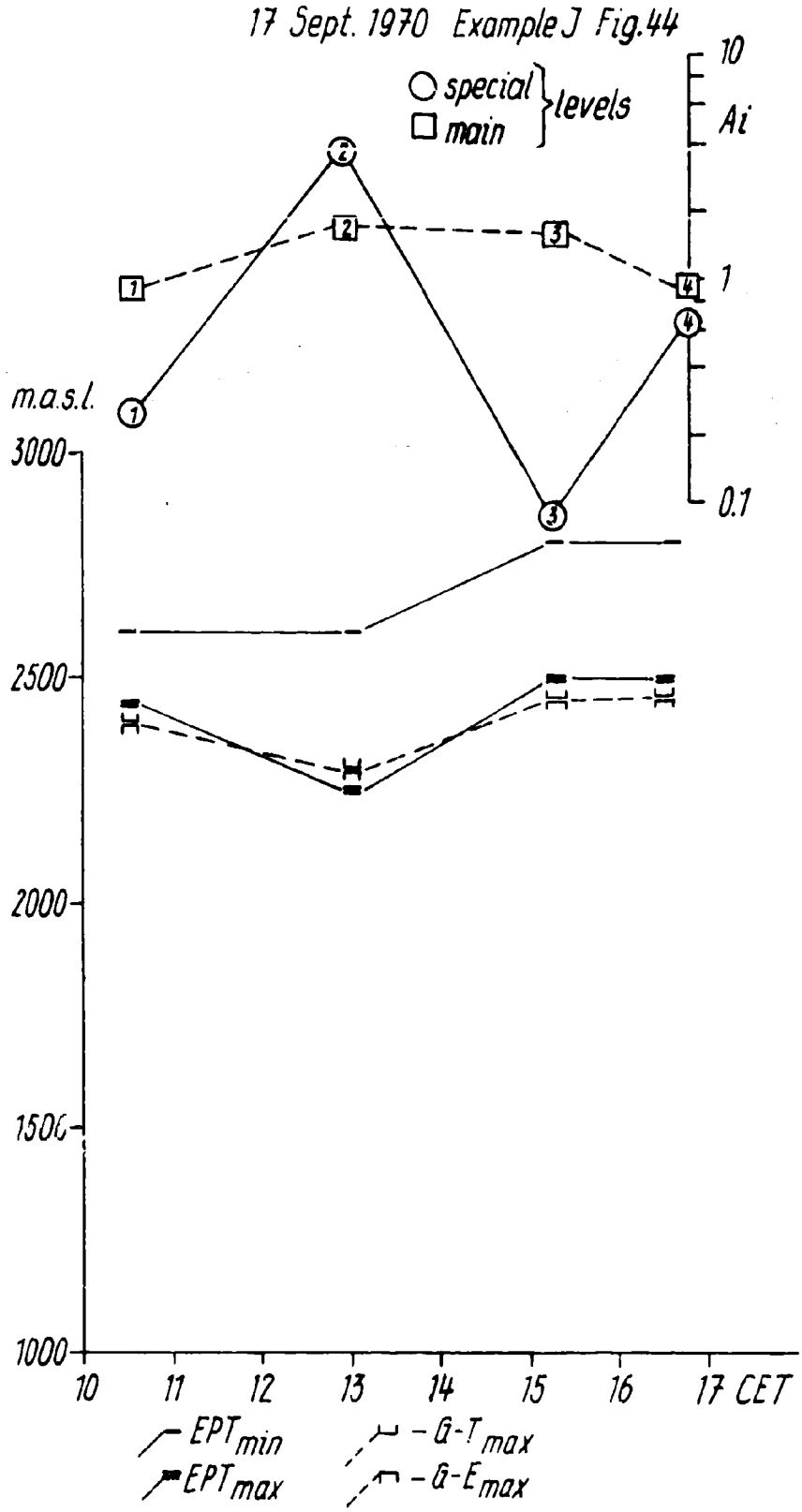


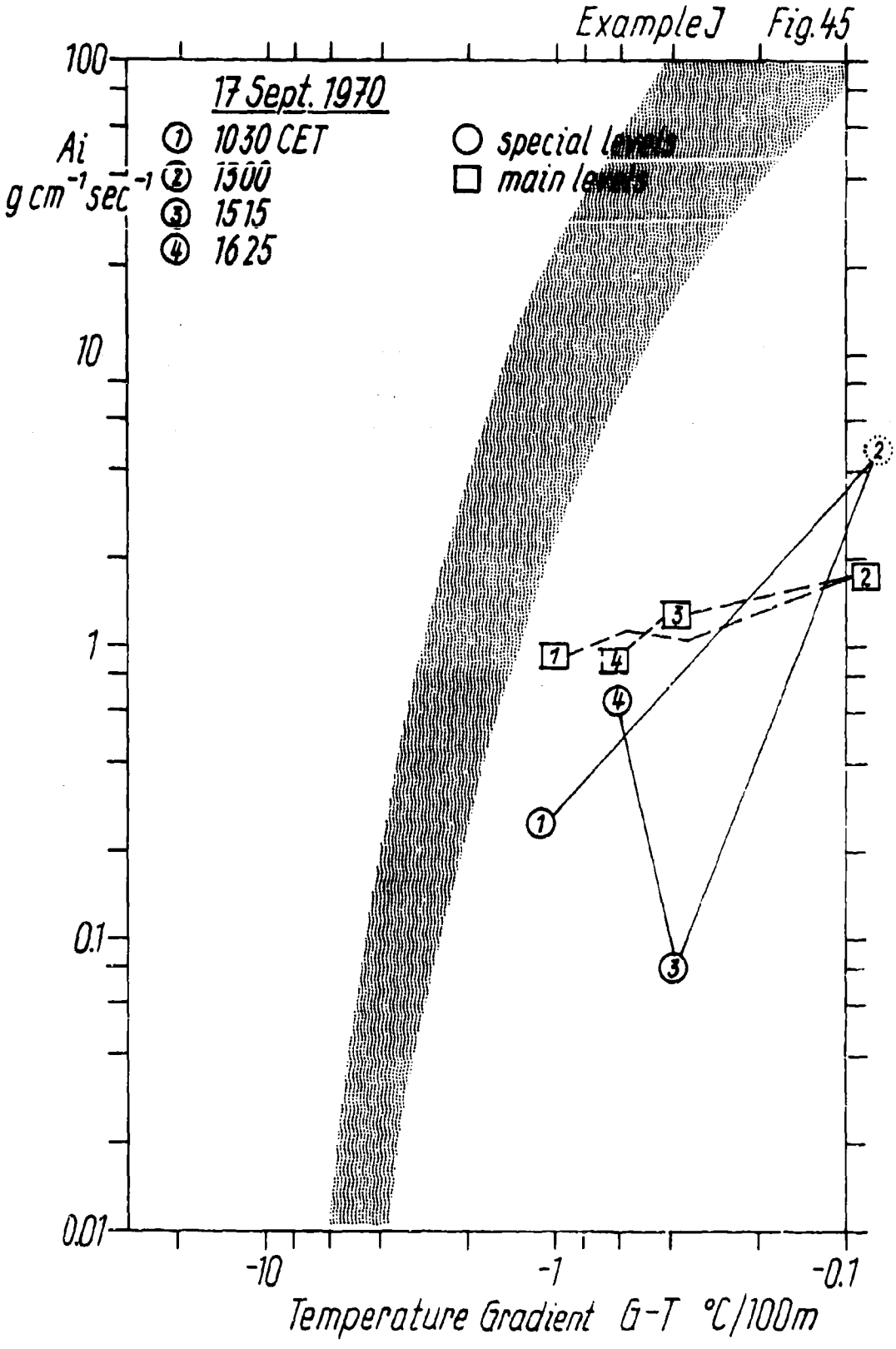

Example H Fig. 40
100
10
1
0.1
0.01
Ai
g cm⁻¹ sec⁻¹
26 Sept. 1970
① 0830 CET
② 0930
③ 1030
④ 4 1210
⑤ 5 1430
⑥ 6 1530
Inversion
Exchange Layer
-10
-1
-0.1
Temperature Gradient G-T °C/100m

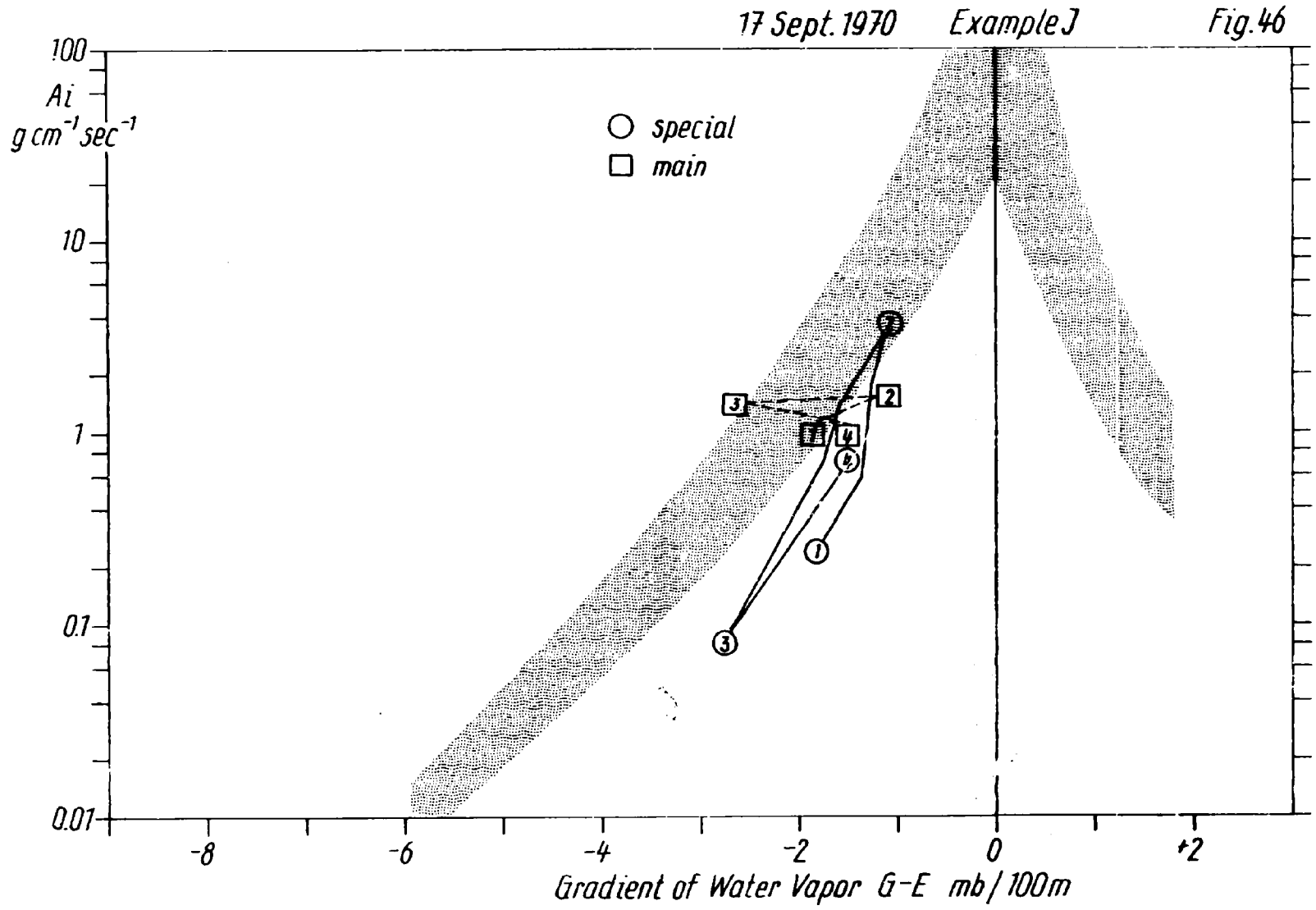

26 Sept. 1970
Example H .
Fig. 41
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
J
E
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb / 100m


26 Sept. 1970
Example H
Fig. 42
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
0
+1
+2
+3
+4
+5
+6
Gradient of Potential Temperature G-PT °C/100 m

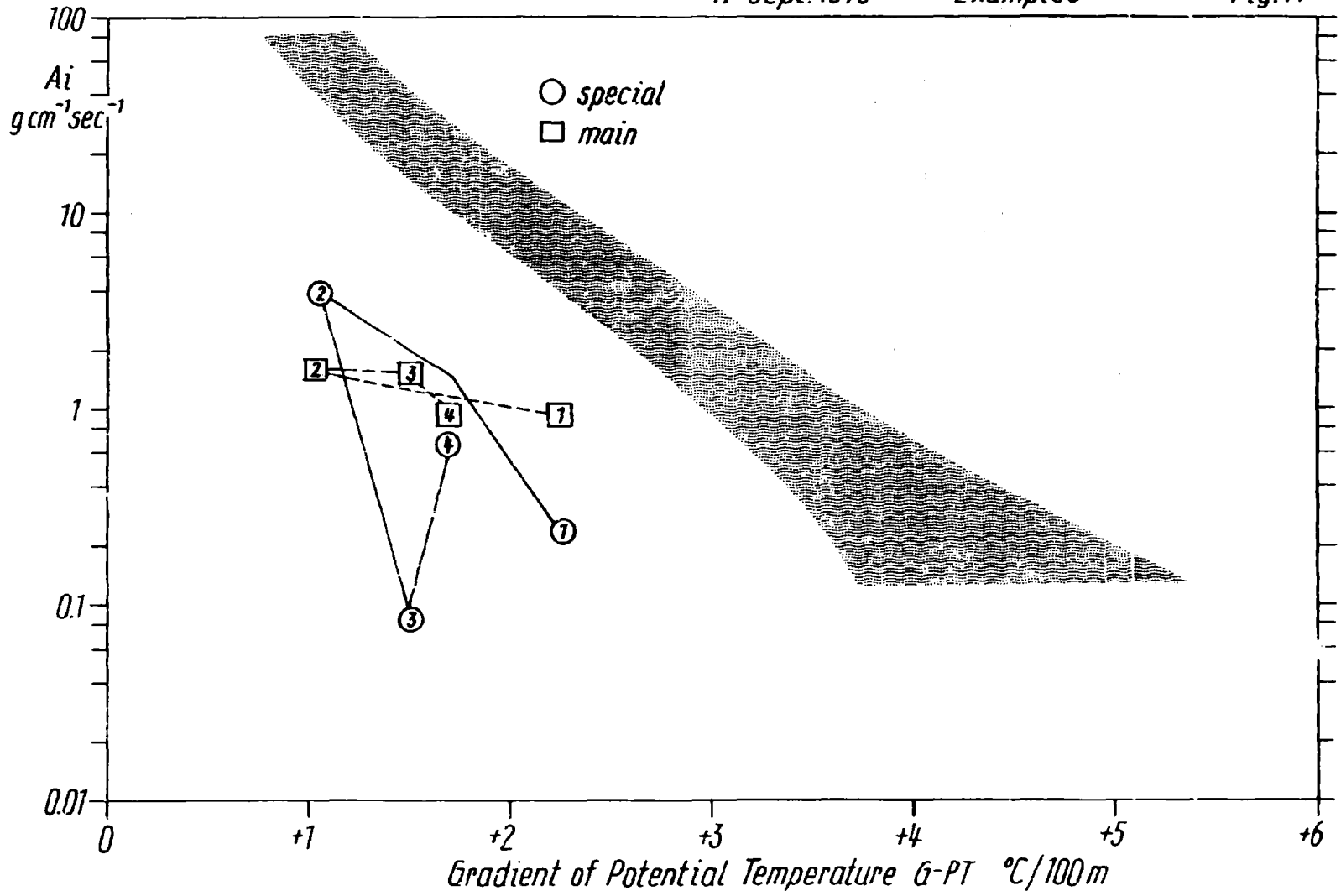

26 Sept. 1970 Example H Fig. 43
m.a.s.l.
3000
2500
2000
1500
1000
6
3
E
E
J
J
0.1
1
10
100
1000
Ai
g cm⁻¹ sec⁻¹

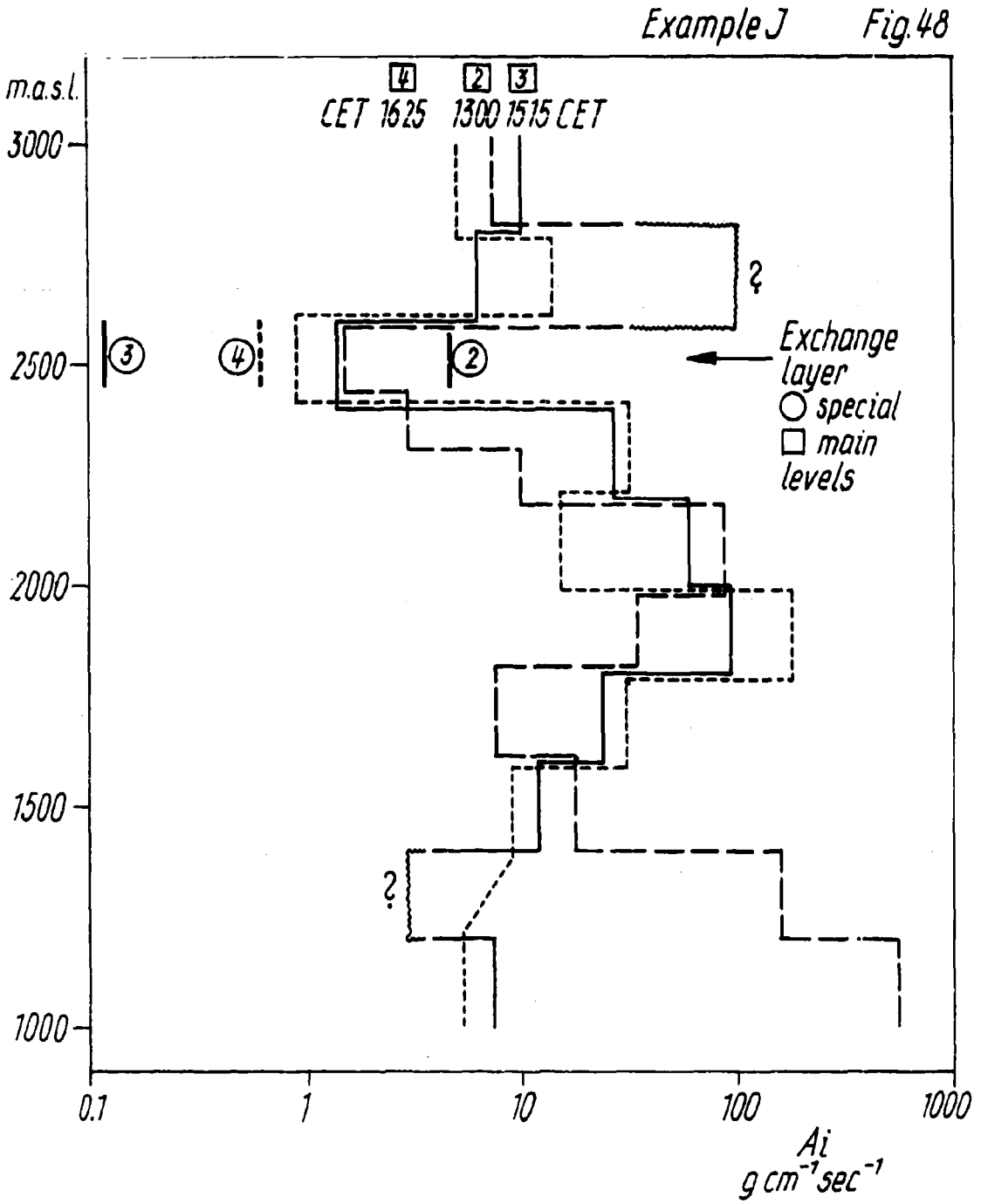

17 Sept. 1970 Example J Fig.44
special
main
levels
10
Ai
1
0.1
m.a.s.l.
3000
2500
2000
1500
1000
10
11
12
13
14
15
16
17 CET
EPT min
EPT max
G-T max
G-E max


Example J Fig. 45
17 Sept. 1970
① 1030 CET
② 1300
③ 1515
④ 1625
special levels
main levels
Ai
g cm⁻¹ sec⁻¹
100
10
1
0.1
0.01
-10
-1
-0.1
Temperature Gradient G-T °C/100m


17 Sept. 1970 Example J
Fig. 46
100
Ai
g cm⁻¹ sec⁻¹
10
1
0.1
0.01
special
main
-8
-6
-4
-2
0
+2
Gradient of Water Vapor G-E mb/100m

17 Sept. 1970 Example J Fig. 47




Example J
Fig. 48
m.a.s.l.
3000
2500
2000
1500
1000
4 2 3
CET 1625 1300 1515 CET
?
3
4
2
Exchange layer
special
main levels
?
0.1
1
10
100
1000
Ai
g cm⁻¹ sec⁻¹

2. Legends to the Figures 1 - 48

Legends to Figures

Fig. 1:
Chart on the processing of the recordings transmitted from the moving cable car, up to the final results: the completed tables printed out by teletype.

Fig. 2:
Relation between incremental exchange coefficient A_i and temperature gradient G-T. Representation of the relation by the individual pairs of values. The relation applies to real inversions exclusively (stationary equilibrium of the eddy diffusion).

Fig. 3:
Result of statistical analyses of Fig. 2 with indication of scatter (red).

Fig. 4:
Relation between incremental exchange coefficient A_i and gradient of potential temperature G-PT expressed in degrees centigrade per 100 m. Representation of the individual pairs of values. Valid for real inversions (stationary equilibrium of eddy diffusion).

Fig. 5:
Same as Fig. 4, however, result of statistical investigation with indication of scatter (red).

Fig. 6:
Relation between incremental exchange coefficient A_i and gradient of water vapor pressure G-E in mb/100m. Individual pairs of values. Valid for aerological structures having a G-T minimum with stationary equilibrium.

Fig. 7:
Same as Fig. 6, however, result of statistical investigation with indication of scatter (red).

Fig. 8 and 9:
Relation between incremental exchange coefficient A_i and gradient of potential temperature G-PT, divided into two intervals of time. Result of statistical investigation with indication of scatter. Relation of general applicability.

Fig. 10:
Mutual comparison of results from both intervals of time.

Re - Example A

Fig. 11:
Variations in space and time of important structural elements of the inversion newly formed at 1200 CET.

Fig. 12:
Time slope within the range of function $A_i=f$ (G-T).
Numerals 1 through 4 identify the runs.

Fig. 13:
Same as Fig. 12, but relation $A_i=f$ (G-PT).

Fig. 14:
Same as Fig. 12, but function $A_i=f$ (G-E).

The following figures to Examples B trough H basically correspond to the figures of example A; hence separate legends are not needed.

Fig. 19:
Vertical profiles of the incremental exchange coefficients

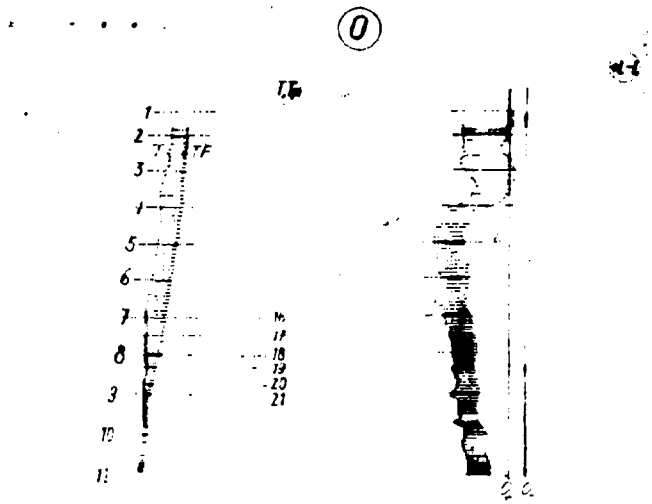
A_i and water vapor pressure E for runs 2 through 7.

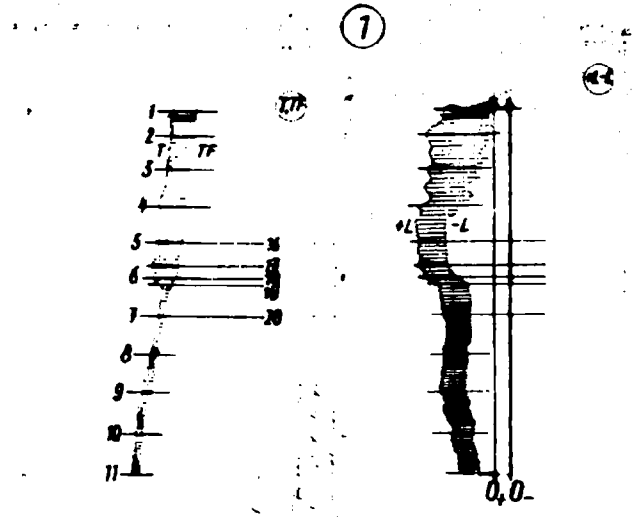
Fig. 43:
Vertical profiles of the incremental exchange coefficients A_i, recorded during runs 3 and 6.
E: upper boundary of the exchange layer
I: level of inversion.

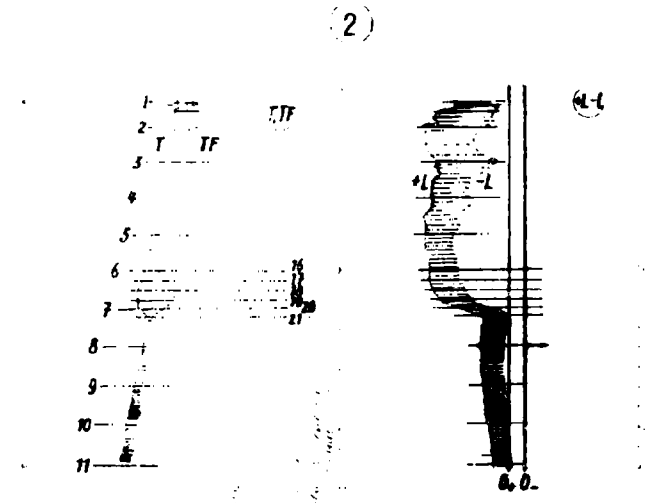
Fig. 48:
Vertical profile of the incremental exchange coefficients A_i for runs 2, 3 and 4.

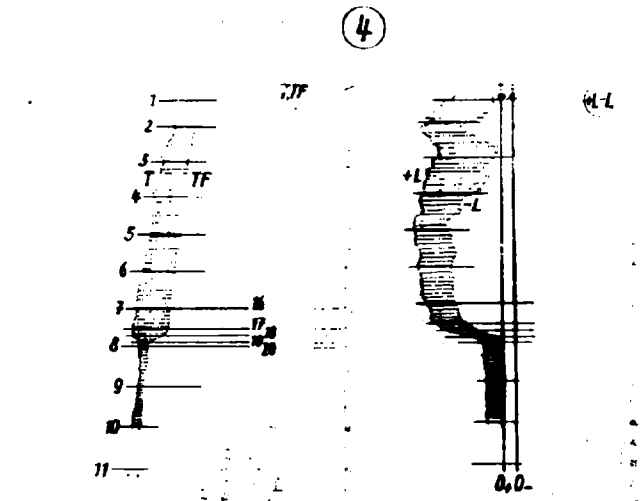
3. Individual Runs and Data Tables

Examples A - J



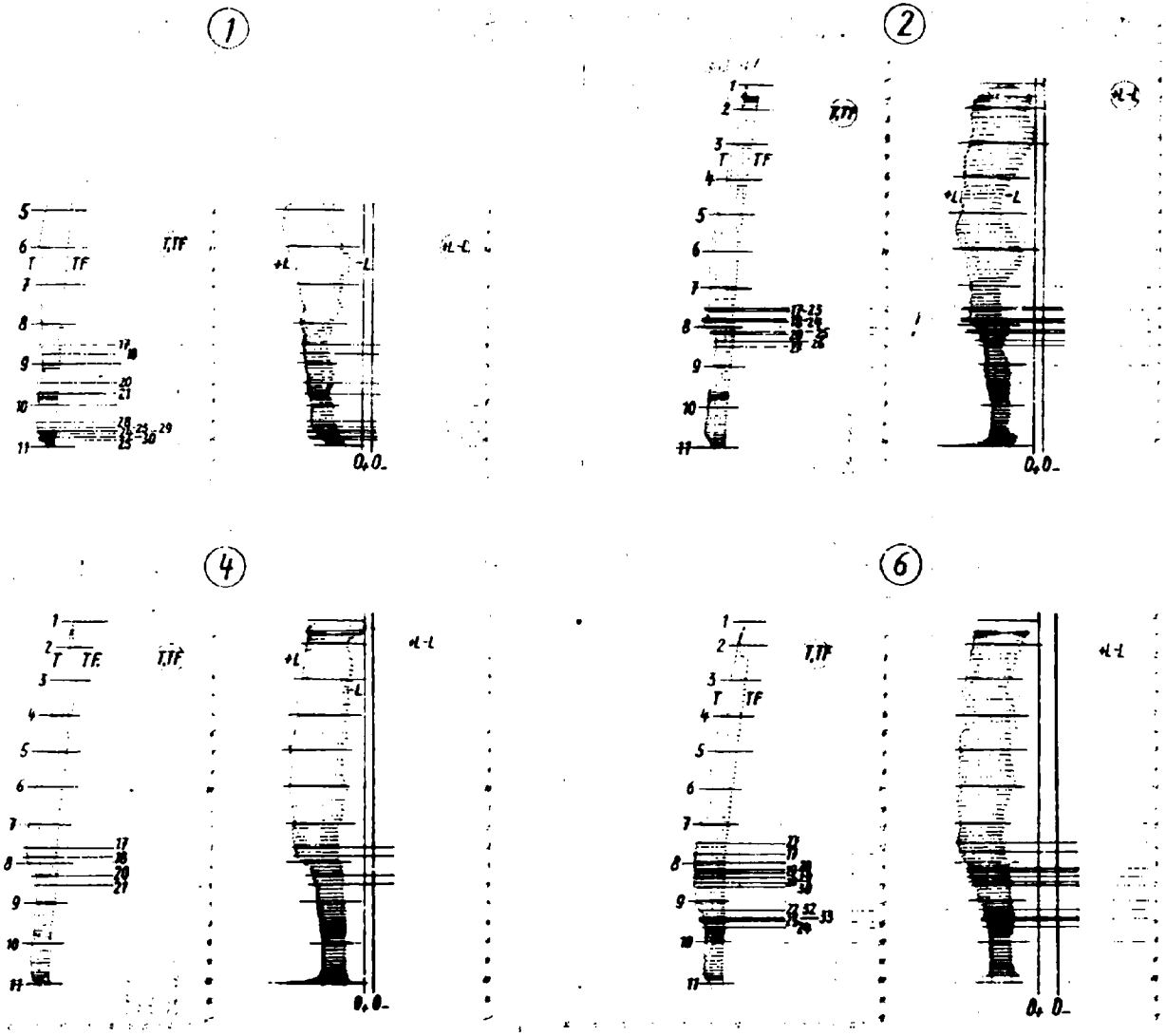




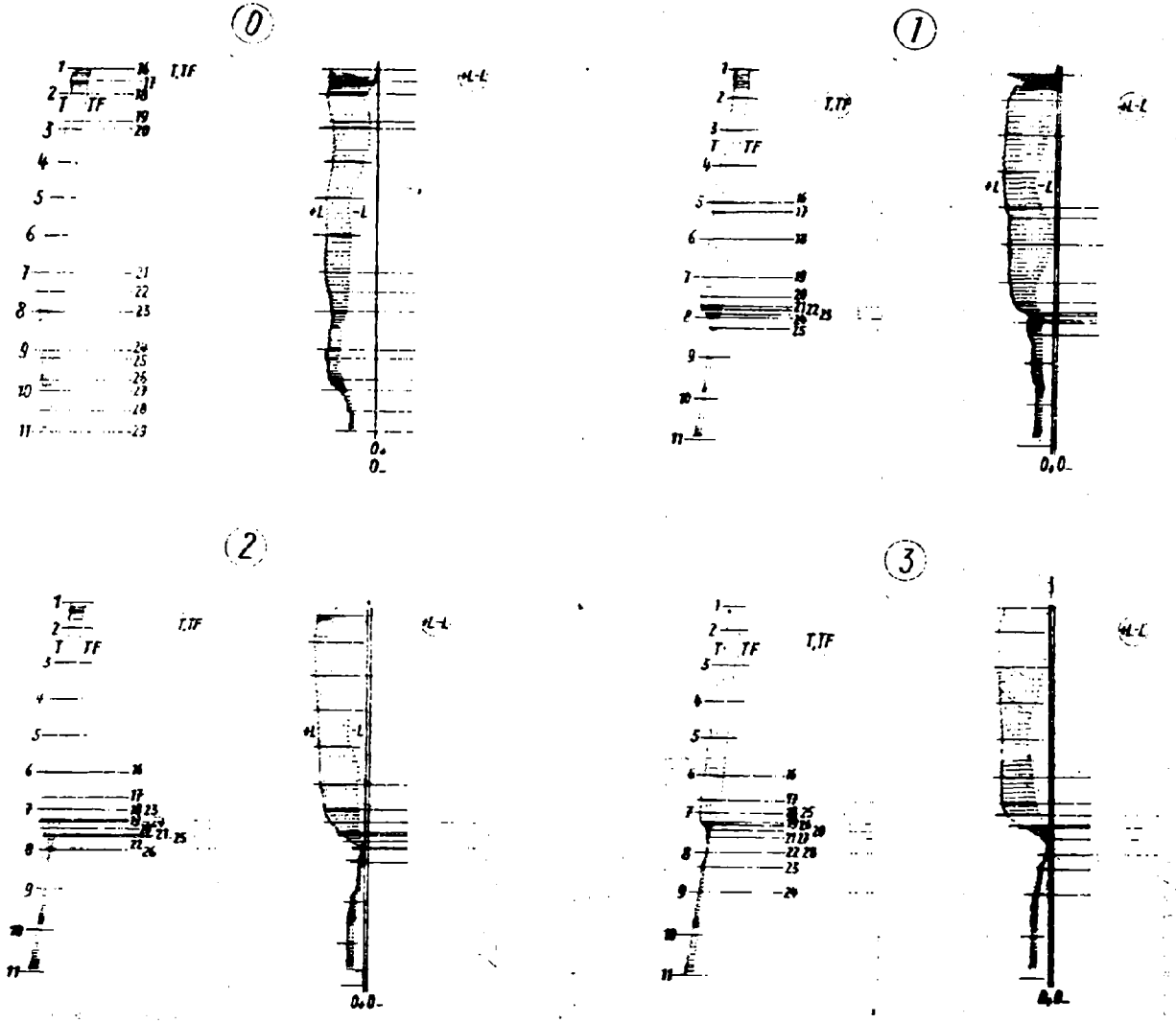


Example
A
5 Oct. 1970

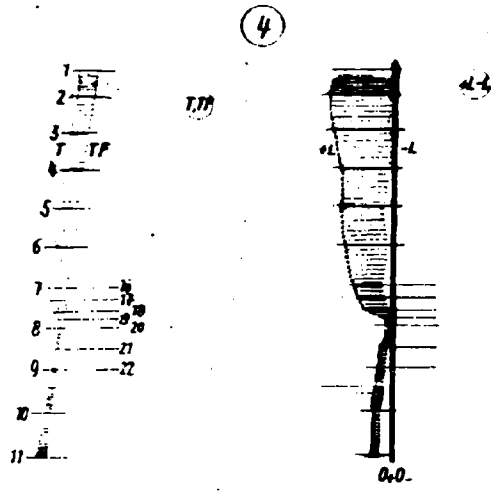
Example
B
13 Nov. 1970

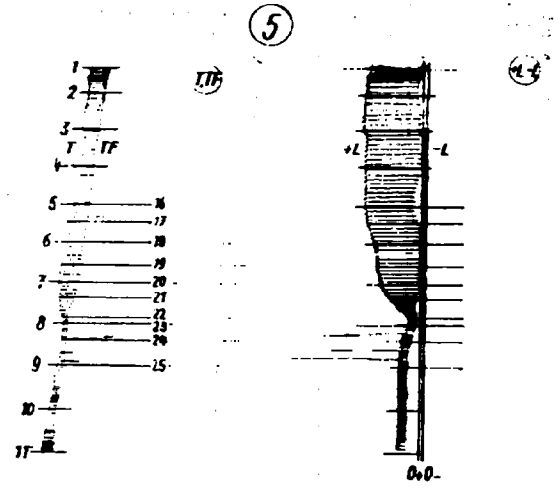


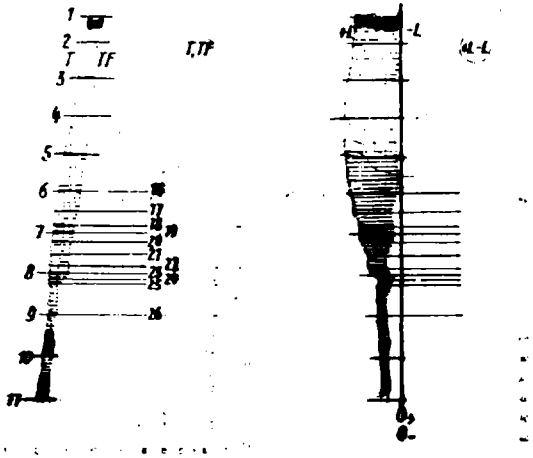
Example
C.1
14 Oct. 1970

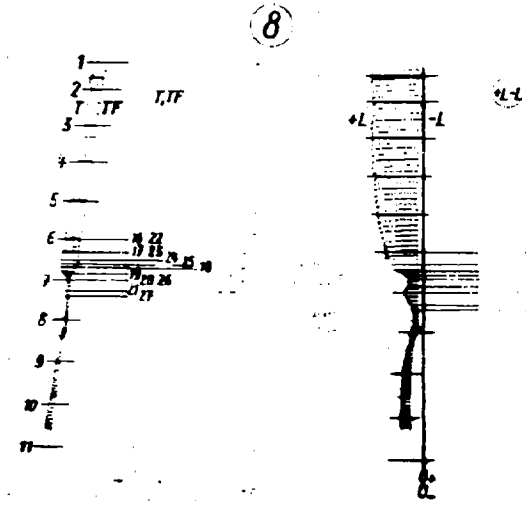


Example
C_2
14 Oct. 1970

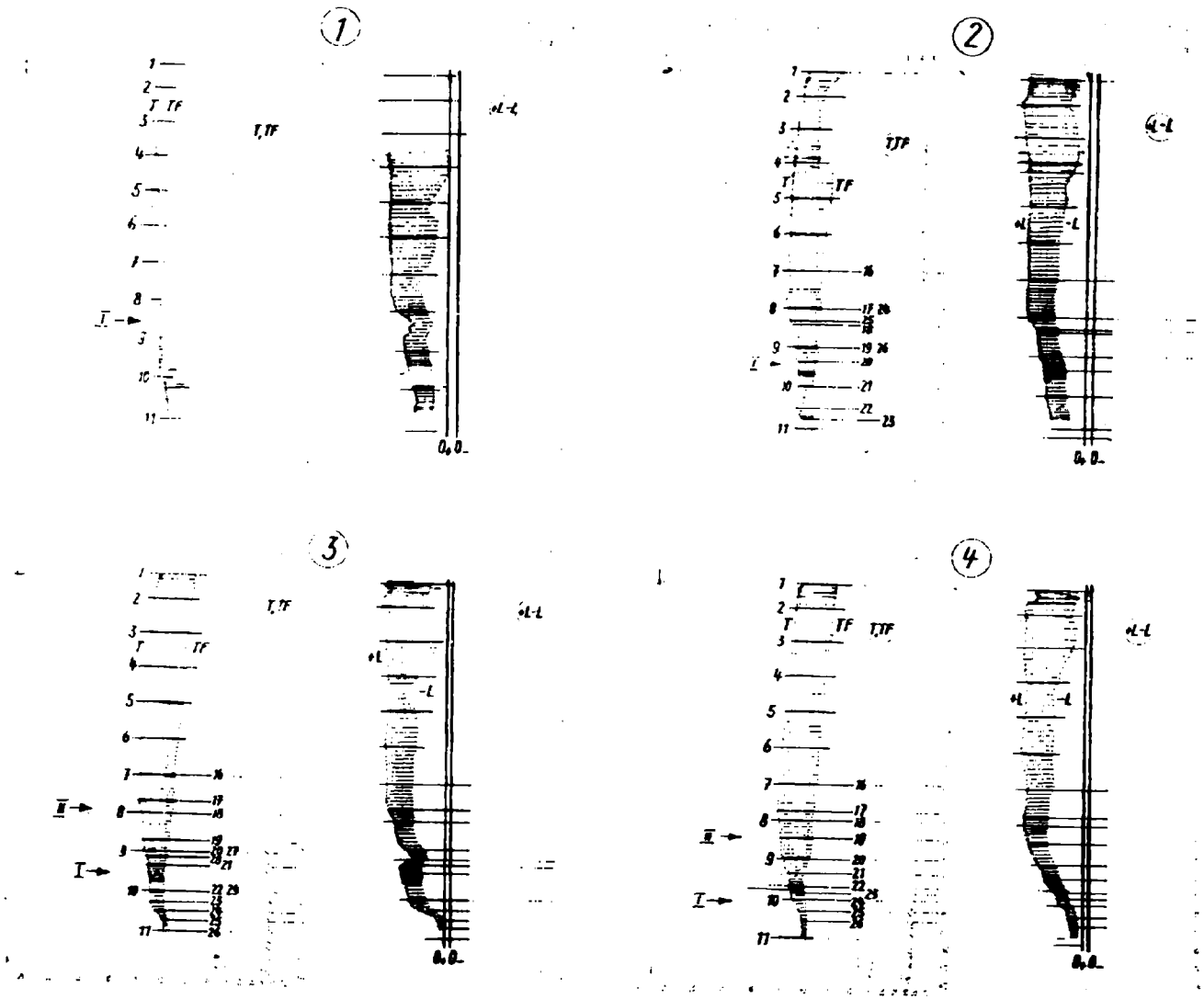




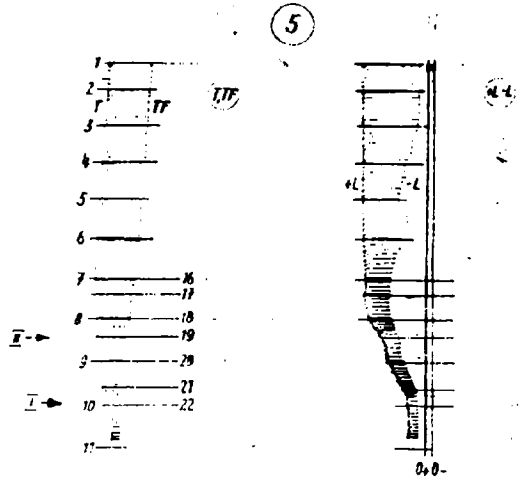


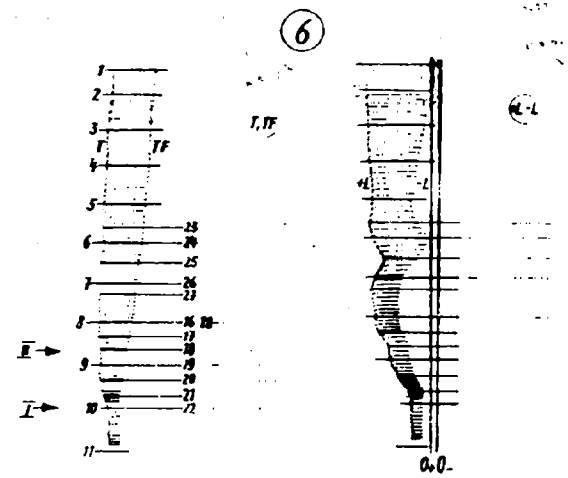


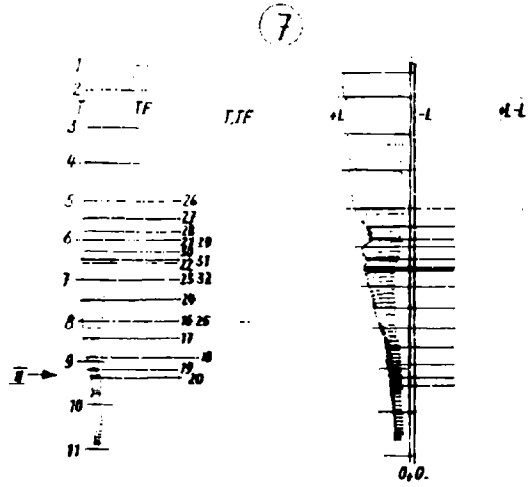
Example
E_1
17 Oct. 1970

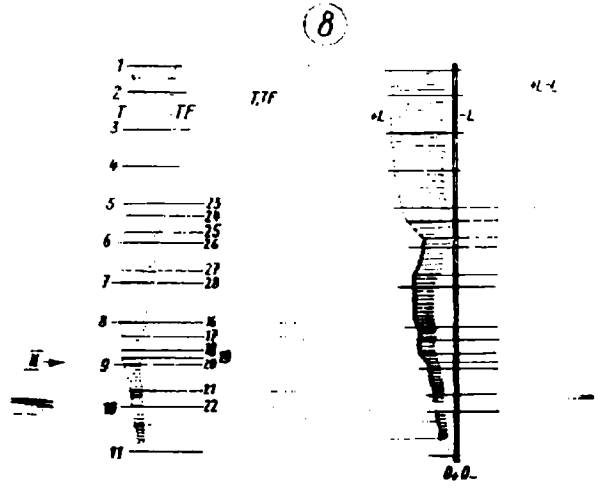


Example
E_2
17 Oct. 1970

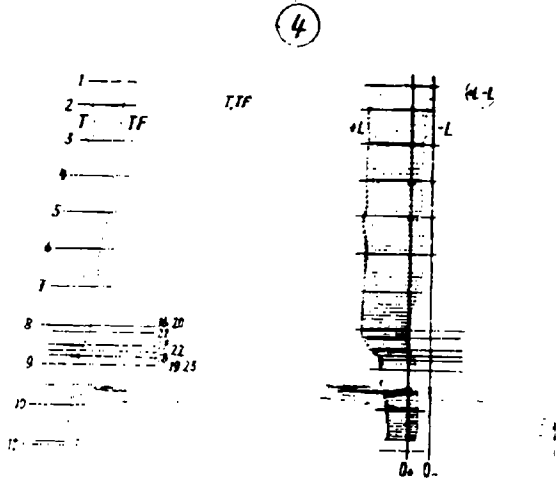


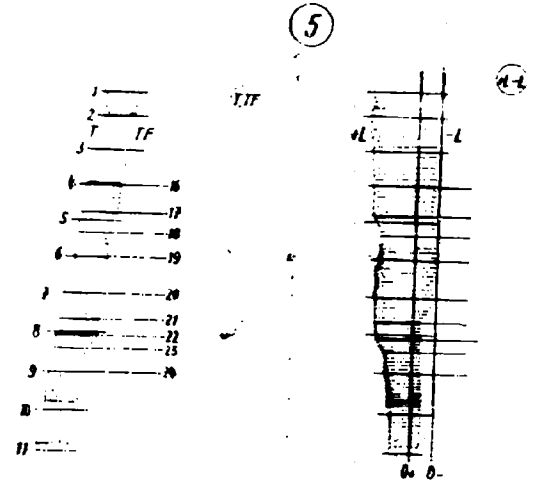


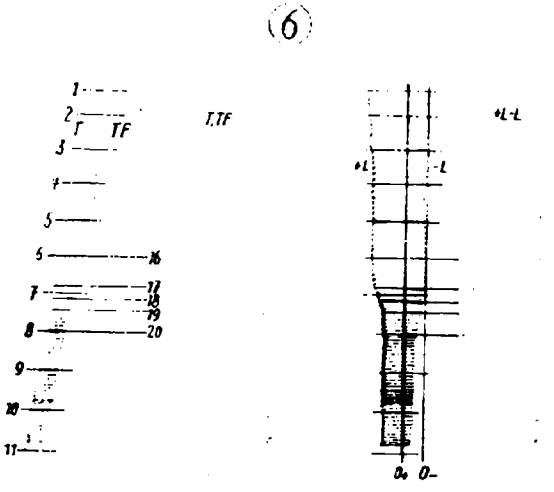


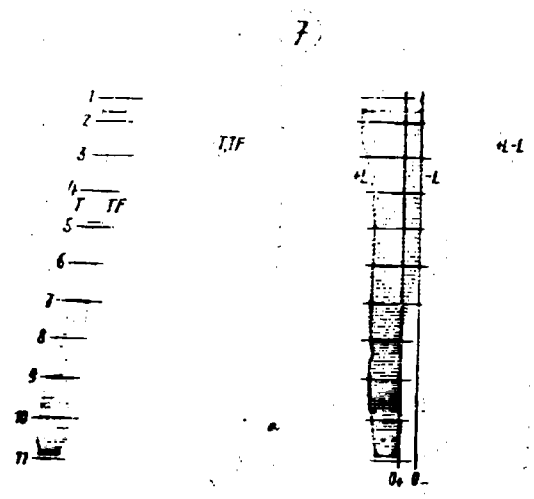


Example
F
30 Sept. 1970

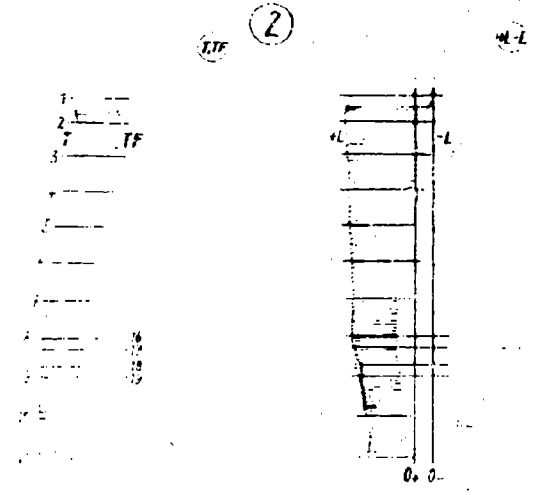


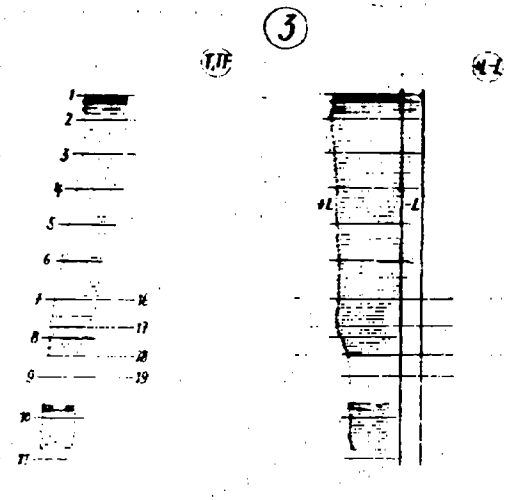


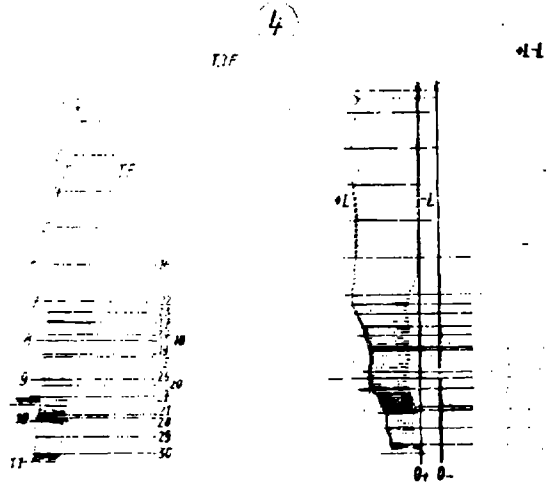


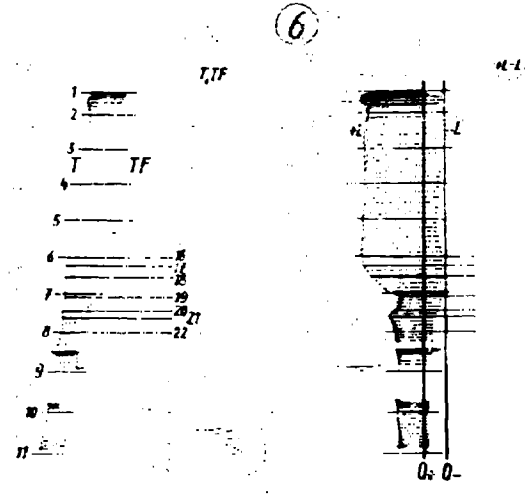


Example
G_1
28 Sept. 1970

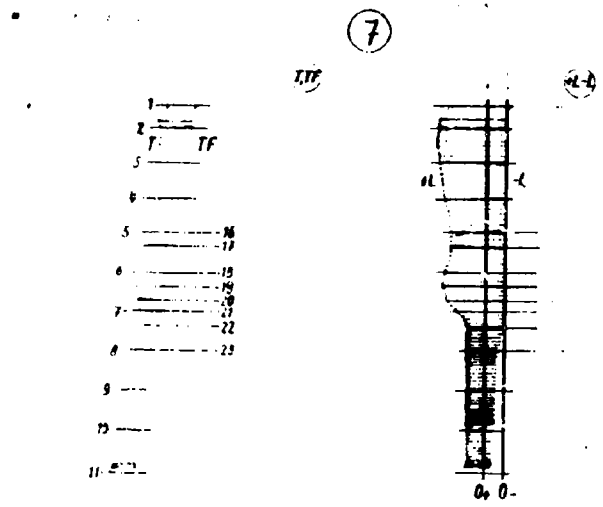


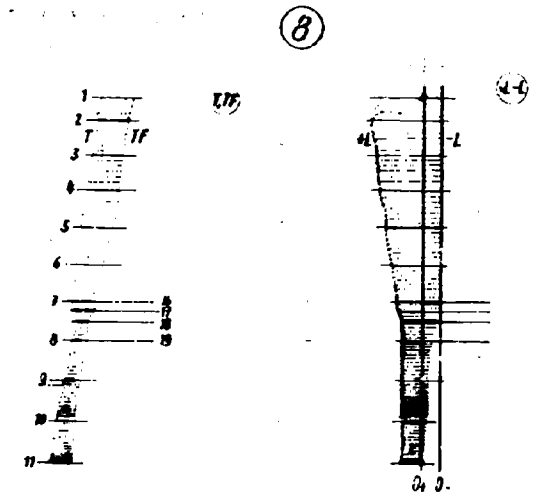


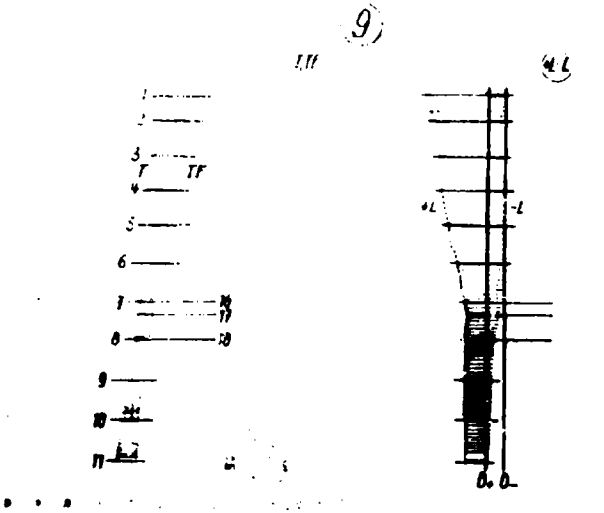


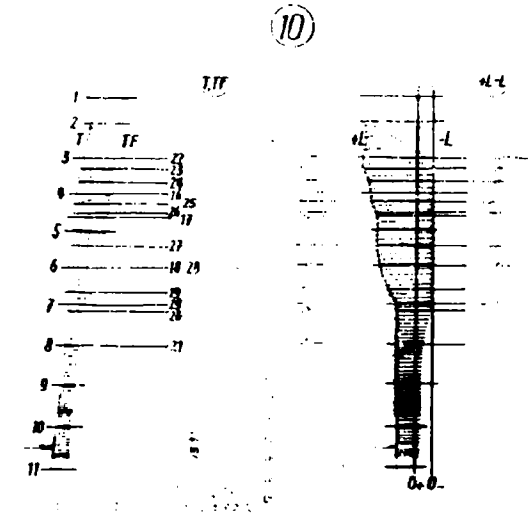


Example
G_2
28 Sept. 1970



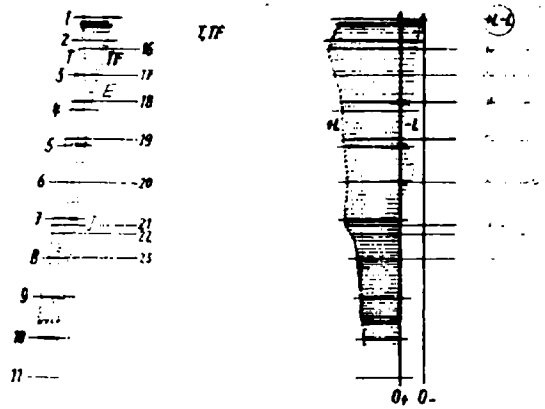




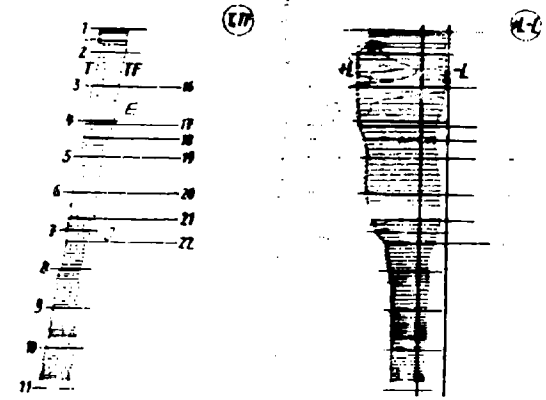


Example
11
26 Sept. 1970

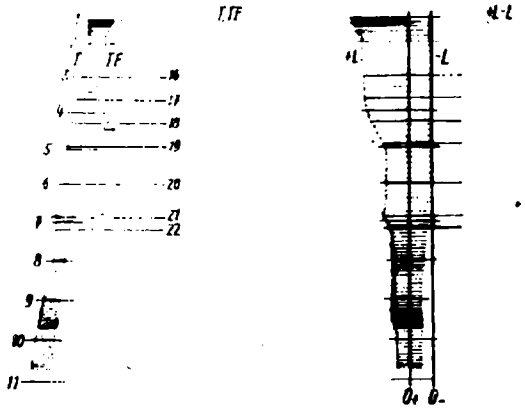
(3)



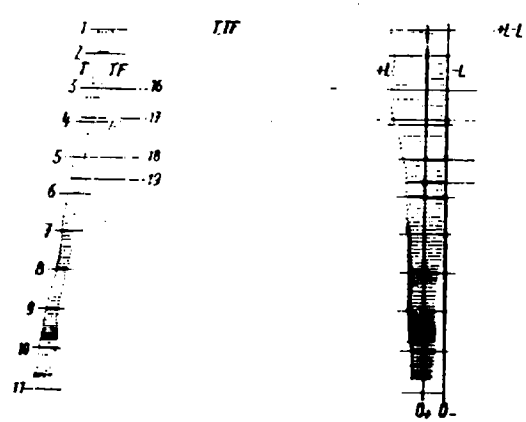
(4)

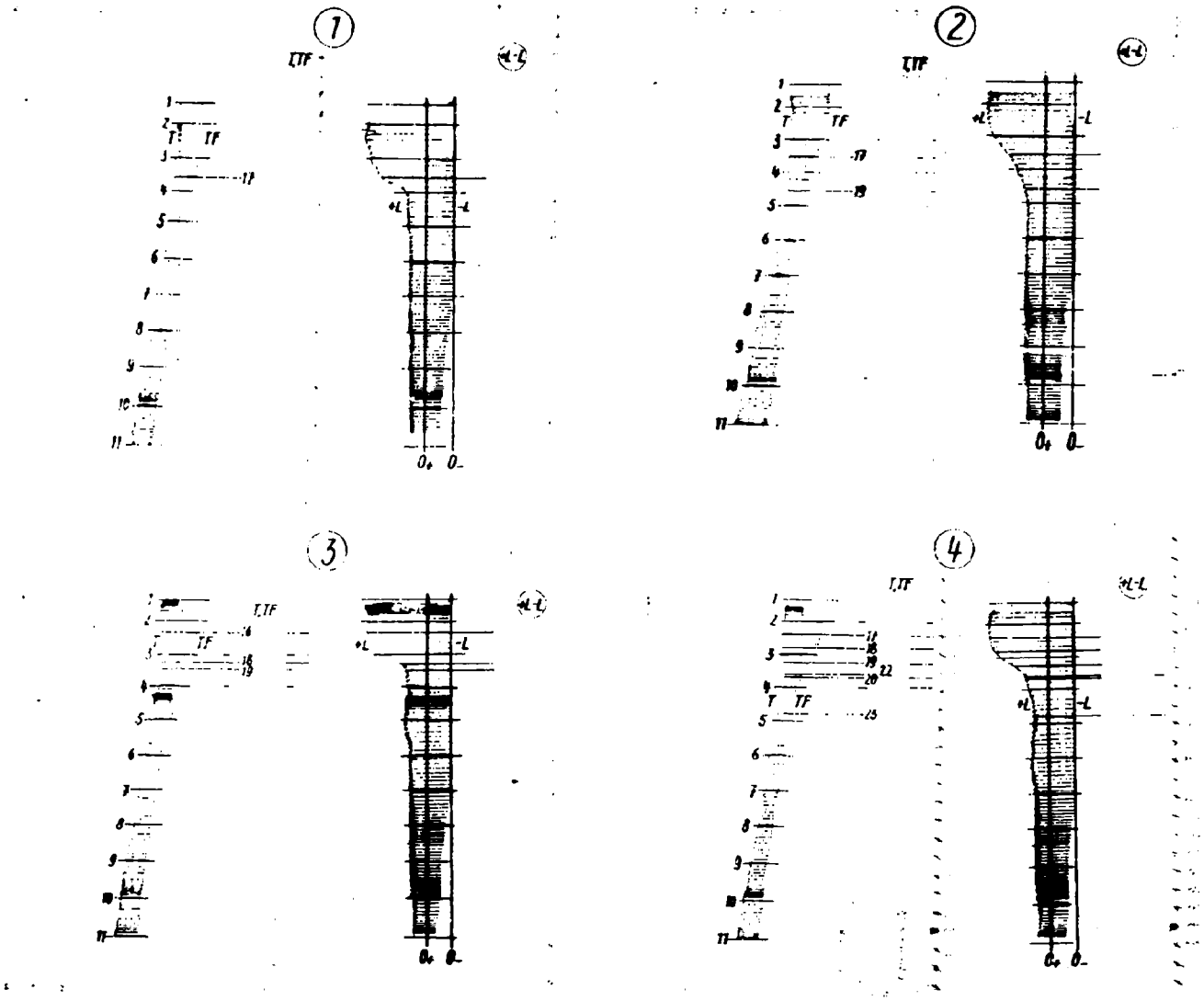


(5)



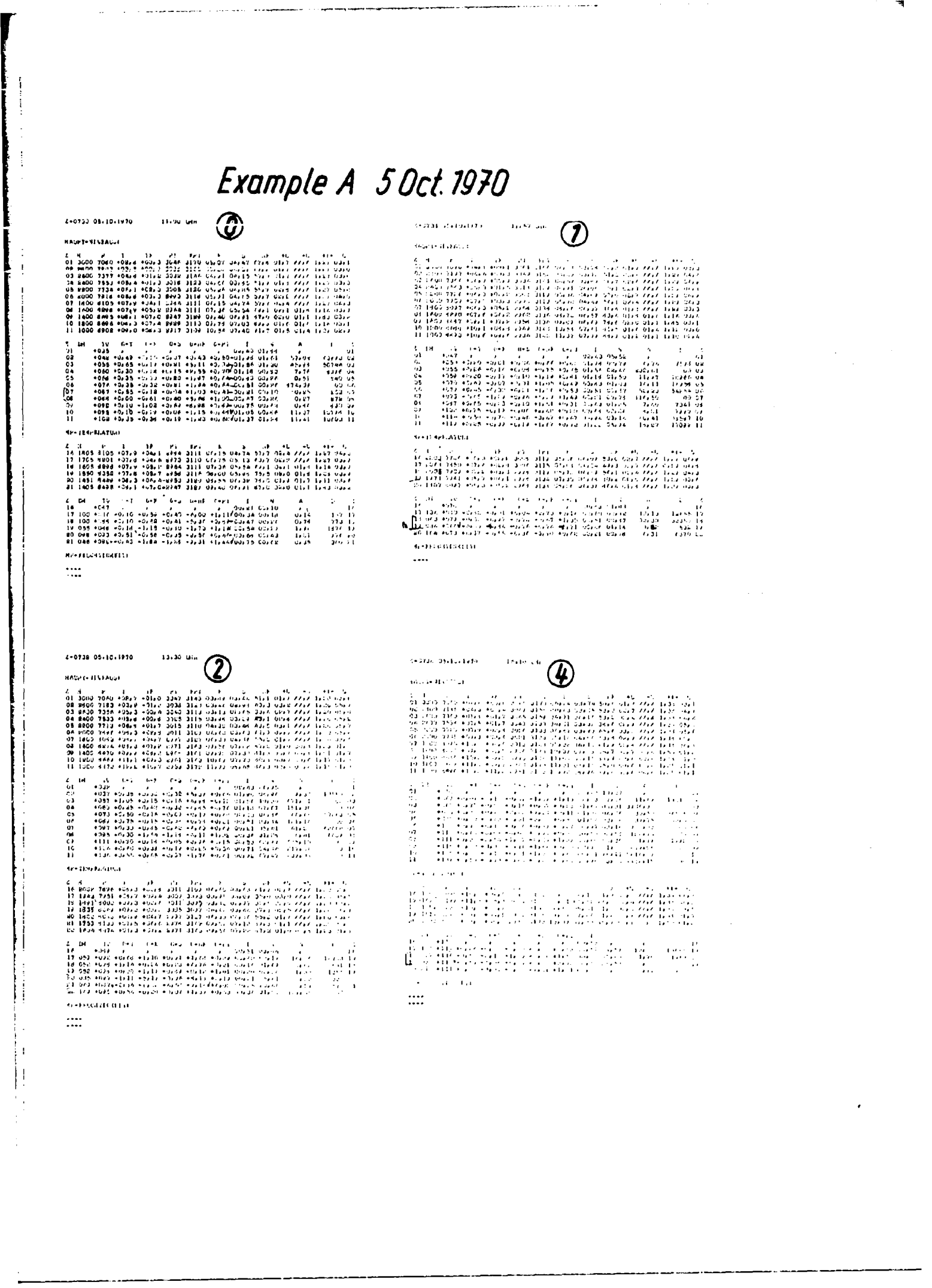
(6)





Example
J
17 Sept. 1970

Example A 5 Oct. 1970



Example B 18 Nov. 1970

Z+0851 18.11.1970 12:33 UHR ①

HAUPT-NIVEAUS:

MITT. WERTE:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
			+03.0	"	1848	1989	02.9	04.1	33.1	"	"	"	03.3

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
		+035	+0.00	+0.15	+0.00	+1.86	+0.00	"	00.5	03487		

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
05	8800	7881	+04.4	+00.6	8988	3084	03.87	03.65	37.4	08.5	////	1.85	04.4
06	8000	7845	+05.5	+00.8	8988	3095	03.43	08.71	37.9	08.5	////	1.85	04.4
07	1600	8084	+05.3	+00.6	8958	3039	03.87	08.96	43.3	08.2	////	1.85	03.5
08	1600	8889	+05.1	+01.9	8936	3084	04.58	03.40	51.4	08.0	01.8	1.81	03.8
09	1400	8498	+04.9	+01.7	8913	3018	05.11	02.75	58.7	01.8	01.8	1.88	03.1
10	1800	8713	+05.7	+00.3	8901	8999	05.45	03.76	57.3	01.8	01.8	1.89	08.9
11	1000	8933	+04.3	+02.7	8868	8983	06.47	04.58	77.9	01.1	00.8	1.33	01.9

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
05		+046	"	"	"	"	"	01.73	00.88	"	"	05
06		+039	+0.55	"	"	+0.03	+0.07	+0.47	+01.55	00.87	48 3.08	00 06
07		+056	+0.10	"	"	+0.13	+0.70	+1.17	01.39	00.35	0.65	67.88 07
08		+056	+0.10	"	"	+0.81	+4.04	+1.18	01.99	00.55	3.81	37.99 06
09		+055	+0.10	"	"	+0.17	+3.75	+1.15	08.87	00.78	11.59	11.04 04
10		+063	+0.40	"	"	+0.00	+0.68	+0.62	+03.04	01.06	15.69	10.13 10
11		+050	+0.70	"	"	+0.38	+0.33	+1.78	+03.62	08.64	3.48	3.65 11

MF-TEMPERATUR:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
06	1999	8869	+08.1	+01.8	8936	3085	04.52	03.40	51.4	08.0	01.8	1.81	03.4
17	1495	8348	+05.3	+01.4	8987	3017	04.59	03.41	51.5	01.9	01.8	1.36	03.4
18	1445	8450	+04.9	+01.6	8918	3018	05.01	03.70	57.8	01.9	01.8	1.34	03.3
08	1400	8498	+04.9	+01.7	8913	3018	05.11	02.75	58.7	01.8	01.8	1.88	03.1
80	1304	8598	+05.3	+01.9	8907	3024	05.07	03.68	54.9	01.8	01.8	1.84	03.0
81	1849	8640	+05.7	+08.1	8906	3021	05.04	03.83	55.0	01.7	01.1	1.80	08.8
10	1200	8713	+05.7	+08.3	8901	2999	05.85	03.76	57.3	01.8	01.8	1.89	08.9
83	1096	8886	+05.9	+08.6	8898	2998	05.98	03.84	58.5	01.8	01.1	1.88	08.7
84	1104	8818	+05.3	+08.1	8886	2995	05.90	04.17	64.1	01.8	01.1	1.33	08.5
88	1099	8900	+05.3	+08.8	8878	2998	06.00	04.80	67.2	01.1	00.9	1.80	08.3
11	1000	8933	+04.3	+08.7	8868	2983	06.47	04.58	77.9	01.1	00.8	1.33	01.9

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
08		+056	"	"	"	"	"	01.93	00.98	"	"	06
17	104	+058	+0.19	+0.07	+0.01	+0.05	+0.04	08.88	00.99	1101.88		00 17
18	049	+055	+0.61	+0.85	+0.59	+0.77	+1.03	08.38	00.65	44.85		4375 16
08	045	+055	+0.00	+0.01	+0.11	+0.43	+1.04	08.47	02.74	8.42		8868 09
80	093	+090	+0.43	+0.04	+0.07	+0.16	+0.99	02.75	00.91	11.72		11365 83
81	057	+063	+0.88	+0.05	+0.08	+2.83	+0.31	+08.98	01.09	4.75		4888 81
10	048	+063	+0.00	+0.88	+0.86	+0.57	+1.03	+03.04	01.08	148.86		00 10
83	103	+065	+0.19	+0.18	+0.06	+1.90	+0.69	+03.38	01.37	9.41		8464 83
84	007	+060	+0.85	+0.37	+0.56	+5.76	+7.58	03.33	01.90	0.45		414 84
85	078	+060	+0.30	+0.13	+0.04	+1.88	+1.33	+03.57	01.95	6.99		6308 85
11	089	+050	+0.38	+1.80	+1.57	+5.77	+8.58	03.63	08.64	0.67		444 11

MF-FEUCHTIGKEIT:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
10	1198	8713	+08.3	+08.3	8901	8999	05.85	03.74	57.3	01.8	01.8	1.89	08.9
88	1188	8793	+05.9	+08.5	8895	8994	05.93	03.76	57.4	01.8	01.8	1.40	08.9
89	1070	8865	+05.3	+08.8	8887	8989	05.95	03.91	60.5	01.5	01.5	1.45	08.6
30	1046	8880	+05.5	+08.8	8883	8930	05.98	04.13	65.1	01.4	00.9	1.53	08.4
11	0998	8933	+04.3	+08.7	8868	8983	06.47	04.58	77.9	01.1	00.8	1.33	01.9

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
10		+043	"	"	"	"	"	03.07	01.01	"	"	10
88	013	+065	+0.87	+0.18	+0.08	+0.18	+0.75	+03.87	01.16	89.66	87404	88
89	056	+063	+0.37	+0.38	+0.83	+0.78	+1.81	+03.44	01.51	3.83	4984	89
30	084	+068	+0.58	+1.37	+0.98	+0.67	+1.86	+03.51	01.74	8.39	8178	30
11	047	+050	+0.58	+1.80	+1.57	+5.77	+8.58	03.63	08.64	1.35	1819	11

Z+0851 18.11.1970 12:33 UHR ②

HAUPT-NIVEAUS:

MITT. WERTE:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
			+04.0	"	1848	1989	02.9	04.1	33.1	"	"	"	03.3

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
		+045	+0.31	+0.14	+0.07	+0.56	+0.55	"	01.9	03487		

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
01	3000	9080	+00.8	+00.9	3018	3061	03.31	03.31	46.6	08.1	////	1.39	03.6
08	8000	7188	+00.5	+08.8	3018	3091	03.88	08.66	51.4	08.0	////	1.39	03.4
03	8400	7321	+01.9	+01.9	3006	3085	03.37	08.67	47.8	08.1	////	1.39	03.1
04	8400	7318	+03.0	+01.1	8998	3077	03.54	08.83	48.3	08.3	////	1.39	04.0
05	8800	7784	+04.4	+00.1	8988	3073	03.46	08.96	41.8	08.4	////	1.38	04.8
06	8000	7858	+05.5	+00.5	8988	3040	03.67	08.88	40.2	02.3	////	1.38	04.1
07	1800	8093	+05.8	+01.3	8963	3084	04.30	03.31	46.6	08.1	////	1.38	03.6
08	1600	8284	+05.3	+01.4	8938	3039	04.58	03.40	51.4	08.0	01.8	1.87	03.8
09	1400	8498	+04.9	+01.7	8913	3018	05.11	02.75	58.7	01.8	01.8	1.88	03.1
10	1800	8714	+04.3	+08.7	8907	3007	05.34	03.82	55.9	01.3	01.1	1.21	08.8
11	1000	8931	+04.4	+03.1	8877	8991	06.27	04.78	77.9	01.3	01.0	1.84	08.4

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
01		+034	"	"	"	"	"	08.81	08.74	"	"	01
08		+006	+0.97	+0.08	-0.08	+3.88	+0.08	08.44	01.64	0.48	1366	08
03		+083	+0.70	+0.05	+0.01	+2.04	+1.34	08.81	01.89	4.88	4838	03
04		+036	+0.55	+0.06	+0.03	+0.97	+0.47	+01.96	00.98	85.68	81983	04
05		+051	+0.80	+0.06	+0.01	+2.03	+0.80	01.74	00.88	41.93	44871	05
06		+060	+0.90	+0.00	+0.03	+0.48	+0.58	+01.55	00.77	406.81		00 06
07		+062	+0.10	+0.38	+0.81	+3.15	+0.94	+01.39	00.90	64.10	66869	07
08		+078	+0.85	+0.18	+0.13	+0.64	+0.56	01.88	01.88	5.43	7848	08
09		+060	+0.65	+0.60	+0.40	+0.58	+1.71	08.39	08.57	18.18	11784	09
10		+069	+0.45	-0.05	+0.01	+1.89	+0.69	-08.88	03.99	83.46	80869	10
11		+061	-0.45	-0.47	-0.88	+3.60	+1.88	03.66	04.80	861.73	00	11

MF-TEMPERATUR:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
07	1801	8093	+08.8	+01.3	8963	3054	04.30	03.31	46.6	08.1	////	1.39	03.6
17	1998	8800	+09.9	+01.4	8983	3041	04.38	03.88	46.4	08.0	////	1.39	03.8
18	1888	8868	+07.8	+01.5	8960	3034	03.89	08.78	38.3	08.1	////	1.36	03.7
08	1801	8893	+08.7	+01.6	8958	3033	04.06	03.05	41.3	08.0	01.8	1.87	03.8
80	1869	8338	+04.6	+01.3	8988	3083	04.78	03.38	85.5	01.7	01.8	1.48	03.0
09	1401	8868	+05.6	+08.1	8918	3019	05.45	03.85	58.8	01.9	01.1	1.35	08.7

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
07		+063	"	"	"	"	"	01.38	00.93	"	"	07
17	106	+064	+0.09	-0.08	+0.03	+0.13	+0.94	01.66	01.07	16.91	16987	17
18	047	+076	+1.93	+0.93	+0.78	+3.18	+1.01	01.83	01.10	184.38	00	18
08	084	+078	-1.66	+1.38	-1.01	-8.69	+2.08	+01.68	01.49	0.68	828	08
80	036	+054	-8.84	-8.00	-1.46	+7.60	+4.98	01.98	01.74	3.16	3079	80
09	163	+060	+0.37	-0.84	-0.17	-1.81	+0.85	+08.39	08.57	19.47	18878	09

MF-FEUCHTIGKEIT:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
07	1801	8093	+08.8	+01.3	8963	3058	04.30	03.31	46.6	08.1	////	1.39	03.6
83	1485	8818	+05.0	+01.4	8943	3040	04.80	03.65	35.0	02.0	////	1.39	03.6
84	1468	8828	+07.8	+01.6	8936	3063	03.81	08.88	37.5	08.1	////	1.38	03.7
85	1577	8585	+04.9	+01.3	8931	3083	04.73	03.54	58.5	01.7	01.1	1.50	08.9
86	1519	8318	+04.9	+01.5	8931	3029	04.94	03.70	58.9	01.6	01.8	1.38	08.9
87	1497	8402	+04.9	+01.7	8928	3023	05.13	03.80	59.1	01.6	01.3	1.17	08.9
09	1408	8508	+05.4	+08.1	8918	3019	05.45	03.85	58.8	01.9	01.1	1.35	08.7

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
07		+063	"	"	"	"	"	01.38	00.93	"	"	07
83	116	+058	-0.88	-0.43	-0.88	-7.86	+1.77	+01.66	01.13	14.78	14998	83
84	000	+077	+1.95	+0.83	+0.90	-0.57	+0.87	+01.88	01.08	0.01	00	84
85	108	+058	-1.66	-1.38	-1.01	-8.69	+2.08	+01.68	01.49	0.38	88.70	85
86	001	+058	+0.00	+0.67	+0.06	+0.13	+1.03	01.93	01.88	0.45	638	86
87	081	+055	+0.00	-0.83	-0.13	-8.31	+1.63	08.16	01.95	116.68	00	87
09	095	+060	+0.38	-0.13	+0.06	+0.68	+0.68	08.39	08.57	18.44	11867	09

Z+0851 18.11.1970 15:44 UHR ④

HAUPT-NIVEAUS:

MITT. WERTE:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
			+04.0	"	1847	1987	02.9	04.1	33.1	"	"	"	03.3

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
		+048	+0.30	+0.17	+0.09	+0.66	+0.54	"	01.8	13106		

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
01	3000	7880	+01.1	+01.2	3011	3102	03.29	03.21	44.6	08.1	////	1.42	03.4
02	8400	7139	+01.8	+01.8	3008	3088	03.37	08.67	47.8	08.1	////	1.39	03.1
03	8400	7318	+03.0	+01.1	8998	3077	03.54	08.83	48.3	08.3	////	1.39	04.0
04	8400	7318	+03.0	+01.1	8998	3077	03.54	08.83	48.3	08.3	////	1.39	04.0
05	8800	7784	+04.4	+00.1	8988	3073	03.46	08.96	41.8	08.4	////	1.38	04.8
06	8000	7858	+05.5	+00.5	8988	3040	03.67	08.88	40.2	02.3	////	1.38	04.1
07	1800	8093	+05.8	+01.3	8963	3084	04.30	03.31	46.6	08.1	////	1.38	03.6
08	1600	8284	+05.3	+01.4	8938	3039	04.58	03.40	51.4	08.0	01.8	1.87	03.8
09	1400	8498	+04.9	+01.7	8913	3018	05.11	02.75	58.7	01.8	01.8	1.88	03.1
10	1800	8714	+04.3	+08.7	8907	3007	05.34	03.82	55.9	01.3	01.1	1.21	08.8
11	1000	8931	+04.4	+03.1	8877	8991	06.27	04.78	77.9	01.3	01.0	1.84	08.4

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
01		+033	"	"	"	"	"	08.81	08.74	"	"	01
02		+028	+0.98	+0.11	-0.06	+0.18	+0.10	08.45	01.62	1.74	1838	02
03		+084	+0.72	+0.05	-0.17	+0.64	+0.31	08.81	01.88	4.38	4853	03
04		+036	+0.73	+0.05	+0.04	+0.96	+0.45	+01.96	00.98	85.68	81983	04
05		+052	+0.80	+0.07	+0.01	+2.04	+0.80	01.74	00.88	41.93	44871	05
06		+063	+0.85	+0.06	+0.02	+0.48	+0.58	+01.55	00.77	406.81		00 06
07		+074	+0.85	+0.06	+0.04	+3.04	+0.94	01.39	00.90	64.10	66869	07
08		+067	+0.55	+0.18	+0.13	+0.64	+0.56	01.88	01.88	5.43	7848	08
09		+060	+0.65	+0.60	+0.40	+0.58	+1.71	08.39	08.57	18.18	11784	09
10		+069	+0.45	-0.05	+0.01	+1.89	+0.69	-08.88	03.99	83.46	80869	10
11		+061	-0.45	-0.47	-0.88	+3.60	+1.88	03.66	04.80	861.73	00	11

Z+0851 18.11.1970 15:44 UHR ⑥

HAUPT-NIVEAUS:

MITT. WERTE:

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
		+04.5	"	1971	1988	02.8	04.1	33.0	"	"	"	03.4	

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
		+051	+0.31	+0.18	+0.08	+0.14	+0.55	"	00.6	03171		

Z	H	P	T	TP	PT	EPT	E	S	MF	WL	WL	WW	L
01	3000	7810	+00.4	+03.2	3011	3103	03.21	03.21	44.6	08.1	////	1.43	08.4
08	8000	7143	+00.4	+08.3	3014	3103	03.27	03.26	39.7	08.1	////	1.43	03.4
03	8400	7322	+01.8	+01.8	3008	3088	03.37	08.67	47.8	08.1	////	1.39	03.1
04	8400	7318	+03.0	+01.1	8998	3077	03.54	08.83	48.3	08.3	////	1.39	04.0
05	8400	7318	+03.0	+01.1	8998	3077	03.54	08.83	48.3	08.3	////	1.39	04.0
06	8000	7784	+04.4	+00.1	8988	3073	03.46	08.96	41.8	08.4	////	1.38	04.8
07	1600	8088	+05.5	+00.5	8988	3040	03.67	08.88	40.2	02.3	////	1.38	04.1
08	1800	8284	+05.8	+01.3	8963	3084	04.30	03.31	46.6	08.1	////	1.38	03.6
09	1400	8498	+05.3	+01.4	8938	3039	04.58	03.40	51.4	08.0	01.8	1.87	03.8
10	1800	8714	+04.3	+08.7	8907	3007	05.34	03.82	55.9	01.3	01.1	1.21	08.8
11	1000	8931	+04.4	+03.1	8877	8991	06.27	04.78	77.9	01.3	01.0	1.84	08.4

Z	DH	TV	G-T	G-E	G-S	G-MF	G-PT	I	M	A	D	Z
01		+034	"	"	"	"	"	08.81	08.74	"	"	01
02		+028	+0.98	+0.11	-0.06	+0.18	+0.10	08.45	01.62	1.74	1838	02
03		+084	+0.72	+0.05	-0.17	+0.64	+0.31	08.81	01.88	4.38	4853	03
04		+036	+0.73	+0.05	+0.04	+0.96	+0.45	+01.96	00.98	85.68	81983	04
05		+052	+0.80	+0.07	+0.01	+2.04	+0.80	01.74	00.88	41.93	44871	05
06		+063	+0.85	+0.06	+0.02	+0.48	+0.58	+01.55	00.77	406.81		00 06
07		+074	+0.85	+0.06	+0.04	+3.04	+0.94	01.39	00.90	64.10	66869	07
08		+067	+0.55	+0.18	+0.13	+0.64	+0.56	01.88	01.88	5.43	7848	08
09		+060	+0.65	+0.60	+0.40	+0.58	+1.71	08.39	08.57	18.18	11784	09
10		+069	+0.45	-0.05	+0.01	+1.89	+0.69	-08.88	03.99	83.46	80869	10
11		+061	-0.45	-0.47	-0.88	+3.60	+1.88	03.66	04.80	861.73	00	11

Example C, 14 Oct. 1970

Z+1779 14.10.1970 09:42 UHR

0

HAUPT-NIVEAUS:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
01	3000	7170	+01.8	+00.1	3085	3195	04:15	03:01	08:21	01:49	/////	1:33	03:4
02	2800	7300	+02.6	+00.8	3014	3127	04:36	03:09	08:23	01:49	/////	1:33	03:4
03	2600	7428	+03.4	+00.9	2994	3109	04:58	03:18	08:24	01:49	/////	1:33	03:4
04	2400	7557	+04.2	+01.0	2974	3091	05:20	03:26	08:25	01:49	/////	1:33	03:4
05	2200	7687	+04.9	+01.1	2954	3074	05:42	03:35	08:26	01:49	/////	1:33	03:4
06	2000	7818	+05.7	+01.2	2934	3056	06:04	03:43	08:27	01:49	/////	1:33	03:4
07	1800	7949	+06.5	+01.3	2914	3038	06:26	03:52	08:28	01:49	/////	1:33	03:4
08	1600	8081	+07.3	+01.4	2894	3020	06:48	04:00	08:29	01:49	/////	1:33	03:4
09	1400	8214	+08.1	+01.5	2874	3002	07:10	04:09	08:30	01:49	/////	1:33	03:4
10	1200	8348	+08.9	+01.6	2854	2984	07:32	04:18	08:31	01:49	/////	1:33	03:4
11	1000	8483	+09.7	+01.7	2834	2966	07:54	04:27	08:32	01:49	/////	1:33	03:4

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
01		+0285	/	/	/	/	/	08:33	01:04	/		01
02		+0334	+0.62	+0.24	+0.18	+0.48	+0.34	08:41	00:18	11:52		02
03		+0343	+0.50	+0.26	+0.17	+0.03	+0.38	08:17	02:47	1134.75		03
04		+0357	+0.60	+0.07	+0.08	+0.71	+0.80	07:57	05:14	5657.46		04
05		+0368	+0.55	+0.11	+0.02	+1.10	+0.45	07:43	00:53	4489		05
06		+0372	+0.55	+0.00	+0.08	+1.04	+0.43	07:47	01:58	5974		06
07		+0390	+0.55	+0.09	+0.05	+1.08	+0.45	07:49	00:40	3035		07
08		+0394	+0.10	+0.19	+0.05	+0.98	+0.38	08:17	01:58	5974		08
09		+0405	+0.05	+0.13	+0.15	+0.94	+0.38	08:13	00:26	1967		09
10		+0407	+0.05	+0.13	+0.11	+0.84	+0.33	08:15	00:13	984		10
11		+0407	+0.05	+0.13	+0.11	+0.84	+0.33	08:15	00:13	984		11

HP-TEMPERATUR:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
16	8845	7170	+02.4	+01.1	2984	3165	04:01	03:41	08:48	01:48	/////	1:33	03:4
17	8630	7437	+03.0	+02.8	3089	3135	04:38	02:46	07:23	01:48	/////	1:33	03:4
18	8744	7300	+08.4	+00.2	3319	3187	04:56	02:49	08:03	01:48	/////	1:33	03:4
19	8430	7448	+03.4	+00.8	3004	3187	05:19	04:35	09:55	01:48	/////	1:33	03:1
20	8400	7469	+03.6	+00.9	3004	3165	05:08	04:28	09:36	01:47	/////	1:33	03:0
21	1900	8249	+06.3	+03.7	3074	3043	05:45	04:14	09:17	04:49	/////	1:33	03:5
22	1750	8350	+06.4	+03.7	8974	3043	05:45	04:17	09:18	01:47	/////	1:33	03:3
23	1600	8481	+06.5	+04.1	2955	3087	05:13	04:53	10:06	01:47	/////	1:33	03:3
24	1500	8659	+07.6	+04.3	3004	3047	06:30	04:58	10:28	01:47	/////	1:33	03:3
25	1350	8730	+07.6	+04.5	3046	3046	06:52	04:46	10:38	01:46	/////	1:33	03:3
26	1200	8819	+07.6	+05.0	2913	3005	07:09	05:08	10:49	01:46	/////	1:33	03:1
27	1050	8871	+07.6	+05.4	2927	3018	07:38	05:38	11:16	01:46	/////	1:33	03:1
28	1100	8946	+07.6	+05.2	2952	3087	06:58	05:27	10:58	01:46	/////	1:33	03:1
29	1050	9089	+07.9	+06.6	8988	3058	09:08	04:36	08:45	00:49	/////	1:33	03:1

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
16		+087	/	/	/	/	/	08:33	03:07	/		16
17	075	+036	+1.06	+0.64	+0.60	+0.35	+0.10	08:51	03:04	6635.09		17
18	070	+034	+1.04	+0.18	+0.05	+0.87	+1.38	08:39	03:17	4.46	00	18
19	163	+041	+0.37	+0.39	+0.04	+0.39	+0.66	08:18	03:03	1999.45	00	19
20	035	+045	+1.11	+0.30	+0.30	+0.49	+0.15	08:18	03:17	1999.47	00	20
21	722	+090	+0.58	+0.05	+1.01	+1.70	+2.44	08:29	03:42	85.83	00	21
22	100	+091	+0.10	+0.14	+0.05	+0.91	+1.24	08:38	03:03	0.47	00	22
23	099	+098	+0.10	+0.14	+0.05	+0.90	+1.24	08:37	03:03	0.47	00	23
24	100	+103	+0.10	+0.14	+0.05	+0.90	+1.24	08:37	03:03	0.47	00	24
25	100	+103	+0.10	+0.14	+0.05	+0.90	+1.24	08:37	03:03	0.47	00	25

HP-FEUCHTIGKEIT:

Z+0781 14.10.1970 11:30 UHR

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HAUPT-NIVEAUS:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
01	3000	7130	+02.4	+00.3	3033	3187	04:46	04:38	09:38	01:49	/////	1:33	03:4
02	2800	7301	+02.6	+00.3	3021	3142	05:04	04:32	09:36	01:49	/////	1:33	03:4
03	2600	7468	+03.7	+00.7	2910	3103	04:24	04:13	08:37	01:49	/////	1:33	03:4
04	2400	7634	+04.7	+01.3	2894	3115	04:44	04:05	08:49	01:49	/////	1:33	03:4
05	2200	7847	+05.7	+02.0	2879	3127	05:04	03:57	09:01	01:48	/////	1:33	03:4
06	2000	8014	+06.7	+02.6	2863	3139	05:24	03:49	09:13	01:48	/////	1:33	03:4
07	1800	8246	+07.6	+03.4	2849	3154	05:42	03:42	09:24	01:48	/////	1:33	03:4
08	1600	8452	+08.6	+09.4	8947	3197	04:15	07:46	04:46	01:16	00:4		
09	1400	8665	+08.7	+04.1	2918	3067	04:07	07:54	08:46	01:47	00:4		
10	1200	8881	+07.7	+04.7	2907	3074	04:37	06:59	07:56	01:16	01:1		
11	1000	9103	+07.3	+07.6	2931	3073	04:11	07:54	08:46	00:6	01:3		

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
01		+030	/	/	/	/	/	08:33	01:04	/		01
02		+035	+0.45	+0.16	+0.07	+0.74	+0.69	08:44	00:18	44.55		02
03		+046	+0.75	+0.59	+0.09	+0.47	+0.43	08:34	01:04	1564.26		03
04		+053	+0.90	+0.08	+0.03	+1.65	+0.53	08:34	01:04	4.47		04
05		+063	+0.45	+0.20	+0.11	+0.68	+0.58	08:46	01:39	1414.31		05
06		+073	+0.50	+0.00	+0.07	+0.84	+0.36	08:31	01:37	1334.77		06
07		+074	+0.30	+0.19	+0.09	+0.78	+0.34	08:37	01:37	1334.70		07
08		+079	+0.70	+1.58	+0.07	+0.38	+0.16	08:37	01:37	1334.64		08
09		+078	+0.45	+0.16	+0.04	+1.19	+0.53	08:34	01:04	44.47		09
10		+090	+0.60	+0.15	+0.04	+0.49	+0.42	08:46	01:39	1414.31		10
11		+104	+0.70	+0.16	+0.03	+0.61	+0.30	08:46	01:39	1414.31		11

HP-TEMPERATUR:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
16	1990	8084	+06.6	+04.7	2977	3118	05:34	04:14	09:47	01:48	/////	1:33	03:4
17	1850	8175	+07.0	+03.4	2968	3068	05:43	04:20	09:41	01:48	/////	1:33	03:4
18	1700	8345	+07.6	+03.4	2952	3078	05:38	04:33	09:41	01:48	/////	1:33	03:4
19	1750	8299	+07.1	+03.6	2958	3073	05:50	04:56	09:43	01:48	/////	1:33	03:4
20	1705	8348	+06.8	+04.2	2948	3083	06:01	05:13	09:49	00:46	/////	1:33	03:4
21	1678	8378	+06.4	+04.2	2961	3095	07:03	05:24	09:51	00:41	/////	1:33	03:2
22	1603	8448	+05.6	+05.3	2987	3096	09:03	06:38	09:35	00:24	/////	1:33	03:4

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
16		+073	/	/	/	/	/	08:33	01:04	/		16
17	133	+077	+1.21	+0.44	+0.14	+0.97	+0.73	08:41	03:22	3.41	00	17
18	067	+079	+0.64	+0.13	+0.05	+0.50	+0.37	08:38	03:04	0.46	00	18
19	051	+079	+0.13	+0.51	+0.03	+0.76	+1.85	08:18	03:03	0.46	00	19
20	041	+076	+0.74	+1.98	+1.42	+3.01	+1.80	08:31	19:53	0.45	00	20
21	038	+078	+1.85	+2.93	+2.13	+3.99	+2.89	08:43	05:14	0.45	00	21
22	047	+080	+0.89	+1.19	+0.61	+1.33	+1.04	08:43	03:03	0.47	00	22

HP-FEUCHTIGKEIT:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
23	1799	8044	+07.8	+03.4	2982	3078	05:32	04:33	09:33	01:48	/////	1:33	03:4
24	1738	8104	+07.4	+03.7	2958	3076	04:26	04:33	09:44	03:45	/////	1:33	03:5
25	1673	8375	+06.5	+04.8	2982	3083	07:24	05:11	12:11	03:44	/////	1:33	03:3
26	1597	8456	+05.8	+05.4	2987	3097	08:15	06:46	14:04	00:18	00:4		

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
23		+174	/	/	/	/	/	08:33	01:04	/		23
24	060	+123	+3.00	+2.58	+1.36	+5.14	+4.06	08:41	03:22	3.41	00	24
25	044	+126	+1.04	+2.82	+1.41	+5.31	+4.19	08:43	03:03	0.46	00	25
26	073	+069	+0.99	+1.47	+1.02	+1.27	+2.04	08:46	03:03	0.47	00	26

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HAUPT-NIVEAUS:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
01	3000	7180	+08.5	-00.3	3036	3144	04:43	04:04	08:48	01:48	/////	1:33	03:5
02	2800	7801	+08.8	+00.8	3081	3136	04:59	04:04	08:41	01:48	/////	1:33	03:1
03	2600	7466	+03.8	+00.8	3011	3181	04:39	04:17	08:56	01:48	/////	1:33	03:3
04	2400	7635	+04.9	+01.5	3001	3114	05:09	04:14	08:24	01:48	/////	1:33	03:4
05	2200	7848	+05.1	+08.1	2993	3101	04:03	04:00	08:04	01:48	/////	1:33	03:4
06	2000	8048	+06.7	+02.7	2970	3090	08:31	04:18	08:49	01:48	/////	1:33	03:0
07	1800	8247	+07.6	+03.3	2967	3073	08:39	04:08	51:6	01:47	/////	1:33	03:0
08	1600	8432	+08.9	+03.9	2938	3106	08:73	02:45	07:7	01:0	00:5	1:80	01:5
09	1400	8644	+08.7	+03.7	2916	3078	08:59	04:19	07:4	00:8	00:5	1:47	01:3
10	1200	8881	+07.8	+04.6	2907	3076	08:54	05:16	07:6	00:5	00:5	1:84	01:8
11	1000	9108	+09.8	+07.9	2900	3073	09:87	06:78	04:8	00:6	00:6	1:80	01:8

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
01		+031	/	/	/	/	/	08:33	01:04	/		01
02		+036	+0.81	-0.08	-0.13	-0.00	+0.86	08:38	01:10	8.98	6194	02
03		+045	+0.50	-0.08	+0.03	+1.98	+0.54	08:48	00:93	60.41	68706	03
04		+036	+0.55	-0.05	+0.01	+1.77	+0.48	08:48	00:86	8108.38	00	04
05		+047	+0.60	+0.03	+0.07	+1.85	+0.48	08:38	00:86	1886.30	00	05
06		+078	+0.50	+0.18	+0.09	+2.76	+0.71	08:31	01:06	289.90	4031	06
07		+083	+0.48	+0.00	+0.08	+1.68	+0.47	08:39	01:10	4483.03	00	07
08		+080	+0.38	+1.67	+1.19	-0.08	+1.41	04:08	06:08	1.83	1494	08
09		+077	+0.10	+0.07	+0.13	+0.18	+1.14	04:78	10:10	84.15	51380	09
10		+090	+0.60	+0.33	+0.15	+0.40	+0.41	07:50	16:81	1184.85	00	10
11		+103	+0.65	-0.38	-0.14	+0.98	+0.35	09:88	13:87	7884.78	00	11

HP-TEMPERATUR:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
16	8199	7848	+06.1	+08.1	2993	3101	08:03	04:00	83:8	08:0	/////	1:33	03:4
17	8146	7900	+06.0	+08.4	8986	3100	08:38	04:85	85:8	01:8	/////	1:33	03:1
18	1998	8048	+06.7	+08.6	8978	3090	08:39	04:18	84:9	01:8	/////	1:33	03:0
19	1798	8247	+07.6	+03.3	8981	3078	08:39	04:08	51:6	01:7	/////	1:33	03:0
20	1897	8230	+07.9	+03.7	8990	3071	08:84	04:81	84:9	01:6	/////	1:33	08:7
21	1681	8399	+07.9	+03.9	8984	3068	08:85	04:35	84:9	01:8	/////	1:33	08:8
22	1686	8415	+07.8	+04.8	8988	3074	08:84	04:43	88:9	00:9	/////	1:33	01:6
23	1611	8441	+07.1	+04.7	8948	3068	07:80	05:38	71:3	00:9	/////	1:33	01:6
24	1595	8453	+06.9	+04.9	8938	3108	08:73	04:48	87:7	01:0	00:5	1:80	01:8
25	1552	8516	+06.6	+05.0	8987	3084	08:17	05:99	84:9	00:9	00:5	1:90	01:5

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
16		+087	/	/	/	/	/	08:38	00:86	/		16
17	063	+081	-0.18	-0.66	+0.67	-1.73	+1.86	08:38	01:04	3.16	3831	17
18	146	+074	+0.68	-0.81	+0.04	+1.78	+0.89	08:31	01:06	5361.88	00	18
19	800	+083	+0.48	+0.00	+0.08	+1.65	+0.87	08:48	01:13	409.85	00	19
20	100	+086	+0.30	+0.88	-0.13	+1.87	+0.73	03:38	01:88	8.61	8788	80
21	047	+086	+0.00	-0.64	+0.88	-4.17	+1.06	02:65	08:99	1.05	1080	81
22	1423	+848	+0.00	+0.08	+1.65	+0.87	08:48	01:13	409.85	0.18	118	82
23	084	+080	+0.38	+0.88	-0.13	+1.87	+0.73	03:38	01:88	8.61	8788	80
24	011	+080	+1.74	-3.31	+0.80	-8.33	+8.87	04:18	06:18	0.46	1578	84
25	041	+074	+0.81	+0.90	+0.74	+4.48	+1.89	04:67	07:86	41.36	39580	85

HP-FEUCHTIGKEIT:

Z+0784 14.10.1970 12:10 UHR

3

HAUPT-NIVEAUS:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
01	3000	7160	+08.5	+00.3	3036	3144	04:43	04:04	08:48	01:48	/////	1:33	03:5
02	2800	7801	+08.8	+00.8	3081	3136	04:59	04:04	08:41	01:48	/////	1:33	03:1
03	2600	7466	+03.8	+00.8	3011	3181	04:39	04:17	08:56	01:48	/////	1:33	03:3
04	2400	7635	+04.9	+01.5	3001	3114	05:09	04:14	08:24	01:48	/////	1:33	03:4
05	2200	7848	+05.1	+08.1	2993	3101	04:03	04:00	08:04	01:48	/////	1:33	03:4
06	2000	8048	+06.7	+02.7	2970	3090	08:31	04:18	08:49	01:48	/////	1:33	03:0
07	1800	8247	+07.6	+03.3	2967	3073	08:39	04:08	51:6	01:7	/////	1:33	03:0
08	1600	8432	+08.9	+03.9	2938	3106	08:73	02:45	07:7	01:0	00:5	1:80	01:5
09	1400	8644	+08.7	+03.7	2916	3078	08:59	04:19	07:4	00:8	00:5	1:47	01:3
10	1200	8881	+07.8	+04.6	2907	3076	08:54	05:16	07:6	00:5	00:5	1:84	01:8
11	1000	9108	+09.8	+07.9	2900	3073	09:87	06:78	04:8	00:6	00:6	1:80	01:8

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
01		+031	/	/	/	/	/	08:33	01:04	/		01
02		+036	+0.81	-0.08	-0.13	-0.00	+0.86	08:38	01:10	8.98	6194	02
03		+045	+0.50	-0.08	+0.03	+1.98	+0.54	08:48	00:93	60.41	68706	03
04		+036	+0.55	-0.05	+0.01	+1.77	+0.48	08:48	00:86	8108.38	00	04
05		+047	+0.60	+0.03	+0.07	+1.85	+0.48	08:38	00:86	1886.30	00	05
06		+078	+0.50	+0.18	+0.09	+2.76	+0.71	08:31	01:06	289.90	4031	06
07		+083	+0.48	+0.00	+0.08	+1.68	+0.47	08:39	01:10	4483.03	00	07
08		+080	+0.38	+1.67	+1.19	-0.08	+1.41	04:08	06:08	1.83	1494	08
09		+077	+0.10	+0.07	+0.13	+0.18	+1.14	04:78	10:10	84.15	51380	09
10		+090	+0.60	+0.33	+0.15	+0.40	+0.41	07:50	16:81	1184.85	00	10
11		+103	+0.65	-0.38	-0.14	+0.98	+0.35	09:88	13:87	7884.78	00	11

HP-TEMPERATUR:

Z	H	P	T	TP	PT	SPT	E	S	HP	HL	HL	H1+	L
16	8199	7848	+06.1	+08.1	2993	3101	08:03	04:00	83:8	08:0	/////	1:33	03:4
17	8146	7900	+06.0	+08.4	8986	3100	08:38	04:85	85:8	01:8	/////	1:33	03:1
18	1998	8048	+06.7	+08.6	8978	3090	08:39	04:18	84:9	01:8	/////	1:33	03:0
19	1798	8247	+07.6	+03.3	8981	3078	08:39	04:08	51:6	01:7	/////	1:33	03:0
20	1897	8230	+07.9	+03.7	8990	3071	08:84	04:81	84:9	01:6	/////	1:33	08:7
21	1681	8399	+07.9	+03.9	8984	3068	08:85	04:35	84:9	01:8	/////	1:33	08:8
22	1686	8415	+07.8	+04.8	8988	3074	08:84	04:43	88:9	00:9	/////	1:33	01:6
23	1611	8441	+07.1	+04.7	8948	3068	07:80	05:38	71:3	00:9	/////	1:33	01:6
24	1595	8453	+06.9	+04.9	8938	3108	08:73	04:48	87:7	01:0	00:5	1:80	01:8
25	1552	8516	+06.6	+05.0	8987	3084	08:17	05:99	84:9	00:9	00:5	1:90	01:5

Z	DH	TV	G+T	G+E	G+S	G+HP	G+PT	I	N	A	D	Z
16		+087	/	/	/	/	/	08:38	00:86	/		16
17	063	+081	-0.18	-0.66	+0.67	-1.73	+1.86	08:38	01:04	3.16	3831	17
18	146	+074	+0.68	-0.81	+0.04	+1.78	+0.89	08:31	01:06	5361.88	00	18
19	800	+083	+0.48	+0.00	+0.08	+1.65	+0.87	08:48	01:13	409.85	00	19
20	100	+086	+0.30	+0.88	-0.13	+1.87	+0.73	03:38	01:88	8.61	8788	80
21	047	+086	+0.00	-0.64	+0.88	-4.17	+1.06	02:65	08:99	1.05	1080	81
22	1423	+848	+0.00	+0.08	+1.65	+0.87	08:48	01:13	409.85	0.18	118	82
23	084	+080	+0.38	+0.88	-0.13	+1.87	+0.73	03:38	01:88	8.61	8788	80
24	011	+080	+1.74	-3.31	+0.80	-8.33	+8.87	04:18	06:18	0.46	1578	84
25	041	+074	+0.81	+0.90	+0.74	+4.48	+1.89	04:67	07:86	41.36	39580	85

HP-FEUCHTIGKEIT:

Example C_2 14 Oct. 1970

Example E, 17 Oct. 1970

E-0804 17.10.1970 08.30 UHR ①

HAUPT-NIVEAUS!

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
01	3000	7180	+08.9	+0[illegible]	J034	3199	04.77	05.94	94.5	08.4	/////	8.00	03.6
02	8600	7890	+03.4	+01.6	3038	3808	07.19	04.19	98.1	08.6	/////	8.00	04.0
03	8600	7434	+03.9	+04.3	3016	3184	07.34	04.17	90.9	08.5	/////	8.00	03.8
04	8400	7681	+04.8	+03.[illegible]	3004	3168	07.09	05.81	88.4	08.4	/////	8.00	03.6
05	8800	7813	+05.8	+[illegible]	3987	3144	07.30	05.83	89.4	08.4	/////	8.00	03.6
06	8000	8009	+05.3	+03.6	3967	3116	07.83	05.63	81.0	08.3	/////	8.00	03.5
07	1600	8810	+08.4	+03.8	3947	3098	07.15	05.44	79.7	08.3	/////	8.00	03.5
08	1600	8417	+04.9	+03.1	3931	3081	06.63	04.81	76.8	08.0	00.6	8.46	06.8
09	1600	8689	+03.2	+08.7	3884	3018	07.08	05.18	91.4	01.7	01.8	1.63	08.9
10	1800	8847	+08.6	+09.0	3858	3979	04.58	04.65	88.1	01.4	00.6	8.37	08.0
11	1000	9018	+01.8	+01.8	3881	3940	04.86	04.58	10.0	01.8	00.6	8.07	01.9

E	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
01		+328	,	,	,	,	,	08.85	00.80	,		01
02		+044	+0.84	+0.89	+0.17	+1.67	+0.17	08.84	00.15	1.46	1648	08
03		+049	+0.86	+0.08	+0.01	+0.61	+0.81	01.97	00.14	174.00	00	03
04		+057	+0.45	+0.13	+0.16	+4.86	+0.96	01.74	00.14	40.8.81	00	04
05		+061	+0.80	+0.10	+0.01	+0.03	+0.85	01.83	00.18	11.13	11680	05
06		+068	+0.08	+0.08	+0.10	+0.48	+1.00	01.36	00.11	15.88	15601	06
07		+083	+0.08	+0.08	+0.10	+0.70	+1.00	01.81	00.10	86.88	86419	07
08		+087	+0.88	+0.86	+0.86	+1.98	+1.30	03.30	00.43	0.17	144	08
09		+041	+0.80	+0.88	+0.10	+7.46	+1.87	08.41	00.68	8.00	4718	09
10		+035	+0.85	+0.84	+0.84	+1.68	+1.09	07.55	01.89	87.04	1871	10
11		+019	+0.80	+0.04	+0.03	+3.98	+1.65	09.70	08.69	34.38	38398	11

MP-TEMPERATURI

E-0806 17.10.1970 10.48 UHR ③

HAUPT-NIVEAUS!

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
01	3000	7100	+08.7	+04.8	3048	3048	00.83	00.80	03.0	08.4	/////	1.48	04.1
02	8800	7831	+03.6	+04.7	3035	3040	00.19	00.14	08.3	08.4	/////	1.48	04.5
03	8600	7418	+03.9	+04.1	3018	3087	00.41	00.34	04.8	08.4	/////	1.48	04.1
04	8400	7604	+04.7	+03.8	3004	3008	00.17	00.14	01.8	08.3	/////	1.48	04.0
05	8800	7797	+04.9	+03.1	2985	2998	00.59	00.47	04.4	08.3	/////	1.49	03.9
06	8000	7994	+05.3	+05.7	2969	2982	00.64	00.80	04.8	08.4	/////	1.48	04.1
07	1600	8197	+04.4	+01.8	2946	2976	01.35	01.03	14.3	08.3	/////	1.48	04.0
08	1600	8405	+04.8	+04.7	2931	2949	01.69	01.35	18.7	08.0	01.5	1.35	03.5
09	1600	8618	+04.1	+05.8	2893	2946	00.88	00.11	34.8	01.4	01.1	1.88	08.5
10	1800	8838	+08.9	+09.1	2860	2943	04.58	03.16	84.9	01.4	00.6	8.10	08.1
11	1000	9044	+00.1	+00.9	2810	2905	04.89	03.84	85.8	00.8	00.9	0.96	00.5

E	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
01		+087	,	,	,	,	,	08.53	00.83	,		01
02		+038	+0.88	+0.03	+0.03	+0.47	+0.49	-08.86	03.64	9.87	10367	08
03		+039	+0.80	+0.11	+0.09	+1.84	+1.63	-08.08	00.68	388.08	00	03
04		+047	+0.80	+0.18	+0.18	+1.49	+0.65	-01.88	00.85	601.96	00	04
05		+049	+0.10	+0.81	+0.17	+8.30	+5.87	-01.65	00.81	348.48	00	05
06		+053	+0.80	+0.03	+0.08	+0.81	+0.85	-01.91	02.81	1.83	28804	06
07		+055	+0.05	+0.35	+0.88	-3.78	+1.01	-01.39	00.50	985.79	00	07
08		+050	-0.30	+0.17	+0.11	-8.81	+1.37	-03.08	01.35	1.51	1467	08
09		+044	+0.35	+0.88	+0.43	-7.81	+1.41	-04.76	03.76	4.00	3788	09
10		+034	+0.80	+0.80	+0.84	-8.88	+1.66	-04.90	06.84	87.77	88338	10
11		+037	+1.41	+0.39	+0.83	-8.98	+0.48	-08.85	86.48	4.73	3881	11

MP-TEMPERATURI

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
16	1600	8197	+[illegible].4	+01.8	3948	3976	01.38	01.03	14.3	08.3	/////	1.48	04.0
17	1660	8348	+05.4	+01.7	3934	3961	01.38	01.03	14.6	08.3	/////	1.48	03.9
18	1600	8405	+04.6	+01.7	3921	3934	01.69	01.85	18.7	08.0	01.5	1.38	03.5
19	1458	8560	+04.5	+00.9	3903	3983	08.61	01.90	89.6	01.5	01.0	1.51	08.6
80	1421	8618	+04.1	+00.8	3893	3948	08.98	08.11	34.8	01.4	01.1	1.88	08.5
81	1386	8989	+03.4	+00.1	3838	3934	04.04	05.90	89.1	01.7	01.1	1.48	08.6
82	1801	8836	+08.8	+00.1	3860	3943	04.52	03.18	89.9	01.4	00.6	8.10	08.1
83	1145	8901	+08.7	+00.1	3858	3936	04.82	03.54	88.8	01.0	00.6	1.45	01.7
84	1101	8990	+08.1	+00.8	3841	3985	04.65	03.64	84.C	00.8	00.8	1.88	00.4
85	1058	8999	+00.4	+00.8	3819	3913	03.28	03.61	88.6	00.8	00.8	0.98	00.4
86	1008	9084	+00.1	+00.7	3810	3909	03.44	03.84	85.8	00.8	00.9	0.96	00.5

E	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
16		+055	,	,	,	,	,	01.39	00.80	,		16
17	140	+055	+0.70	-0.08	-0.00	-0.83	+1.08	08.57	00.96	1.47	1436	17
18	060	+050	+1.00	-0.51	-0.36	+6.68	+5.10	03.08	01.35	14.61	1853	18
19	145	+048	-0.81	-0.72	-0.45	+7.51	+7.38	04.38	03.34	16.98	8447	19
80	083	+044	-0.74	-0.58	-0.40	-8.60	+1.88	-04.76	03.96	35.47	33838	80
81	074	+038	-0.64	-1.81	-1.06	-1.39	+8.08	-85.47	03.46	140.80	00	81
82	189	+034	-0.40	-0.38	-0.83	-7.81	+1.45	-06.50	06.84	8.13	7438	88
83	086	+038	-0.36	-0.19	+0.09	-4.08	+1.40	-07.03	10.84	8.13	9338	83
84	043	+086	-1.38	-0.06	+0.01	-4.06	+8.66	-07.37	98.39	0.83	876	84
85	048	+010	-3.96	-1.33	-0.88	-3.06	+5.19	-07.81	36.38	100.65	81251	85
86	056	+007	-0.89	-0.18	-0.04	-8.81	+1.55	-04.86	84.45	76.61	67874	76

MP-FEUCHTIGKEITI

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
87	1404	8618	+04.1	+00.8	8893	8948	08.98	08.11	34.8	01.4	01.1	1.88	08.5
88	1373	8651	+03.7	+00.5	8886	8941	03.48	08.49	41.8	01.7	01.1	1.48	08.9
89	1904	8834	+08.9	+00.1	8860	8943	04.58	03.18	89.9	01.4	00.6	8.10	08.1

Z	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
87		+044	,	,	,	,	,	04.78	03.76	,		87
88	036	+041	-1.34	-1.76	-1.24	-4.49	+2.61	05.04	03.68	3.33	3131	88
89	109	+038	+0.47	-0.48	-0.41	-0.46	+1.83	06.50	06.88	9.71	8904	89

E-0805 17.10.1970 [illegible] UHR ②

HAUPT-NIVEAUS!

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
01	3000	7100	+08.8	/////	3037	3190	04.59	05.53	87.8	08.4	/////	1.50	04.0
02	8600	7831	+02.9	/////	3007	3170	05.45	05.17	74.6	08.7	/////	1.50	04.4
03	8600	7416	+03.9	/////	3018	3183	05.44	04.57	81.8	08.6	/////	1.50	04.2
04	8400	7605	+04.4	/////	3001	3118	05.15	04.98	81.5	08.4	/////	1.50	04.0
05	8800	7798	+04.9	+03.0	8985	3000	00.66	00.54	07.4	08.3	/////	1.50	03.9
06	8000	7996	+05.3	+08.8	8968	8988	01.12	00.87	11.9	08.4	/////	1.50	04.0
07	1600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
08	1600	8406	+05.5	+01.9	8968	8964	01.80	01.33	18.9	08.3	01.5	1.48	03.9
09	1600	8619	+04.8	+00.3	8894	8958	03.78	08.45	39.4	01.8	01.8	1.47	03.1
10	1800	8838	+03.3	+00.4	8864	8948	04.59	03.88	59.3	01.5	01.5	1.50	08.6
11	1000	9044	+08.8	+00.1	8838	8919	04.89	03.37	88.3	01.3	00.8	1.34	01.9

E	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
01		+031	,	,	,	,	,	04.45	00.48	,		01
02		+037	+0.46	+0.84	-0.87	+0.11	+0.58	04.44	00.30	8.98	3356	08
03		+048	+0.50	+0.85	+0.06	+5.65	+0.56	-01.97	00.86	138.88	00	03
04		+051	+0.85	+0.14	+0.17	+0.86	+0.81	-01.74	00.89	4713.84	00	04
05		+049	+0.85	+0.84	+1.84	+7.09	+3.80	-01.53	00.86	46.36	4636	05
06		+054	+0.80	+0.58	-0.14	-8.88	+0.85	-01.38	00.84	16.16	12450	06
07		+058	+0.05	-0.48	-0.31	-4.37	+1.06	-01.81	00.80	60.35	64818	07
08		+057	+0.08	+0.07	+0.07	+0.85	+1.00	-01.30	00.57	0.55	135	08
09		+048	-0.65	+0.80	-0.56	-0.31	+1.70	-05.41	01.45	8.00	1893	09
10		+038	+0.45	+0.60	-0.60	-9.95	+1.81	-07.55	02.64	10.03	9888	10
11		+027	+0.55	+0.19	-0.06	-4.58	+1.80	-09.70	08.51	86.16	83385	11

MP-TEMPERATURI

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
16	1800	8198	+08.4	+01.8	8948	8988	01.95	01.88	80.8	08.4	/////	1.50	04.0
17	1600	8408	+05.9	+01.8	8938	8964	01.80	01.33	18.9	08.3	01.5	1.48	03.9
18	1513	8408	+04.6	+00.8	8918	8948	08.66	01.46	84.8	01.5	01.0	1.53	08.6
19	1401	8619	+04.8	+00.3	8894	8958	03.78	08.45	39.4	01.8	01.8	1.47	03.1
80	1381	8701	+03.4	+00.4	8878	8948	03.78	08.66	46.1	01.7	01.8	1.63	08.7
81	1808	8838	+03.3	+00.4	8864	8948	04.59	03.84	58.3	01.5	01.5	1.50	08.6
88	1093	8860	+03.5	+00.3	8858	8933	04.35	03.08	56.3	01.4	00.9	1.48	08.3
83	0999	9067	+08.6	+00.8	8838	8981	04.76	03.87	64.5	01.3	00.9	1.50	08.8

C	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
16		+036	,	,	,	,	,	01.81	00.80	,		16
17	000	+057	+0.05	+0.07	+0.07	+0.85	+1.00	-03.30	00.87	0.55	835	17
18	048	+040	+1.06	+1.01	+0.78	+3.01	+8.13	-04.85	00.85	1.03	988	18
19	118	+046	+0.36	-0.63	-0.43	-8.86	+1.41	-05.41	01.45	8.07	3838	19
80	078	+038	+1.06	-0.88	-0.88	-8.98	+8.19	-06.26	08.68	3.66	3388	80
81	183	+036	-0.06	+0.70	-0.46	-3.98	+1.78	-07.55	08.69	77.35	68560	81
88	108	+060	+0.18	+0.83	+0.80	+3.44	+0.84	-08.73	03.64	15.00	13819	88
83	094	+031	-0.96	+0.48	-0.86	-9.84	+8.01	-09.81	04.61	78.38	64038	83

MP-FEUCHTIGKEITI

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
84	1600	8406	+05.5	-01.8	8956	8984	01.80	01.33	18.9	08.3	01.5	1.48	03.9
85	1535	8478	+04.8	+00.9	8916	8968	08.87	01.82	87.4	08.0	01.4	1.41	03.4
86	1401	8619	+04.8	-00.3	8894	8958	03.39	08.48	39.4	01.8	01.8	1.47	03.1

Z	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
84		+037	,	,	,	,	,	01.30	00.57	,		84
85	065	+051	-1.07	-1.03	-0.76	+3.06	+8.17	-04.24	03.69	9.76	783	85
86	134	+046	-0.45	-0.69	-0.47	-8.96	+1.51	-05.41	01.45	4.10	3661	86

E-0807 17.10.1970 11.17 UHR ④

HAUPT-NIVEAUS!

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
01	3000	7100	+08.5	+08.1	3040	3053	00.41	03.36	03.4	08.1	/////	1.38	03.6
02	8600	7831	+03.3	+04.7	3033	3040	00.29	00.85	03.6	08.4	/////	1.38	04.0
03	8600	7418	+03.7	+04.3	3016	3083	00.33	00.88	04.0	08.3	/////	1.38	04.3
04	8400	7608	+04.1	+03.8	8998	3009	00.47	00.36	03.5	08.4	/////	1.38	04.1
05	8800	7795	+04.8	+03.1	8985	8998	00.66	03.51	07.0	08.4	/////	1.38	04.0
06	8000	7981	+05.3	+08.1	8969	8994	01.88	00.95	10.4	08.5	/////	1.38	04.3
07	1600	8193	+05.7	+01.9	8958	8974	01.09	00.83	11.3	08.3	/////	1.38	03.9
08	1600	8399	+05.7	+00.9	8931	8978	08.60	01.48	85.4	08.3	01.5	1.35	04.0
09	1400	8611	+04.8	+00.7	8901	8961	08.63	01.80	89.1	01.7	01.3	1.38	03.0
10	1800	8886	+08.9	+00.8	8861	8946	04.48	03.86	81.3	00.7	00.6	1.39	01.6
11	1300	9053	+00.9	+00.1	8880	8981	04.87	03.91	87.C	00.4	00.4	1.98	00.9

Z	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
01		+085	,	,	,	,	,	08.51	00.90	,		01
02		+033	+0.55	+0.06	+0.07	+1.46	+0.48	-08.87	00.66	4.93	5061	09
03		+037	+0.80	+0.08	+0.08	-0.88	+0.84	-08.07	00.55	48.33	48317	03
04		+041	+0.83	+0.07	+0.05	-0.73	+0.84	-01.91	00.58	547.78	00	04
05		+048	+0.35	+0.08	+0.06	+0.79	+0.69	-01.77	00.50	130.08	00	05
06		+054	+0.85	+0.89	-0.58	-8.94	+0.74	-01.67	00.43	41.05	41976	06
07		+038	+0.60	+0.06	+0.06	+0.88	+0.84	-01.59	00.50	39.03	38993	07
08		+038	+0.55	+0.45	+0.33	+4.84	+1.05	-08.86	00.86	3.48	3877	08
09		+031	-0.49	-0.31	+0.81	+4.86	+1.41	-04.16	08.98	3.34	3174	09
10		+034	-0.98	-1.06	+0.88	+0.81	+0.83	-04.47	08.19	2.81	3401	10
11		+013	+1.00	-0.83	-0.38	-8.84	+8.04	-06.80	85.15	81.55	69834	11

MP-TEMPERATURI

E	N	P	T	TF	PT	EPT	E	S	HP	+L	-L	+I-	L
16	1793	8193	+05.7	-01.9	8954	8974	01.09	00.82	11.3	08.3	/////	1.38	04.0
17	1647	8249	+05.8	-01.3	8937	8966	01.56	01.16	15.9	08.4	/////	1.38	04.0
18	1569	8389	+06.7	-00.9	8931	8970	08.00	01.44	8.8	08.3	01.6	1.45	04.0
19	1508	8493	+06.8	-01.8	8918	8953	01.93	01.41	80.7	08.5	01.4	1.53	03.6
80	1399	8611	+04.5	+00.7	8901	8951	08.63	01.90	89.1	01.7	01.3	1.34	03.0
81	1388	8498	+03.6	+00.4	8881	8944	04.45	03.19	54.3	01.8	01.0	1.46	08.6
88	1868	8765	+03.5	+00.7	8873	8963	04.80	03.48	61.1	01.1	00.8	1.31	01.9
83	1887	8799	+03.1	+00.5	8865	8955	04.89	03.41	61.0	00.9	00.7	1.38	01.7
84	1801	8898	+08.9	+00.8	8861	8946	04.48	03.26	61.3	00.7	00.6	1.39	01.6
85	1137	8899	+01.5	+00.1	8845	8931	05.33	03.73	78.6	00.5	00.4	1.31	00.9
86	1098	8950	+01.0	+00.0	8830	8930	05.54	03.84	83.9	00.4	00.3	1.86	00.8

Z	DM	TV	G-T	G-E	G-S	G-HP	G-PT	I	N	A	D	Z
16		+038	,	,	,	,	,	01.84	00.88	,		16
17	131	+063	+0.07	-0.31	+0.88	-3.08	+0.99	-00.41	00.78	5.96	5825	17
18	044	+059	+0.81	-0.89	+0.87	+1.74	+1.89	-04.93	00.84	4.06	1988	18
19	094	+058	+0.83	+0.07	+0.07	+0.84	+1.00	-04.31	00.88	3.40	3488	19
80	105	+051	+0.38	-0.66	-0.46	-7.97	+1.83	-06.88	08.07	3.56	3382	80
81	074	+041	-1.60	-0.83	-1.75	+8.14	+8.79	-08.68	08.98	9.05	8493	81
88	068	+040	+0.18	+0.57	-0.57	-7.93	+1.43	-09.67	09.48	8.05	1988	88
83	038	+036	-1.12	+0.05	+0.01	-5.58	-8.85	-05.36	08.78	6.88	7581	83
84	086	+034	-0.76	+0.76	+0.56	+4.78	+0.78	-08.47	04.19	4.85	6830	84
85	043	+081	+8.80	-1.11	-0.74	-4.56	+1.31	-08.34	04.88	8.87	8346	85
86	045	+016	+1.11	-0.48	-0.24	-8.77	+2.17	-08.20	86.16	31.54	88184	86

MP-FEUCHTIGKEITI

Example E_2 17 Oct. 1970

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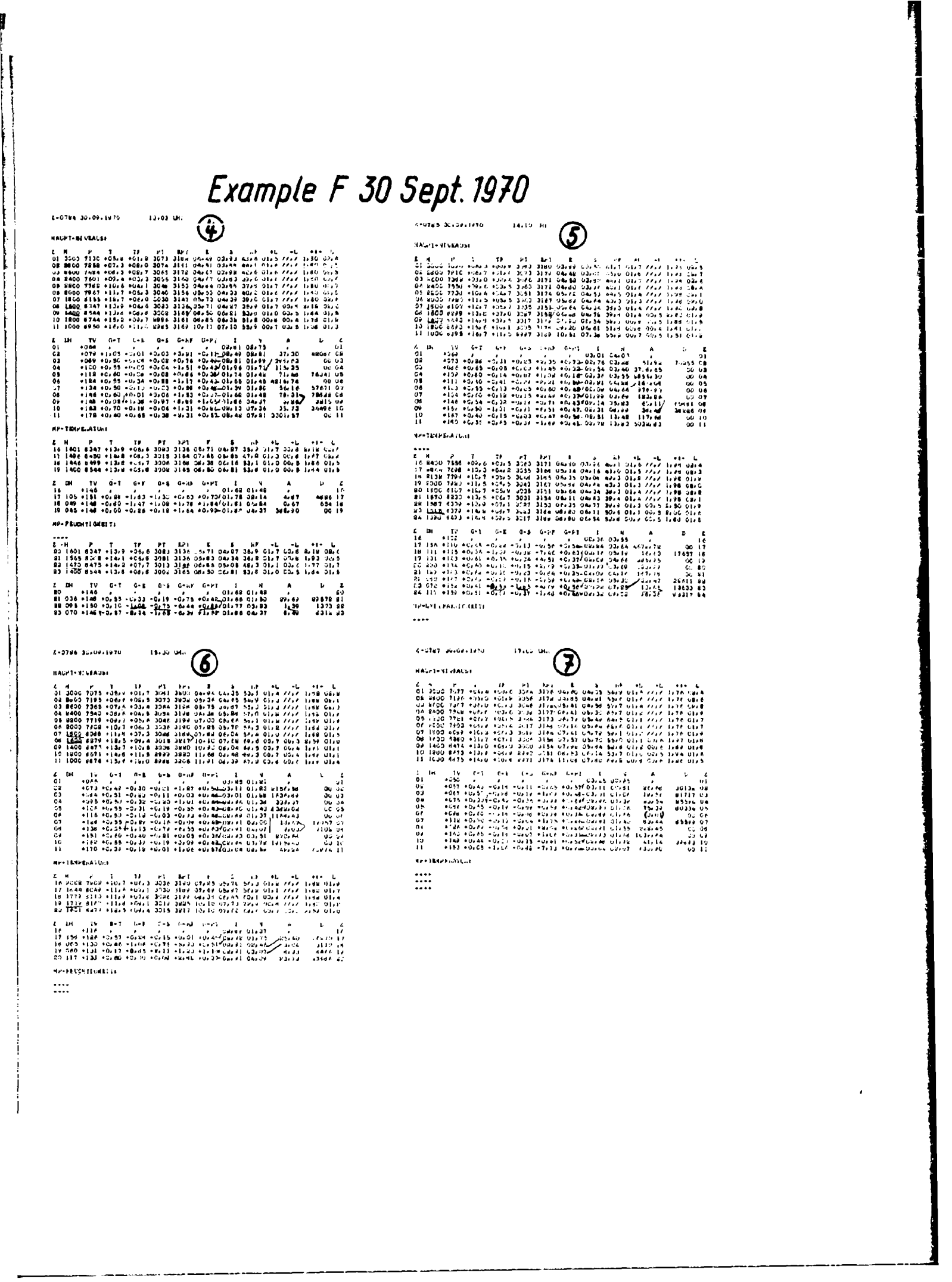
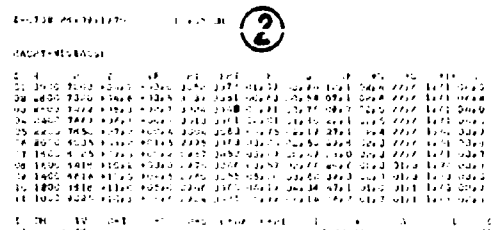
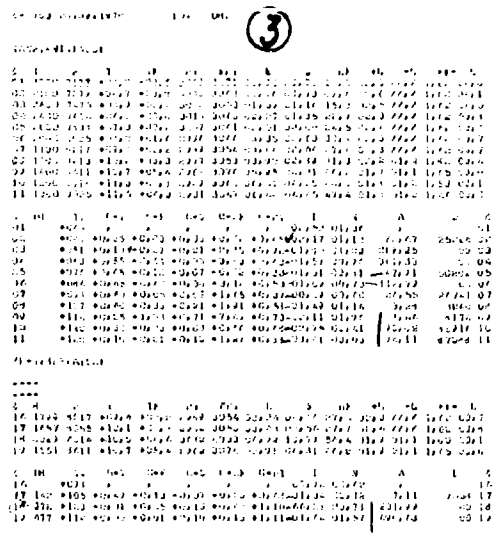
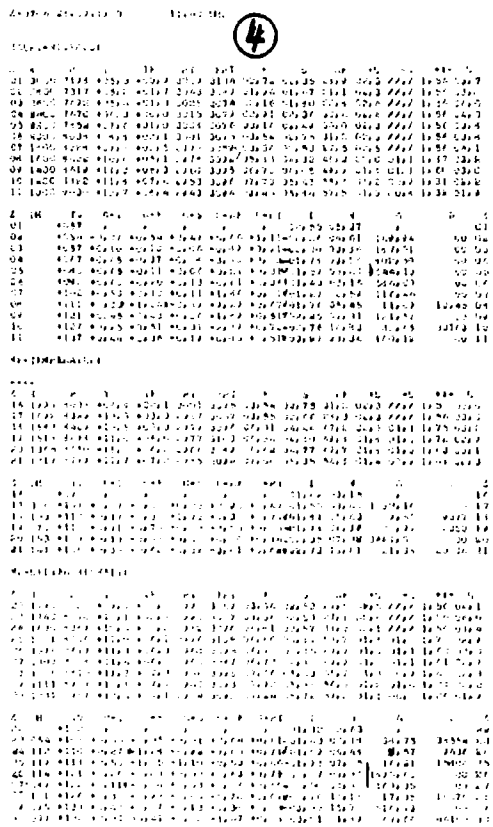
Example F 30 Sept. 1970

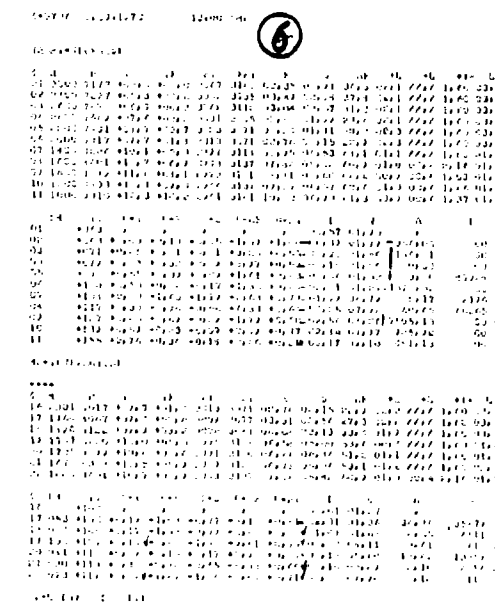


Example G_1 28 Sept. 1970









Example G_2 28 Sept. 1970

Example H 26 Sept. 1970

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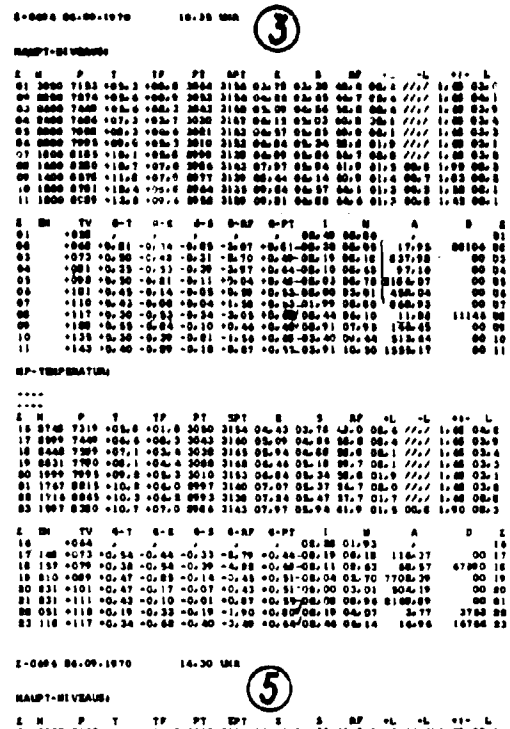

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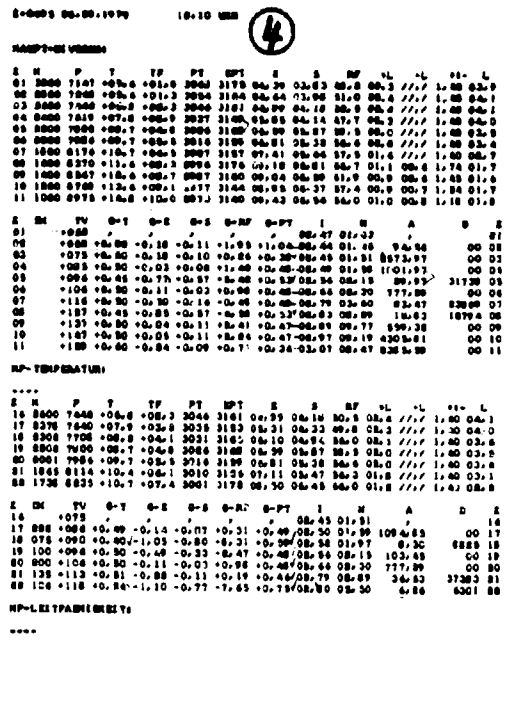

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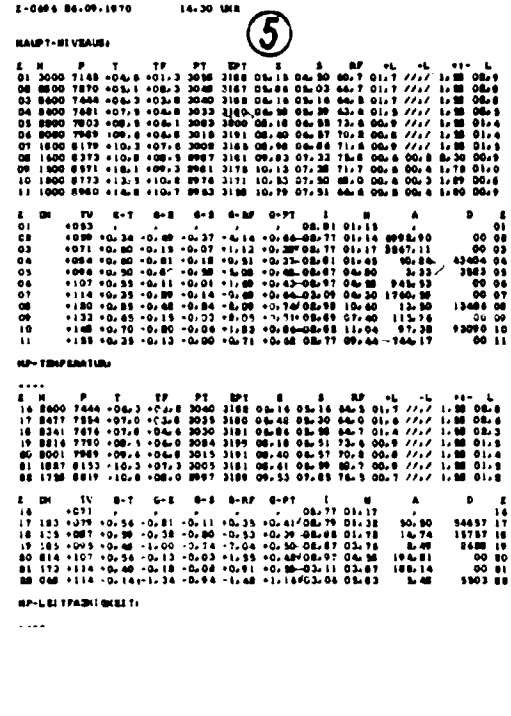

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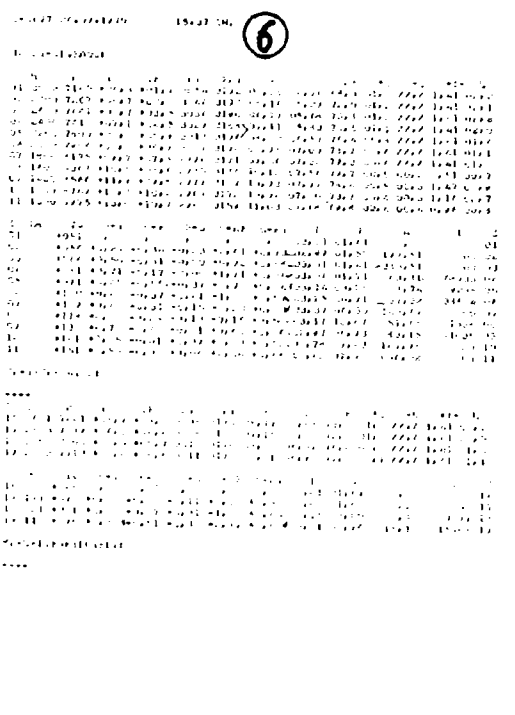

Example J 17 Sept. 1970

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HAUPT-NIVEAUS:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8000	7180	+08.8	-04.6	304.8	304.3	00.48	00.40	05.8	08.4	00.0	7.40	08.8
2	8000	7841	+03.6	-04.8	304.8	303.5	00.34	00.29	04.4	08.5	00.0	6.84	08.6
3	8600	7416	+03.1	-01.9	300.9	307.3	08.76	08.38	35.1	01.8	00.0	0.83	01.9
4	8400	7395	+03.3	+00.8	299.1	310.7	05.88	04.88	67.3	00.6	00.0	9.08	00.9
5	8800	7778	+04.8	+00.9	298.6	308.4	04.31	03.68	58.4	00.9	00.0	8.19	01.0
6	8000	7864	+03.8	+00.9	299.7	310.3	04.00	04.70	65.0	00.7	00.0	7.78	00.7
7	1800	8154	+04.9	+03.4	294.9	309.4	06.13	04.99	61.5	00.6	00.0	7.85	00.7
8	1800	8348	+07.7	+04.6	293.7	309.1	06.77	05.06	64.4	00.4	00.0	8.91	00.8
9	1400	8549	+09.3	+05.4	293.4	308.4	06.76	04.94	57.7	00.6	00.4	1.88	01.0
1	1800	6751	+10.8	+06.3	293.4	308.0	07.09	05.80	58.5	00.5	00.4	1.88	00.9
8	1000	8860	+10.9	+06.9	293.1	304.8	07.58	06.98	58.1	00.5	00.6	0.75	01.1

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+00.8	,	,	,	,	,	08.45	00.77	,		1
8		+03.0	+0.07	+0.08	+0.07	+1.03	+0.96	08.08	00.61	9.48	10506	8
3		+03.4	+0.03	+1.81	-1.01	-5.36	+0.98	01.70	00.98	6.64	7855	3
4		+04.0	+0.10	-1.83	-0.98	-4.13	+0.89	01.38	03.38	1.51	1615	4
5		+03.4	+0.78	+0.35	+0.33	+7.46	+0.91	01.79	08.29	96.23	88178	5
7		+07.2	+0.85	+0.07	+0.01	+1.78	+0.42	00.13	08.38	95.86	96126	7
6		+08.5	+0.60	+0.38	+0.19	+1.48	+0.[illegible]	[illegible]	[illegible]	84.84	84696	6
9		+10.1	+0.78	+0.00	+0.06	+3.30	+0.18	00.68	01.09	18.88	15389	9
1		+11.1	+0.65	+0.86	+0.13	+0.48	+0.53	00.43	01.06	0.01	00	1
8		+11.8	+0.34	-0.14	-0.04	+0.88	+0.68	00.48	00.69	7.75	7110	8

HP-TEMPERATUR:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8738	7390	+ 8.9	-04.8	308.0	304.1	00.87	00.74	11.1	08.1	00.0	3.66	08.8
8	8599	7416	+ [illegible]	-01.9	300.9	307.3	08.76	08.38	35.1	01.8	00.0	0.83	01.9
3	2548	7468	+0[illegible]	-00.8	300.1	310.4	04.48	03.74	57.8	00.7	00.0	8.39	00.8
4	8506	7493	+0[illegible]	+00.1	299.7	310.5	04.76	03.98	63.8	00.8	00.0	9.38	00.9
5	8400	7395	+03.3	+00.8	299.1	310.7	05.88	04.88	67.3	00.6	00.0	9.08	00.9

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+03.0	,	,	,	,	,	01.93	00.76	,		1
8	0138	+03.4	+0.15	-1.44	-1.80	-8.13	+0.86	01.68	00.91	30.74	33468	8
3	6451	+03.5	-0.39	-3.31	-8.74	-3.88	+1.44	01.60	04.40	0.08	82	3
4	6041	+03.5	+0.00	-0.68	-0.53	-3.18	+1.02	01.53	03.49	4.75	3084	4
5	0138	+04.0	+0.38	-0.43	-0.30	-3.83	+0.61	01.38	03.38	1580.88		00 5

HP-FEUCHTIGKEIT:

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E-0640 17.09.1970 13.00 UHR

HAUPT-NIVEAUS:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	3000	7150	+08.8	-04.8	303.7	304.1	00.[illegible]	[illegible]	[illegible]	08.0	00.8	00.0	08.8
8	8800	7873	+08.6	-04.8	303.8	303.0	00.[illegible]	[illegible]	[illegible]	08.5	00.3	00.0	08.6
3	8600	7600	+08.9	-04.8	300.3	308.1	00.80	[illegible]	[illegible]	08.5	00.3	00.0	08.9
4	8400	7600	+08.8	-04.8	300.1	308.1	00.80	[illegible]	[illegible]	08.5	00.3	00.0	08.8
5	8800	7815	+03.0	-01.3	298.4	309.1	03.[illegible]	[illegible]	[illegible]	08.4	01.6	00.0	01.3
6	8000	7815	+33.7	+00.9	297.1	309.0	05.01	04.05	63.6	00.6	00.0	7.63	00.9
7	8000	8004	+04.8	+01.8	296.0	307.4	05.41	04.86	64.5	00.6	00.0	7.63	00.9
8	1800	8197	+06.1	+08.7	295.6	306.9	05.97	04.84	59.1	00.7	00.0	8.01	00.8
9	1600	8395	+07.8	+03.5	295.4	306.1	05.68	04.84	51.6	00.6	00.3	8.02	01.0
1	1400	8585	+08.4	+04.8	295.0	306.5	05.97	04.94	50.7	00.8	00.4	1.93	01.1
8	1000	8800	+10.8	+06.4	294.5	306.3	05.88	04.13	44.9	00.8	00.4	1.88	01.1
8	1000	8810	+10.6	+06.6	294.4	306.5	06.17	04.87	45.8	00.5	00.5	0.88	01.1

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+08.6	,	,	,	,	,	08.48	00.88	,		1
8		+06.6	-0.18	+0.08	-0.08	-0.31	+1.19	08.08	00.64	8.38	9835	8
3		+03.0	+0.18	+0.30	-0.88	-3.90	+0.87	01.71	00.68	1897.66	00	3
4		+03.4	+0.05	+1.87	-1.03	-6.18	+0.97	01.38	01.88	1.67	1778	4
5		+06.3	+0.35	+0.87	+0.67	+0.88	+0.84	01.07	03.83	16.83	10788	5
6		+05.3	+0.08	-0.20	+0.11	-0.41	+0.93	00.80	08.78	89.05	9[illegible]	6
7		+06.8	+0.15	+0.05	+0.01	+0.68	+0.81	00.55	01.89	84.83	84[illegible]	7
8		+08.9	+0.84	+0.04	+0.09	+3.76	+0.11	00.48	01.07	7.44	7485	8
9		+10.1	+0.80	+0.86	+0.14	+0.43	+0.15	00.44	00.78	16.86	15648	9
1		+11.8	+0.99	+0.06	+0.11	+0.87	+0.86	00.48	00.78	183.44	00	1
8		+13.3	+0.89	+0.17	+0.07	+1.38	+0.86	00.46	00.68	1408.81	00	8

HP-TEMPERATUR:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8600	7499	+08.9	-04.8	300.3	308.1	00.80	00.66	10.8	08.0	00.0	3.88	08.1
8	8498	7541	+08.8	-08.4	299.1	304.6	08.41	01.99	31.3	01.3	00.0	6.81	01.4
3	8801	7689	+03.0	-01.3	298.6	308.7	03.31	08.71	68.4	01.0	00.0	0.13	01.1
4	8898	7783	+03.0	-00.1	297.3	307.1	04.47	03.61	57.3	00.7	00.0	8.68	00.8
5	8800	7818	+03.7	+00.9	297.1	306.6	05.07	04.05	63.6	00.6	00.0	7.63	00.7

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+03.0	,	,	,	,	,	01.71	00.69	,		1
8	0108	+03.1	-0.10	-1.58	-1.80	-0.61	+1.13	01.58	01.38	0.88	937	8
3	0098	+03.4	+0.81	-0.94	-0.74	-1.48	+0.87	01.38	01.88	4.65	4609	3
4	0108	+3.36	+0.00	-1.14	-0.89	-4.57	+1.08	01.81	03.18	3.83	3895	4
5	0098	+04.3	+0.71	-0.61	-0.44	-4.41	+0.88	01.07	03.53	84.81	89947	5

HP-FEUCHTIGKEIT:

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E-0641 17.09.1970 18.15 UHR

HAUPT-NIVEAUS:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8000	7180	+08.8	-04.8	304.8	304.3	00.48	00.40	05.8	08.4	00.0	7.40	08.8
8	8800	7841	+03.6	-04.8	304.8	303.5	00.34	00.29	04.4	08.5	00.0	6.84	08.6
3	8600	7416	+03.1	-01.9	300.9	307.3	08.76	08.38	35.1	01.8	00.0	0.83	01.9
4	8400	7395	+03.3	+00.8	299.1	310.7	05.88	04.88	67.3	00.6	00.0	9.08	00.9
5	8800	7778	+04.8	+00.9	298.6	308.4	04.31	03.68	58.4	00.9	00.0	8.19	01.0
6	8000	7864	+03.8	+00.9	299.7	310.3	04.00	04.70	65.0	00.7	00.0	7.78	00.7
7	1800	8154	+04.9	+03.4	294.9	309.4	06.13	04.99	61.5	00.6	00.0	7.85	00.7
8	1800	8348	+07.7	+04.6	293.7	309.1	06.77	05.06	64.4	00.4	00.0	8.91	00.8
9	1400	8549	+09.3	+05.4	293.4	308.4	06.76	04.94	57.7	00.6	00.4	1.88	01.0
1	1800	6751	+10.8	+06.3	293.4	308.0	07.09	05.80	58.5	00.5	00.4	1.88	00.9
8	1000	8860	+10.9	+06.9	293.1	304.8	07.58	06.98	58.1	00.5	00.6	0.75	01.1

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+08.8	,	,	,	,	,	08.45	00.77	,		1
8		+03.0	+0.07	+0.08	+0.07	+1.03	+0.96	08.08	00.61	9.48	10506	8
3		+03.4	+0.03	-1.81	-1.01	-5.36	+0.98	01.70	00.98	6.64	7855	3
4		+04.0	+0.10	-1.83	-0.98	-4.13	+0.89	01.38	03.38	1.51	1615	4
5		+03.4	+0.78	+0.35	+0.33	+7.46	+0.91	01.79	08.29	96.23	88178	5
7		+07.2	+0.85	+0.07	+0.01	+1.78	+0.42	00.13	08.38	95.86	96126	7
6		+08.5	+0.60	+0.38	+0.19	+1.48	+0.[illegible]	[illegible]	[illegible]	84.84	84696	6
9		+10.1	+0.78	+0.00	+0.06	+3.30	+0.18	00.68	01.09	18.88	15389	9
1		+11.1	+0.65	+0.86	+0.13	+0.48	+0.53	00.43	01.06	0.01	00	1
8		+11.8	+0.34	-0.14	-0.04	+0.88	+0.68	00.48	00.69	7.75	7110	8

HP-TEMPERATUR:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8738	7390	+ 8.9	-04.8	308.0	304.1	00.87	00.74	11.1	08.1	00.0	3.66	08.8
8	8599	7416	+ [illegible]	-01.9	300.9	307.3	08.76	08.38	35.1	01.8	00.0	0.83	01.9
3	2548	7468	+0[illegible]	-00.8	300.1	310.4	04.48	03.74	57.8	00.7	00.0	8.39	00.8
4	8506	7493	+0[illegible]	+00.1	299.7	310.5	04.76	03.98	63.8	00.8	00.0	9.38	00.9
5	8400	7395	+03.3	+00.8	299.1	310.7	05.88	04.88	67.3	00.6	00.0	9.08	00.9

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+03.0	,	,	,	,	,	01.93	00.76	,		1
8	0138	+03.4	+0.15	-1.44	-1.80	-8.13	+0.86	01.68	00.91	30.74	33468	8
3	6451	+03.5	-0.39	-3.31	-8.74	-3.88	+1.44	01.60	04.40	0.08	82	3
4	6041	+03.5	+0.00	-0.68	-0.53	-3.18	+1.02	01.53	03.49	4.75	3084	4
5	0138	+04.0	+0.38	-0.43	-0.30	-3.83	+0.61	01.38	03.38	1580.88		00 5

HP-FEUCHTIGKEIT:

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E-0642 17.09.1970 18.05 UHR

HAUPT-NIVEAUS:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	3000	7108	+08.9	-04.8	304.4	303.9	00.18	00.16	08.4	08.8	00.0	4.80	08.9
8	8800	7888	+03.6	+24.8	303.4	303.8	00.16	00.14	01.9	08.3	00.0	6.32	08.6
3	8600	7404	+03.8	-03.3	301.8	304.[illegible]	01.[illegible]	00.97	13.9	01.8	00.0	1.08	01.9
4	8400	7388	+03.6	+00.5	299.8	310.8	04.78	03.93	60.4	00.8	00.0	8.92	00.8
5	8800	7769	+04.8	+08.8	298.4	311.9	04.18	04.96	73.3	00.5	00.0	6.18	00.6
6	8000	7817	+08.8	+08.7	297.8	310.0	04.78	04.94	68.7	00.6	00.0	7.35	00.7
7	1600	8149	+04.8	+04.2	294.8	310.2	06.68	04.83	67.0	00.5	00.0	6.03	00.6
8	1600	8346	+27.7	+04.9	295.7	309.8	07.18	05.38	67.6	00.5	00.1	3.88	00.7
9	1400	8546	+09.0	+04.9	295.1	309.8	07.53	05.80	65.6	00.5	00.3	1.68	00.8
1	1800	8751	+10.8	+06.6	294.6	308.6	07.66	05.46	61.5	00.4	00.3	1.88	00.8
8	1000	8960	+11.3	+07.3	293.5	307.7	07.86	05.47	58.8	00.5	00.4	1.08	01.0

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+08.8	,	,	,	,	,	08.45	00.81	,		1
8		+03.4	+0.35	-0.88	-0.81	-3.08	+0.66	08.07	00.46	5.08	5618	8
3		+03.9	+0.80	-0.30	-0.48	-5.98	+0.88	01.78	00.98	14.64	16068	3
4		+04.8	-0.10	-1.81	-1.08	-3.30	+1.11	04.01	01.11	08.33	0.90	963	4
5		+05.3	+0.43	-0.70	-0.58	-6.66	+0.94	01.13	03.88	81.79	88786	5
6		+06.5	+0.65	+0.80	+0.81	+5.33	+0.38	00.88	04.10	14.07	14471	6
7		+07.6	+0.50	-0.48	-0.87	-8.16	+0.88	00.85	08.98	135.18	00	7
8		+08.8	+0.45	-0.85	-0.18	+0.38	+0.54	00.57	01.78	31.46	31033	8
9		+09.9	+0.83	-0.81	-0.09	+1.08	+0.38	00.50	01.04	0.01	9991	9
1		+11.1	+0.60	-0.06	+0.08	+0.88	+0.37	00.46	01.11	400.04	00	1
8		+12.8	+0.95	-0.10	-0.00	+1.05	+0.88	00.44	00.66	5.60	5805	8

HP-TEMPERATUR:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8800	[illegible]	+03.4	-04.8	303.4	303.8	00.16	00.[illegible]	[illegible]	[illegible]	00.0	6.32	08.4
8	8717	7300	+03.8	-04.8	303.0	304.0	00.43	30.37	05.1	08.3	00.0	6.18	08.4
3	8646	7363	+03.8	-03.8	300.3	304.0	00.76	00.63	08.9	08.1	00.0	4.87	08.8
4	8548	7450	+03.7	-01.8	301.8	307.0	02.55	08.13	10.8	01.4	00.0	3.64	01.4
5	8483	7585	+03.8	+00.1	299.7	310.8	04.41	03.68	59.9	00.8	00.0	9.96	00.9
6	8800	7784	+03.6	+00.5	299.5	310.8	04.78	03.93	60.4	00.8	00.0	8.93	00.8

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+03.4	,	,	,	,	,	08.07	00.86	,		1
8	0088	+03.6	+0.66	-0.33	-0.86	-3.69	+0.51	01.90	03.83	88.43	84798	8
3	0091	+03.9	+0.00	-0.43	-0.36	-5.88	+1.04	01.79	03.88	15.03	16465	3
4	0097	+04.0	-0.10	-1.85	-1.54	-8.51	+1.15	01.66	03.94	0.86	500	4
5	0083	+03.8	+0.60	-1.48	-2.03	-4.96	+1.44	01.50	03.03	0.65	698	5
6	0084	+04.8	+0.68	-0.86	-0.17	-0.78	+0.36	01.41	08.33	19.75	809 77	6

HP-FEUCHTIGKEIT:

E	N	P	T	TP	PT	EPT	E	S	RF	+L	-L	+/-	L
1	8468	7510	+03.1	-00.1	299.6	310.4	04.66	03.87	61.0	00.9	00.0	0.30	01.0
8	8845	7787	+04.3	+08.8	298.9	310.0	04.09	04.91	73.8	00.5	00.0	6.33	00.6

E	DH	TV	G-T	G-E	G-S	G-RF	G-PT	I	N	A	D	E
1		+03.7	,	,	,	,	,	01.53	01.03	,		1
8	0P36	+05.1	+0.51	-0.60	-0.48	-5.16	+0.48	01.18	03.67	18.15	18918	8

4. Tables I - XII

TABLE I

RaB in air; units: 10^{-12} µc/cm^3

Station designations:

Z	Zugspitze	2964 m	a.s.l.
W	Wank	1780 m	a.s.l.
G	Garmisch-Partenkirchen	730 m	a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220, c = 1250 - 1620. (Central European Time)

Month: July 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	8,5	7	130	14,2	16	82	7,9	61	85
2.	-	57	233	12,2	24	64	14,8	-	58
3.	8,1	28	108	8,8	16	43	7,1	10	37
4.	3,3	18	130	1,9	11	46	3,9	17	57
5.	-	-	171	-	-	54	-	-	-
6.	4,2	-	263	4,9	57	145	17,5	64	92
7.	4,1	49	299	20,4	109	160	60,6	108	150
8.	5,8	116	256	71,7	145	237	90,3	154	229
9.	-	75	194	55,9	76	128	31,8	11	57
10.	32,7	90	304	58,7	81	116	62,9	81	86
11.	100,3	135	333	86,5	146	151	92,8	90	129
12.	-	-	268	-	-	115	-	-	-
13.	49,7	150	-	80,9	171	228	96,2	141	189
14.	65,5	87	313	68,2	113	180	66,9	103	131
15.	3,7	4	35	2,5	7	39	1,5	10	53
16.	3,2	7	80	1,3	4	58	0,8	-	38
17.	1,7	2	54	0,5	4	50	0,6	-	46
18.	2,6	15	180	7,7	35	93	5,4	21	53
19.	-	-	172	-	-	88	-	-	-
20.	75,1	-	306	99,9	157	208	93,2	168	153
21.	63,7	63	148	79,3	77	135	55,9	86	89
22.	69,7	156	336	64,0	150	200	85,1	113	138
23.	68,3	107	320	78,3	157	291	114,2	105	147
24.	75,8	75	200	84,4	126	-	88,2	104	183
25.	1,6	14	-	1,6	9	-	1,2	14	38
26.	-	-	-	-	-	38	-	-	-
27.	1,4	15	173	2,1	15	128	3,4	23	113
28.	5,2	74	316	13,3	46	190	69,3	108	186
29.	77,4	68	307	111,4	110	131	17,6	32	96
30.	49,3	97	304	58,1	150	213	73,1	118	152
31.	44,2	89	240	55,2	126	184	65,4	46	-

TABLE II

RaB in air; units: 10^{-12} µc/cm^3

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 750 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: August 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	22,1	49	297	40,5	112	246	51,2	44	65
2.	-	-	-	-	-	174	-	-	-
3.	31,8	101	-	63,2	111	-	67,2	77	-
4.	38,8	69	286	41,0	36	148	70,4	108	145
5.	110,3	147	359	99,8	125	143	89,7	82	-
6.	71,3	160	333	76,2	166	268	97,0	137	191
7.	142,6	107	349	87,5	95	188	73,0	94	-
8.	50,4	49	242	45,6	87	120	25,2	48	96
9.	-	-	161	-	-	130	-	-	-
10.	1,5	-	569	1,6	4	338	-	7	431
11.	0,3	32	466	-	58	174	-	26	112
12.	2.7	18	165	10,7	50	107	46,6	56	-
13.	28,4	98	-	39,8	105	-	78,5	122	132
14.	83,7	107	388	73,5	136	200	53,4	77	100
15.	-	-	-	-	-	-	-	-	-
16.	-	-	-	-	-	-	-	-	-
17.	28,3	98	268	0,8	17	153	3,6	18	109
18.	15,6	67	215	13,3	103	169	40,0	99	133
19.	70,5	172	426	85,6	232	295	105,0	154	134
20.	77,8	110	449	101,7	132	150	53,7	23	110
21.	3,8	10	90	4,4	9	66	-	9	61
22.	5,1	25	151	7,8	35	93	28,6	41	68
23.	-	-	258	-	-	109	-	-	-
24.	-	-	194	1,7	20	243	1,2	19	102
25.	21,9	62	304	19,9	91	158	35,3	76	93
26.	15,5	101	306	24,1	128	207	82,2	86	117
27.	72,0	100	382	78,3	104	203	86,3	125	189
28.	28,3	48	217	50,7	58	130	82,6	70	153
29.	75,2	115	318	94,5	140	240	87,4	156	210
30.	-	-	503	-	-	174	-	-	-
31.	33,1	-	306	36,0	121	198	39,5	101	133

TABLE III

RaB in air; units: 10^{-12} µc/cm^3

Station Designations:

Z	Zugspitze	2964 m a.s.l.
W	Wank	1780 m a.s.l.
G	Garmisch-Partenkirchen	730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220, c = 1250 - 1620. (Central European Time)

Month: September 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	8,3	56	535	3,7	33	117	4,8	85	198
2.	38,4	80	167	45,5	114	154	88,5	129	12[illegible]
3.	76,4	124	448	104,4	127	250	60,8	123	247
4.	2,4	41	279	3,7	22	67	13,2	30	59
5.	2,7	22	342	-	4	114	1,4	16	61
6.	-	-	92	-	-	57	-	-	-
7.	3,1	40	136	10,4	54	115	26,4	82	81
8.	65,6	120	276	44,5	131	230	84,7	153	160
9.	67,9	136	279	69,7	181	255	121,5	163	158
10.	54,0	112	301	59,7	101	157	50,9	91	181
11.	63,2	91	326	62,8	65	105	15,4	12	75
12.	37,8	20	88	51,8	35	104	65,3	47	99
13.	-	-	107	-	-	44	-	-	-
14.	29,4	58	258	26,3	153	160	63,4	101	103
15.	83,7	-	394	124,8	131	208	138,7	156	159
16.	4,3	16	74	2,3	11	84	1,8	12	37
17.	6,3	38	235	3,5	28	53	1,7	33	59
18.	5,5	26	275	11,1	53	184	24,0	83	124
19.	27,3	108	380	26,9	177	376	43,9	193	318
20.	-	-	504	-	-	237	-	-	-
21.	8,0	46	527	1,6	92	150	-	91	134
22.	1,6	48	697	12,4	143	201	36.8	94	119
23.	4,8	89	273	5,9	117	153	56,3	84	122
24.	8,4	84	410	0,9	109	201	24,3	132	167
25.	2,6	10	331	5,6	70	175	14,3	61	133
26.	5,4	41	401	3,2	138	230	31,2	170	164
27.	-	-	419	-	-	257	-	-	-
28.	5,8	19	311	6,6	74	265	22,3	144	211
29.	13,6	64	384	36,2	109	315	64,3	200	333
30.	5,9	44	329	12,8	50	200	41,6	146	226

TABLE IV

RaB in air; units $10^{-12}\mu c/cm^3$

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: October 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	-	4	130	-	6	47	-	2	53
2.	1,7	16	99	0,2	9	96	0,1	8	34
3.	2,7	3	45	0,9	-	35	2,4	2	15
4.	-	-	59	-	-	56	-	-	-
5.	1,1	11	175	0,6	11	145	0,9	27	126
6.	15,5	22	190	20,6	74	143	50,3	103	174
7.	24,8	86	210	29,3	77	107	65,6	80	109
8.	40,3	43	251	26,3	61	245	34,8	50	294
9.	40,7	49	631	40,5	40	410	45,9	74	401
10.	27,7	71	276	28,6	74	123	52,8	103	392
11.	-	-	359	-	-	653	-	-	-
12.	12,4	51	238	9,9	124	431	14,0	155	399
13.	8,8	84	407	7,0	112	382	15,9	168	270
14.	16,4	65	727	20,2	232	373	46,4	192	392
15.	4,7	78	268	5,4	150	200	5,7	34	141
16.	7,4	61	412	9,9	82	322	16,7	78	141
17.	6,8	61	700	4,4	79	361	16,6	145	354
18.	-	-	395	-	-	464	-	-	-
19.	11,8	18	297	13,6	31	282	19,6	69	203
20.	13,1	11	71	6,0	4	136	8,7	3	171
21.	18,9	25	159	5,2	21	74	4,1	20	74
22.	11,1	32	226	14,7	19	63	13,4	40	96
23.	-	7	129	3,5	3	57	3,2	4	18
24.	14,2	23	175	9,6	61	112	12,9	69	102
25.	-	-	221	-	-	117	-	-	-
26.	-	9	-	2,3	10	345	6,6	36	200
27.	13,3	44	493	13,4	33	345	16,4	105	193
28.	7,2	38	487	6,0	66	264	16,1	60	169
29.	3,4	17	302	0,8	9	138	2,0	7	149
30.	6,5	15	286	2,5	35	208	8,4	25	205
31.	7,6	13	208	7,3	18	305	14,6	21	252

TABLE V

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: November 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	-	-	221	-	-	145	-	-	-
2.	4,8	10	271	9,8	7	82	12,0	10	56
3.	14,4	22	276	11,6	9	35	12,2	11	34
4.	26,9	51	319	19,4	65	129	24,8	77	134
5.	7,0	15	416	8,3	10	196	4,2	5	36
6.	14,2	9	54	4,5	8	41	9,3	16	58
7.	20,1	65	384	19,7	125	320	49,5	193	289
8.	-	-	446	-	-	383	-	-	-
9.	35,2	48	484	15,2	47	373	13,5	29	91
10.	10,8	17	64	8,6	14	45	7,8	13	46
11.	4,7	28	334	2,6	25	196	2,3	6	270
12.	11,0	30	366	11,4	41	222	17,7	83	177
13.	82,9	83	415	80,1	136	241	86,8	116	183
14.	65,3	88	521	61,1	136	310	67,8	26	263
15.	-	-	211	-	-	91	-	-	-
16.	7,9	5	109	10,3	4	78	17,0	7	79
17.	3,3	21	315	1,3	10	228	0,7	2	227
18.	16,6	36	327	18,5	70	291	28,1	78	245
19.	32,2	32	302	39,4	29	209	48,1	70	146
20.	11,7	10	193	10,6	7	189	9,3	28	99
21.	45,8	-	384	57,9	-	174	44,3	-	61
22.	-	-	194	-	-	86	-	-	-
23.	3,4	19	306	2,9	14	145	-	23	146
24.	2,8	7	236	1,9	5	188	1,3	5	209
25.	4,7	22	245	3,6	16	189	1,3	83	294
26.	5,9	11	285	0,3	25	271	-	47	247
27.	3,4	24	551	0,7	40	308	0,4	61	403
28.	2,9	-	202	2,1	-	187	23,5	-	158
29.	-	-	197	-	-	340	-	-	-
30.	57,7	33	546	7,6	5	620	7,2	14	261

TABLE VI

Station Designation: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods: a = 2150 - 0920, b = 0950 - 1220.
b = 1250 - 1620. (Central European Time)

Month: December 1970 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	22,9	70	350	24,9	85	292	55,4	92	315
2.	6,7	9	285	7,5	18	175	7,5	22	146
3.	10,9	27	279	-	21	224	-	4	135
4.	-	11	233	4,1	15	250	-	-	181
5.	15,0	-	317	4,7	-	371	2,1	-	59
6.	-	-	343	-	-	183	-	-	-
7.	57,0	-	505	73,9	85	648	74,6	226	333
8.	42,0	23	187	38,7	23	205	9,4	72	233
9.	3,2	17	513	1,3	10	397	1,5	10	401
10.	2,9	6	746	0,2	12	672	-	38	551
11.	3,1	16	1045	1,6	13	557	1,4	36	509
12.	6,8	49	239	6,1	23	228	9,7	33	344
13.	-	-	317	-	-	570	-	-	-
14.	17,6	142	824	14,2	148	825	30,7	140	750
15.	32,3	10	173	5,4	12	108	16,3	15	102
16.	-	11	257	2,1	16	332	3,2	27	234
17.	2,4	7	804	0,9	9	830	-	50	630
18.	7,8	16	686	5,6	17	670	7,4	33	430
19.	5,8	54	429	5,3	74	378	3,6	105	280
20.	-	-	554	-	-	715	-	-	-
21.	2,7	15	555	1,4	26	685	6,5	16	485
22.	11,3	6	88	8,9	14	84	18,7	16	102
23.	20,4	44	436	21,7	21	260	15,9	28	152
24.	11,2	28	-	13,8	43	598	-	-	272
25.	-	-	490	-	-	495	-	-	-
26.	-	-	-	-	-	750	-	-	-
27.	-	-	328	-	-	850	-	-	-
28.	52,0	52	559	47,4	57	510	62,2	79	546
29.	34,8	88	504	31,9	93	466	25,3	38	434
30.	39,3	113	430	63,9	168	488	71,1	68	494
31.	78,5	61	713	54,2	103	292	-	-	278

TABLE VII

RaB in air; units $10^{-12}\mu c/cm^3$

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620, (Central European Time)

Month: January 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	-	-	182	-	-	120	-	-	-
2.	3,2	12	444	2,3	8	415	3,1	10	459
3.	-	-	1150	-	-	721	-	-	-
4.	17,6	6	514	31,5	54	368	34,6	133	330
5.	25,1	74	650	12,5	79	1006	17,0	120	844
6.	-	-	402	-	-	481	-	-	-
7.	8,6	51	347	6,7	19	319	7,4	45	331
8.	4,4	8	247	3,0	13	291	0,7	13	399
9.	1,9	5	256	0,1	4	350	5,2	22	345
10.	-	-	279	-	-	413	-	-	-
11.	30,8	30	290	32,5	30	292	25,5	30	287
12.	34,1	85	508	25,6	111	445	31,4	186	344
13.	21,4	124	661	14,3	145	880	17,1	160	509
14.	26,4	36	334	30,6	26	371	32,5	30	558
15.	84,1	198	516	63,4	195	536	109,2	128	150
16.	30,2	127	588	25,3	151	599	25,5	147	304
17.	-	-	560	-	-	420	-	-	-
18.	12,8	107	434	10,2	79	445	25,9	217	443
19.	57,5	81	441	52,6	73	497	48,3	95	327
20.	52,9	91	480	35,1	77	511	34,9	107	431
21.	31,2	53	388	27,2	25	498	36,4	22	369
22.	11,7	31	-	11,7	19	403	19,4	24	416
23.	30,9	91	400	23,8	119	342	21,1	124	213
24.	-	-	314	-	-	139	-	-	-
25.	17,3	-	321	32,9	62	348	36,3	37	198
26.	11,3	27	350	9,9	12	338	9,0	22	291
27.	32,7	59	330	27,5	77	297	35,1	71	160
28.	11,7	11	176	11,7	12	207	12,3	17	109
29.	10,3	119	467	7,4	122	278	12,6	145	184
30.	26,5	99	336	29,4	86	294	24,2	61	198
31.	-	-	144	-	-	78	-	-	-

TABLE VIII

RaB in air; units $10^{-12}\mu c/cm^3$

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: February 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	20,5	26	498	41,8	102	390	45,5	72	235
2.	4,1	27	57	2,0	26	60	5,7	86	74
3.	3,0	7	430	2,1	10	333	0,2	12	352
4.	11,9	3	65	16,1	4	64	11,1	15	85
5.	5,2	5	388	1,0	10	308	-	26	305
6.	8,6	2	224	..	6	445	0,8	26	392
7.	-	-	772	-	-	283	-	-	-
8.	2,8	5	414	0,3	22	212	1,0	34	134
9.	3,1	31	457	0,5	66	415	-	121	298
10.	2,0	91	635	-	117	644	-	192	478
11.	2,4	156	677	0,8	158	910	0,1	170	592
12.	5,1	76	487	-	31	364	24,3	26	135
13.	8,1	64	388	9,1	67	425	33,6	153	184
14.	-	-	615	-	-	277	-	-	-
15.	103,7	85	362	75,4	149	-	104,3	185	362
16.	54,7	56	281	35,2	34	184	53,5	16	33
17.	7,1	20	264	5,3	12	—	6,6	22	-
18.	7,3	17	-	4,1	8	280	9,9	21	275
19.	12,3	20	339	11,6	21	367	24,5	22	141
20.	12,1	7	47	12,9	20	79	12,1	16	66
21.	-	-	348	-	-	210	-	-	-
22.	8,6	23	388	3,0	15	96	6,0	7	38
23.	5,1	7	47	4,6	7	25	5,5	5	36
24.	5,7	15	236	1,5	29	117	1,1	78	93
25.	1,8	19	367	6,1	14	203	6,2	7	63
26.	-	-	46	8,6	7	34	12,0	6	40
27.	-	14	33	-	17	48	22,5	21	63
28.	-	-	338	-	-	109	-	-	-

TABLE IX

RaB in air; units 10^{-12} µc/cm^3

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: March 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	58,9	72	85	57,4	73	117	65,2	70	128
2.	14,6	90	482	22,9	128	255	6,0	133	210
3.	41,1	71	470	-	113	349	98,4	112	215
4.	62,9	133	147	45,6	117	170	13,9	107	130
5.	49,2	75	553	51,2	109	209	69,6	-	129
6.	45,4	95	461	52,9	169	420	55,8	176	230
7.	-	-	613	-	-	198	-	-	-
8.	28,9	136	470	16,7	136	312	16,4	182	320
9.	11,3	130	756	19,9	192	544	14,7	101	266
10.	5,8	27	272	34,3	13	137	18,7	18	54
11.	-	18	101	9,2	15	87	-	13	64
12.	5,5	19	124	1,5	12	79	7,1	16	101
13.	4,4	16	266	1,7	35	207	5,0	65	189
14.	-	-	336	-	-	242	-	-	-
15.	23,1	180	407	17,1	169	334	62,9	157	196
16.	64,2	12	128	23,0	6	69	24,1	8	58
17.	10,2	18	232	0,8	38	125	22,4	24	138
18.	27,1	90	270	29,8	79	221	100,3	69	162
19.	24,6	30	292	22,2	37	176	41,2	47	158
20.	32,8	37	201	42,7	35	105	31,3	23	63
21.	-	-	93	-	-	41	-	-	-
22.	16,4	28	195	13,4	39	165	85,8	75	162
23.	24,9	8	60	26,3	21	61	-	5	80
24.	8,7	92	274	0,6	91	212	2,9	63	124
25.	5,7	42	381	16,4	80	201	29,4	51	78
26.	10,5	18	91	15,8	19	57	18,3	13	42
27.	16,8	3	57	17,2	12	38	13,1	13	35
28.	-	-	138	-	-	61	-	-	-
29.	6,2	-	259	1,4	58	108	37,1	36	71
30.	4,4	86	350	10,7	122	201	1,2	122	108
31.	87,8	-	317	94,7	116	352	147,6	106	266

TABLE X

RaB in air; units $10^{-12}\mu C/cm^3$

Station Designations:
Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220, c = 1250 - 1620. (Central European Time)

Month: April 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	13,4	75	324	3,2	87	210	64,6	85	189
2.	39,0	132	388	44,2	134	259	73,5	152	242
3.	82,1	122	382	108,0	141	229	115,3	98	179
4.	-	-	-	-	-	61	-	-	-
5.	35,5	74	316	38,7	98	139	73,0	67	104
6.	26,2	67	330	29,5	68	103	51,3	47	92
7.	56,2	109	276	75,1	99	147	105,4	111	157
8.	37,3	109	265	15,4	42	149	62,2	95	129
9.	-	-	311	-	-	156	-	-	-
10.	61,4	97	507	35,7	153	263	70,6	174	255
11.	-	-	203	-	-	132	-	-	-
12.	-	-	228	-	-	90	-	-	-
13.	8,5	44	261	1,6	47	94	30,3	56	75
14.	5,8	56	304	1,0	63	130	23,5	22	53
15.	8,5	63	242	1,8	76	162	34,7	105	130
16.	53,9	76	332	54,6	81	101	47,6	76	102
17.	-	145	381	52,6	24	88	16,0	19	91
18.	-	-	178	-	-	102	-	-	-
19.	8,1	122	256	32,4	145	203	92,2	139	166
20.	77,1	129	372	109,3	140	145	75,0	85	101
21.	-	122	289	48,4	117	187	61,9	110	138
22.	67,2	142	286	70,1	118	152	77,0	123	113
23.	54,4	92	254	62,2	72	104	45,4	63	90
24.	-	-	176	22,8	-	60	11,5	-	80
25.	-	-	49	-	-	58	-	-	-
26.	32,1	-	102	16,7	15	51	18,5	19	42
27.	52 5	87	295	50,4	79	169	39,8	54	73
28.	32,8	18	52	35,0	13	56	28,1	16	89
29.	28,8	71	245	41,0	76	185	49,7	88	114
30.	31,9	124	402	24,6	109	250	18,5	120	138

TABLE XI

RaB in air; units $10^{-12}\mu C/cm^3$

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: May 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	-	-	282	-	-	193	-	-	-
2.	-	-	203	-	-	190	-	-	-
3.	51,5	-	220	49,6	118	207	53,9	100	155
4.	67,6	91	220	70,0	98	195	92,6	95	194
5.	75,8	90	329	64,8	68	207	45,7	76	198
6.	39,3	64	299	53,1	49	140	61,4	79	110
7.	36,6	52	306	31,8	68	126	62,3	65	100
8.	30,3	-	429	37,3	-	317	26,4	-	223
9.	-	-	336	-	-	100	-	-	-
10.	49,2	-	395	65,6	130	247	32,7	47	144
11.	39,4	77	204	41,1	81	179	47,4	49	95
12.	28,5	56	185	49,0	53	68	53,0	80	103
13.	131,3	134	340	90,4	125	128	42,7	66	91
14.	35,9	29	260	13,6	8	128	28,0	61	139
15.	33,9	43	398	39,7	87	154	52,3	73	81
16.	-	-	228	-	-	75	-	-	-
17.	19,5	111	172	34,9	45	113	52,3	86	117
18.	29,0	129	277	40,2	39	103	45,4	45	111
19.	23,0	50	150	44,8	52	79	67,5	54	97
20.	-	-	251	-	-	158	-	-	-
21.	58,0	128	203	62,8	94	94	44,1	27	73
22.	19,5	33	174	35,5	46	69	45,8	39	78
23.	-	-	213	-	-	159	-	-	-
24.	85,2	110	289	84,7	97	118	72,2	53	114
25.	71,5	70	168	57,6	74	116	45,9	69	112
26.	31,1	42	128	48,8	41	102	35,8	25	58
27.	25,7	29	190	40,5	15	153	55,2	39	144
28.	24,6	44	147	25,0	56	89	14,3	21	69
29.	19,7	24	111	33,2	23	78	30,7	35	80
30.	-	-	148	-	-	121	-	-	-
31.	-	-	308	-	-	145	-	-	-

TABLE XII

RaB in air; units $10^{-12}\mu C/cm^2$

Station Designations: Z Zugspitze 2964 m a.s.l.
W Wank 1780 m a.s.l.
G Garmisch-Partenkirchen 730 m a.s.l.

Measurement periods : a = 2150 - 0920, b = 0950 - 1220,
c = 1250 - 1620. (Central European Time)

Month: June 1971 ("No measurement" is denoted by: -)

	a			b			c		
	Z	W	G	Z	W	G	Z	W	G
1.	25,7	101	450	25,7	89	165	21,0	75	104
2.	31,6	54	223	64,7	130	198	93,3	65	123
3.	54,8	102	368	87,3	98	158	97,6	78	142
4.	72,8	107	274	90,4	146	203	94,8	115	159
5.	42,4	83	201	47,4	68	96	72,2	49	97
6.	-	-	346	-	-	147	-	-	-
7.	26,9	62	251	22,7	40	150	21,6	70	113
8.	16,5	17	300	20,1	21	228	20,9	39	102
9.	30,1	47	299	32,4	47	193	47,6	65	96
10.	-	-	209	-	-	37	-	-	-
11.	34,4	32	121	10,0	12	54	30,2	10	55
12.	8,3	13	73	17,3	17	53	21,5	21	37
13.	-	-	169	-	-	39	-	-	-
14.	28,7	69	171	44,0	46	110	75,8	68	128
15.	60,6	80	99	12,4	4	29	2,0	5	27
16.	7,3	17	73	6,6	21	34	19,6	16	30
17.	-	-	150	-	-	67	-	-	-
18.	12,7	71	329	11,6	12	74	9,1	8	39
19.	-	26	206	5,9	7	91	1,3	13	89
20.	-	-	51	-	-	73	-	-	-
21.	-	39	110	-	14	43	-	12	48
22.	28,9	59	218	55,6	101	116	26,1	17	53
23.	44,4	58	111	42,5	37	81	43,5	32	76
24.	71,5	96	379	87,3	112	261	84,0	53	252
25.	40,3	40	391	48,1	93	187	71,8	71	96
26.	63,5	87	297	84,7	81	135	107,1	81	101
27.	-	-	61	-	-	55	-	-	-
28.	52,9	53	134	53,6	61	116	54,2	44	74
29.	5,1	9	26	7,2	11	25	6,9	8	33
30.	6,3	14	101	8,0	16	77	4,3	11	57

5. The Computer Program

```
PAGE 001

                        *
                        * WANN + ZUSSPITZE - TEMPS PROGRAMM *
                        *
0000                    AN      ORG   X'0'
                        *
0000 00                         MLT
0001 64C184                     JMP/  BE6
     8000               SPE     SET   X'8000'
     6900               TAB     SET   X'6800'
     1801               BOF     SET   X'1801'
     1883               BGP     SET   X'1883'
     1800               GAP     SET   X'1800'
     1891               EPE     SET   X'1891'
     1678               ANF     SET   X'1678'
     1681               SDF     SET   X'1681'
     1733               MLF     SET   X'1733'
     1701               BWF     SET   X'1701'
     19C9               EDF     SET   X'19C9'
     197A               EZP     SET   X'197A'
                        * SET - BP
                        *
                        *
     1BA1               CPL     SET   X'1BA1'
     1BB4               CNE     SET   X'1BB4'
     1AB4               POL     SET   X'1AB4'
     1AB6               EXN     SET   X'1AB6'
     1A9C               EXB     SET   X'1A9C'
     1ABA               LXB     SET   X'1ABA'
     1B07               L4N     SET   X'1B07'
     1B1E               L4B     SET   X'1B1E'
     1B3B               L4B     SET   X'1B3B'
                        *
                        * EINSCHREIBPLATZ ; BR.= 39 *
                        *
0004 0004               TF      DS    4
0008 0004               E       DS    4
000C 0004               RP      DS    4
0010 0004               S       DS    4
0014 0004               TV      DS    4
0018 0004               EPT     DS    4
001C 0004               ERE     DS    4
0020 0004               GRF     DS    4
0024 0004               GRS     DS    4
0028 0004               GRT     DS    4
002C 0004               GPT     DS    4
0030 0004               T       DS    4
0034 0004               P       DS    4
0038 0004               ET      DS    4
003C 0004               ETF     DS    4
0040 0004               PT      DS    4
0044 0004               PL      DS    4
0048 0004               NL      DS    4
004C 0004               VPB     DS    4
0050 0004               L       DS    4
0054 0004               PLO     DS    4
0058 0004               NLO     DS    4
005C 0004               IT      DS    4
0060 0004               IHS     DS    4
0064 0004               IHR     DS    4
```

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PAGE 002

0068 0004               HBI     DS    4
006C 0004               BMA     DS    4
0070 0004               TB      DS    4
0074 0004               TI      DS    4
0078 0004               I1      DS    4
007C 0008               ZYA     DS    8
007E 0008               ZE1     DS    8
0080 0008               FBE     DS    8
0088 0004               ZB      DS    4
008A 0004               AUS     DS    4
008E 0004               P1      DS    4
0092 0004               PB      DS    4
0096 0004               HI      DS    4
0098 0004               HB      DS    4
009A 0004               DIF     DS    4
009E 0004               IBK     DS    4
00A0 0008               ZEN     DS    8
00A8 0008               YB      DS    8
00AA 0002               YX      DS    2
00A6 0002               X6T     DC    X'0008'
00A8 0002               HN      DS    8
00AA 0002               HX      DS    8
00AC 0002               XX      DS    8
00AE 0002               YYX     DS    8
00B0 0002               YPX     DS    8
00B2 0002               YLX     DS    8
00B4 0004               ZSP     DS    4
00B8 0004               HO1     DS    4
00BC 000D               HO8     DS    13
00C9 0009               HO3     DS    9
00D8 0004               EWT     DS    4
00D8 0004               EWI     DS    4
00DC 0004               EWB     DS    4
00E0 0004               EY3     DS    4
00E4 0004               EW4     DS    4
00E8 0004               EWY     DS    4
00EA 0004               N       DS    4
00EE 0004               XL      DS    4
00F2 0004               HDX     DS    4
00F6 0004               LN      DS    4
00FA 0002               ASP     DS    8
00FC 0004               F       DS    4
                        *
                        *
                        *
0100 0000               ERR     DC    *4                    ZEICHEN IN R/X
0108 678B9E                     LDR=  A'ERR'
0109 4E                         TXA
0104 B7B000                     SBA=  X'0000'
0107 F0FA                       STA   ASP
0109 E7FFD8                     LDA=  X'FFD8'
010E 6E05C5                     RTJ/  HIB
0111 68AA                       STX   RR
0113 678B9E                     LDR=  A'ERR'
0116 4E                         TXA
0117 B7B000                     SBA=  X'0000'
011A F0FA                       STA   ASP
011C E7FFCB                     LDA=  X'FFCB'
011F 6E05C5                     RTJ/  HIB
0122 68AC                       STX   XX
```

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PAGE 003

0184 63DA                       JMP=  ERR
                        *
                        *
                        *
                        * EINLESEN VON B + K *
                        *
0186 00                 BE0     MLT
0187 00                         RO1
0188 E70000                     LDA=  0
018B F0FA                       STA   ASP
018D E791                       LDV=  X'91'
018F 3800                       OAS   0,0
0191 3000               IN0     IBS   0,0
0193 E700?F                     ABA=  X'7F'
0196 A70080                     ADA=  X'80'
0199 80FA                       LBR   ASP
019B FEAR5E                     STV/  ERR,X
019E E7008A                     LDX=  X'8A'
01A1 17EE                       JAX   IN0
01A3 E700BD                     LBX=  X'BD'
01A6 17E9                       JAX   IN0
01A8 E700FF                     LBX=  X'FF'
01AB 17EA                       JAX   IN0
01AD E700A0                     LBX=  X'A0'
01B0 17DF                       JAX   IN0
01B2 E700B3                     LBX=  X'B3'
01B5 1704                       JAX   EE0
01B7 70FA                       IAN   A7/
01B9 61D6                       JMP   !40
01BB E703               EE0     LDV=  X'03'
01BD 3800                       OBS   0,0
01BF 6E0100                     RTJ/  ERR
                        *
                        *
                        * ANFANG ; EINLESEN PER PART. *
                        *
01C2 E700C1                     LDA=  X'C1'
01C5 F68BAE                     STA/  CAS
01C8 6E11B8                     RTJ/  CIT
01CB 660330                     JMP/  SBX
01CE E700D4             BG1     LDA=  X'D4'
01D1 F68BAE                     STA/  CAS
01D4 6E11B8                     RTJ/  CIT
01D7 6E1868                     RTJ/  BLX
01DA 6E1878                     RTJ/  BGX
01DD 660188                     JMP/  TAB
01E0 E700C6             BGP     LDA=  X'C6'
01E3 F68BAE                     STA/  CAS
01E6 6E11B8                     RTJ/  CIT
01E9 6E188E                     RTJ/  BLT
01EC 1003                       JOV   BG3-3
01EE 660030                     JMP/  TA3
01F1 66052C                     JMP/  PA9-3
01F4 E700CC             BG3     LDA=  X'CC'
01F7 F68BAE                     STA/  CAS
01FA 6E11B8                     RTJ/  CIT
01FD 6E188E                     RTJ/  BLT
0200 1003                       JOV   BG4-3
0202 660030                     JMP/  TA3
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PAGE 004

0205 66034A                     JMP/  PAA-3
0208 E70000             BG4     LDA=  X'00'
020B F68BAE                     STA/  CAS
020E 6E11B8                     RTJ/  CIT
0211 6E188E                     RTJ/  BLT
0214 1003                       JOV   *+3
0216 660030                     JMP/  TA3
0219 660186                     JMP/  BE0
                        *
                        *
                        * TRANSP. V. T,TF,N,P, IN TAB ; BR - 48 *
                        *
021C E70000             TAB     LBR=  0
021F 887C                       STX   ZYA
0221 08                         RO1
0222 E700=0                     LDX=  0
0225 8884                       STX   ZSP
0227 8084               BB0     LBR   ZSP
0229 08                         RO2
022A E8A008                     LDV/  SPE,X
022D 4B0885                     RTJ/  HI2
0230 F8A801                     STV/  TAB+1,X
0233 4B0B0D                     RTJ/  HI8
0236 08                         RO4
0237 E8A008                     LDV/  SPE+8,X             P
023A 4B0BF5                     RTJ/  HIP
023D E8A808                     LDV/  SPE+6,X             T
0240 4B0B08                     RTJ/  HIT
0243 E8A80A                     LDV/  SPE+10,X
0246 4B0B0F                     RTJ/  HTP                 TP
0249 08                         RO3
024A E8AC08                     LDV/  SPE+14,X
024D 4B041C                     RTJ/  N,P                 LP
0250 E8AC11                     LDV/  SPE+17,X            LN
0253 4B0699                     RTJ/  HLN
0256 08                         RO1
0257 E8A014                     LDV/  SPE+20,X
025A 8884                       STX   ZSP
025C 4E0B84                     RTJ/  CBA
025F 1718                       JNX   BB1
0261 8084                       LBR   ZSP
0263 B499F8                     LDA/  SPE-8,X
0266 887C                       LDR   ZYA
0268 4E2F85                     RTJ/  ZHR
026B 4E0BCE                     RTJ/  BET
026E 4E2F98                     RTJ/  NAB
0271 61B6                       JMP   BB0
0273 4E2F73             BB1     RTJ/  HLZ
0276 E70000                     LBR=  0
0279 887C                       STR   ZYA
027B 4E09CE                     RTJ/  BET
027E 4E07AF                     RTJ/  PPL
0281 F8AE                       STV   TTE
0283 4E07CA                     RTJ/  TPL
0286 F8FBB8                     STV/  TIT
0289 887C                       LDR   ZYA
028C E8A801                     LDV/  TAB+1,X
028E F8BA                       STV   WB1+8
0290 E7ABB0                     LDA=  X'ABB0'
```

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PAGE 005

0829 F080          STA   M01
082B 6B0093        RTJ/  UP3
082E F8A0          STV   TX
0830 66087C        JMP/  SB7
0833 00      TAB   R01
0834 070000        LDX=  0
0841 887C          STX   ZTA
0843 070000        LDX=  0
0846 08B4          STX   ZAP
0848 0080          LDX   ZSP
-----              -----
0849 6BBB84        RTJ/  CSA
084C 1F05          JAX   SB8
084E 6BD648        RTJ/  M17
0851 61F1          JMP   SB0
0853 6BBFT2  SB3   RTJ/  MLZ
-----              -----
0856 070000        LDX=  0
0859 887C          STX   ZTA
085B 887C    DF1   LDX   ZTA
085D 6BDD31        RTJ/  PKB
0860 6BDE8C        RTJ/  PN1
0863 887C          LDX   ZTA
0865 FEA831        STV/  TAB+49,X
086B AB            TXA
086C A7C063        ADD=  X'63'
086F 0C            TAX
0870 E4A800        LDA/  TAB,X
0873 87A0A0        LDX=  X'A0A0'
0876 1FE6          BAX   DF1
0878 6413A7        JMP/  VYS
                   *
                   * MP : MR -49 *
                   *
087B 6E0CBB  SB7   RTJ/  PG1          ZURUECK MQ,*LAB
087E 6BBE97        RTJ/  PG2
0881 65D80A        RTJ/  PG0
0884 070000  SB8   LDX=  0
0887 887C          STX   ZTA          I. REIHE V. TAB IN PL
0889 6E07BA  SP1   LDX   ZTA
088C 6E01AF        RTJ/  TPL
088F 6E07FC        RTJ/  LPF
0892 6E0811        RTJ/  LNF
0895 6E004A        RTJ/  GBF
0898 171B          JAN   SC3
089A 6E01E0        RTJ/  TPF
089D 8E3C          LDV   T
089F F8D8          STV   ZVI
08A1 6BD83C        RTJ/  PCB
08A4 F81C          STV   ZTF          ETP
08A6 6E088E        RTJ/  PC4          E.S.TV,RF
08A9 64009A        JMP/  PD8    EPT
08AC 6E0910  SC3   RTJ/  PC3          //// IN I,S ....
08AF 6E093C        RTJ/  PE3          PT
08B2 6EEEA1        RTJ/  PEX
```

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PAGE 006

08C1 6E0ADA        RTJ/  PFT          IT
08C4 6E0B0B        RTJ/  PC4
08C7 887C          LDX   ZTA          IN PG4 SIND N DER.
08C9 6E0C6C        RTJ/  ZTA          ALLE ERG. IM PL+LA. IN D
08CC 6E01CE        RTJ/  M7T
08CF 6E0CC8        RTJ/  TAE          OP ENDE V. TAB
08D2 61B4          JMP   SP1
                   *
                   *
                   * MP : MR - 44 *
                   *
08D4 6E0D31  SP8   RTJ/  PKB
08D7 6E0CEC        RTJ/  PN1          AUS + DIF
08DA 6E0DA1        RTJ/  PN8
08DD 6E0D66        RTJ/  PN1
08E0 F836          STV   T
08E2 6E0DAE        RTJ/  PN3
08E5 6E0D66        RTJ/  PN1
08E8 F806    PP8   STV   E
08EA 6E0DCC        RTJ/  PNA
08ED 6E0D66        RTJ/  PN1
08F0 F81C          STV   S
08F2 6E0DDD        RTJ/  PNB
08F5 6E0D66        RTJ/  PN1
08F8 F80C          STV   RF
08FA 6E0DEF        RTJ/  PN6
08FD 6E0D66        RTJ/  PN1
0900 F845          STV   PT
0902 6E0E01        RTJ/  PN7
0905 6E0E15        RTJ/  PI1
0908 887C          LDX   ZTA
090A E89E          LDV   DN
090C FEAB31        STV/  TAB+49,X
090F 8E30          LDV   T
0911 FEAB39        STV/  TAB+57,X
0914 E906          LDV   E
0916 FEAB3D        STV/  TAB+61,X
0919 8E10          LDV   S
091B FEAB41        STV/  TAB+65,X
091E E30C          LDV   RF
0920 FEAB45        STV/  TAB+69,X
0923 E840          LDV   PT
0925 FEAB49        STV/  TAB+73,X
0928 E886          LDV   AUS
092A FEAB87        STV/  TAB+87,X
092D E89A          LDV   DIF
092F FEAB9D        STV/  TAB+93,X
0932 6E0DT3        RTJ/  TAF
0935 6408D6        JMP/  SP8
0938 070000  SBX   LDX=  0
093B 887C          STX   ZTA
093D 0A            RO3
093E EEA00F        LDV/  SPE+15,X
0941 6E067F        RTJ/  UP1
0944 08            RO1
0945 EEA00E        LDV/  SPE+14,X
0948 6E068C        RTJ/  UP2
094B 6E0693        RTJ/  UP3
094E 6E0886        RTJ/  DZE
```

```
PAGE 007

0951 F8F0          STV   F
0953 6404BC        JMP/  SR7
0956 E88BAE  SP5   LDA/  CAB
0959 070004        LDX=  X'0004'
095C 1F05          BAX   *+8
095E 6E18F0        RTJ/  PRI
                   *
                   * MP : MR - 48 *
                   *
0961 6EEBA7        RTJ/  PNX
0964 887C          STX   ZTA
0966 6E0ED0  SPX   RTJ/  PNB          ANFANG PL IN DER TAB
0969 1008          JOV   SP6
096B 61F9          JMP   SPX
096D 070004  SP6   LDX=  4
0970 887C          STX   ZTA
0972 6E0ED0        RTJ/  PNB
0975 1008          JOV   SP7
0977 61F9          JMP   SP6+5
0979 070000  SP7   LDX=  0
097C 887C          STX   ZTA
097E 6E0EF0        RTJ/  PNA
0981 1008          JOV   SP8
0983 61F9          JMP   SP7+5
0985 070004  SP8   LDX=  4
0988 887C          STX   ZTA
098A 6E0EF0        RTJ/  PNA
098D 1008          JOV   SP9
098F 61F9          JMP   SP8+5
0991 070034  SP9   LDX=  58
0994 887C          STX   ZTA
0996 6E0EF0        RTJ/  PNA
0999 1008          JOV   SPA
099B 61F9          JMP   SP9+5
099D 070038  SPA   LDX=  56
09A0 887C          STX   ZTA
09A2 6E0EF0        RTJ/  PNA
09A5 1008          JOV   SPB
09A7 61F9          JMP   SPA+5
09A9 070008  SPB   LDX=  8
09AC 887C          STX   ZTA
09AE 6ECEF0        RTJ/  PNA
09B1 1008          JOV   SPC
09B3 61F9          JMP   SPB+5
09B5 070063  SPC   LDX=  99
09B8 887C          STX   ZTA
09BA 6E0F0F        RTJ/  PN0
09BD 1008          JOV   SPD
09BF 61F9          JMP   SPC+E
09C1 070000  SPD   LDX=  0
09C4 887C          STX   ZTA
09C6 6EBE7B        RTJ/  N1P
09C9 1008          JOV   SPY
09CB 61F9          JMP   SPD+5
09CD 070067  SPY   LDX=  103          G-T
09D0 887C          STX   ZTA
09D2 6E0F88        RTJ/  P1R
09D5 1008          JOV   SPF
09D7 61F9          JMP   SPY+5
```

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PAGE 008

09D9 070068  SPF   LDX=  104    GRE
09DC 887C          STX   ZTA
09DE 6E0F85        RTJ/  P1R
09E1 1008          JOV   SR1
09E3 61F9          JMP   SPF+5
09E5 070049  SR1   LDX=  111    GRS
09E8 887C          STX   ZTA
09EA 6E0F85        RTJ/  P1R
09ED 1008          JOV   SRE
09EF 61F9          JMP   SR1+5
09F1 070073  SR8   LDX=  115    GRF
09F4 887C          STX   ZTA
09F6 6E0F85        RTJ/  P1R
09F9 1008          JOV   SR3
09FB 61F9          JMP   SR8+5
09FD 070077  SR2   LDX=  119    SPT
0A00 887C          STX   ZTA
0A02 6E0F85        RTJ/  P1R
0A05 1008          JOV   SR4
0A07 61F9          JMP   SR3+5
0A09 070043  SR4   LDX=  99
0A0C 887C          STX   ZTA
0A0E 6E0F4A        RTJ/  P7R
0A11 1008          JOV   SR5
0A13 61F9          JMP   SR4+5
0A15 070063  SR5   LDX=  99
0A18 887C          STX   ZTA
0A1A 6E0F6E        RTJ/  P8R
0A1D 1008          JOV   SR6
0A1F 61F9          JMP   SR5+5
0A21 070043  SR6   LDX=  99
0A24 887C          STX   ZTA
0A26 6E0F89        RTJ/  P9R
0A29 6E1817        RTJ/  RUF
                   *
                   * MP : MR - 46 *
                   *
0A2C 08      SR7   RO1          ANFANG + PRINT
0A2D 070000        LDX=  0
0A30 6E1170        RTJ/  VRZ
0A33 6F1195        RTJ/  PRS
0A36 EFAD          LDV=  X'AD'          '-'
0A38 6E0BF8        RTJ/  OUT
0A3B 6E1195        RTJ/  PRS
0A3E 6E1195        RTJ/  PRS
0A41 6E1195        RTJ/  PRS
0A44 6E1195        RTJ/  PRS
0A47 070006        LDX=  6
0A4A 6E117E        RTJ/  ZVR
0A4D 070005        LDX=  5
0A50 6E1195        RTJ/  PRS
0A53 6E1195        RTJ/  PRS
0A56 EFAE          LDV=  X'AE'          '.'
0A58 6E0BF8        RTJ/  OUT
0A5B 6E1195        RTJ/  PRS
0A5E 6E1195        RTJ/  PRS
0A61 EFAE          LDV=  X'AE'
0A63 6E0BF8        RTJ/  OUT
0A66 EFB1          LDV=  X'B1'
```

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PAGE 009

0468 6F8BF8            RTJ/  OUT
046B EF90              LDV•  X'90'
046D 6E8BF8            RTJ/  OUT
0470 EF87              LDV•  X'87'
0472 6E8BF8            RTJ/  OUT
0475 6E1198            RTJ/  PR8
0478 870007            LDX•  7
047B 6E117E            RTJ/  EVR
047E ------            ----  --
0481 6E1198            RTJ/  PR8
0484 6E1198            RTJ/  PR8
0487 EFAE              LDV•  X'AE'
048A 6E8BF8            RTJ/  OUT
048D 6E1198            RTJ/  PR8
0490 ------            ----  --
0493 870001            LDX•  1
0496 6E117E            RTJ/  EVR
0499 EFD5              LDV•  X'D5'      'U'
049C 6E8BF8            RTJ/  OUT
049F EFC8              LDV•  X'C8'      H
04A2 6E8BF8            RTJ/  OUT
04A5 EFD2              LDV•  X'D2'      R
04A8 6E8BF8            RTJ/  OUT
04AB 6E1170            RTJ/  WRE
04AE 6E1170            RTJ/  WRE
04B1 6E1170            RTJ/  WRE
04B4 870008            LDX•  13
04B7 EE9A46      PA1   LDV/  AB1,X
04BA 6E8BF8            RTJ/  OUT
04BD 45                DCX
04BE 1DF7              NXN   PA1
04C0 6E1170            RTJ/  WRE
04C3 661844            JMP/  WRA
04C6 6E1049      R1U   RTJ/  RQ1
04C9 6E10CB      SK1   RTJ/  PT1          PRT 1-TEIL TAB IN SM
04CC 6E09CE            RTJ/  NZT
04CF EEA800            LDV/  TAB,X
04D2 87FFA0            LDX•  X'FFA0'
04D5 1708              JAX   SK3
04D7 6170              JMP   SK1
04D9 6E1170      SK8   RTJ/  WRE
04DC 6E1049            RTJ/  RQ8          XOPP 8
04DF 6E11D8            RTJ/  PT8          PRINT 8- TEIL TAB IN MM
04E2 6E09CE            RTJ/  NZT
04E5 EEA800            LDV/  TAB,X
04E8 87FFA0            LDX•  X'FFA0'
04EB 1708              JAX   SK3
04ED 6170              JMP   SK8+6
04EF 6E1170      SK3   RTJ/  WRE
04F2 870008            LDX•  13
04F5 EEAA61      PA8   LDV/  AM8,X          MP-T
04F8 6E8BF8            RTJ/  OUT
04FB 45                DCX
04FC 1DF7              NXN   PA8
04FE 6E1170            RTJ/  WRE
0501 661844            JMP/  WRB
0504 6E1049      RBU   RTJ/  RQ1
0507 6E10CB      SK6   RTJ/  PT1
050A 6E09CE            RTJ/  NZT
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050D EEA800            LDV/  TAB,X
0510 87FFA0            LDX•  X'FFA0'
0513 1708              JAX   SK5
0515 6170              JMP   SK6

                       •
                       •
                       • MP : PRINT PORTSETZUNG 3 NR. 97 •
                       •
0517 6E1170      SK9   RTJ/  WRE
051A 6E1049            RTJ/  RQ8
051D 6E11B8            RTJ/  PT8
0520 6E09CE            RTJ/  NZT
0523 EEA800            LDV/  TAB,X
0526 87FFA0            LDX•  X'FFA0'
0529 1708              JAX   SKA
052B 6170              JMP   SK9+6
052D 6E1170      R3U   RTJ/  WRE
0530 6E1049      SK9   RTJ/  RQ1
0533 6E10CB            RTJ/  PT1
0536 6E09CE            RTJ/  NZT
0539 EEA800            LDV/  TAB,X
053C 87FFA0            LDX•  X'FFA0'
053F 1708              JAX   SKA
0541 6170              JMP   SK9
0543 6E1170      SKA   RTJ/  WRE
0546 6E1049            RTJ/  RQ2
0549 6E11D8            RTJ/  PT2
054C 6E09CE            RTJ/  NZT
054F EEA800            LDV/  TAB,X
0552 87FFA0            LDX•  X'FFA0'
0555 1708              JAX   SKC
0557 6170              JMP   SKA
0559 6E1170      SKC   RTJ/  WRE
055C 6E1049            RTJ/  RQ3
055F 6E11B8            RTJ/  PT3
0562 6E09CE            RTJ/  NZT
0565 EEA800            LDV/  TAB,X
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PAGE 011

0568 87FFA0            LDX•  X'FFA0'
056B 1708              JAX   SKB
056D 6170              JMP   SKE
056F 661B9C      SKB   JMP/  WRE
                       •
                       •
                       • UP-10
                       •
0572 0000        SUE   DC    ••
0574 08                RQ1
0575 F01E              STA   ESI
0577 80FA        SUE   LDX   ASP
0579 EEA000            LDV/  SPE,X
057C 401E              LDX   ESI
057E 1704              JAX   SU1
0580 709A              IVM   ASP
0582 61F3              JMP   SUE
0584 63EC        SU1   JMP•  SUE
                       •
0586 0000        MI1   DC    ••
0588 870000            LDX•  0
058B 80FA              STX   ASP
058D 63F7              JMP•  MI1
                       •
058F 0000        MI8   DC    ••
0591 6E08AA            RTJ/  SUE
0594 80FA              LDX   ASP
0596 63F7              JMP•  MI8
                       •
                       •
                       • UP-8 : MASCHSTE ZEILE IN TAB • SPE •
                       •
0598 0000        MET   DC    ••
059A L07C              LDA   ZTA
059C A70063            ADA•  P'99'
059F F07C              STA   ZTA
05A1 AC                TAM
05A2 63F4              JMP•  MET
                       •
05A4 0000        ME5   DC    ••
05A6 E0B4              LDA   ZSP
05A8 A70014            ADA•  P'20'
05AB F0B4              STA   ZSP
05AD 63F5              JMP•  ME5
                       •
05AF 0000        MI3   DC    ••
05B1 80BA              STX   ZSP
05B3 607C              LDX   ZTA
05B5 63F8              JMP•  MI3
                       •
05B7 0000        MI8   DC    ••
05B9 A87C              STX   ZTA
05BB A0B4              LDX   ZSP
05BD 63F6              JMP•  MI6
                       •
                       •
                       • UP - 3 : NILFSPRO. •
                       •
05BF 0000        MIP   DC    ••
```

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PAGE 012

05C1 6E8BE8            RTJ/  MI3
05C4 FEA808            STV/  TAB+8,X
05C7 6E08ED            RTJ/  MI4
05CA 63F3              JMP•  MIP
                       •
05CC 0000        MIT   DC    ••
05CE 6E08E8            RTJ/  MI3
05D1 FEA809            STV/  TAB+9,X
05D4 6E08ED            RTJ/  MI4
05D7 63F3              JMP•  MIT
                       •
05D9 0000        MTP   DC    ••
05DB 6E08E8            RTJ/  MI3
05DE FEA80D            STV/  TAB+13,X
05E1 6E08ED            RTJ/  MI4
05E4 63F3              JMP•  MTP
                       •
05E6 0000        MLP   DC    ••
05E8 6E08E8            RTJ/  MI3
05EB FEA825            STV/  TAB+37,X
05EE 6E08ED            RTJ/  MI4
05F1 63F3              JMP•  MLP
                       •
05F3 0000        MLM   DC    ••
05F5 6E08E8            RTJ/  MI3
05F8 FEA828            STV/  TAB+40,X
05FB 6E08ED            RTJ/  MI4
05FE 63F3              JMP•  MLM
                       •
                       •
                       • UP-4 : NILFSPRO. •
                       •
                       •
0600 0000        MI6   DC    ••
0602 08                RQ4
0603 EEA000            LDV/  SPE,X        P
0606 6E06F8            RTJ/  MIP
0609 EEA004            LDV/  SPE+4,X
060C 6E0608            RTJ/  MIT          TM
060F EEA008            LDV/  SPE+8,X      TP
0612 6E0607            RTJ/  MTP
0615 0A                RQ3
0616 EEA00C            LDV/  SPE+12,X
0619 6E061C            RTJ/  MLP          LPM
061C EEA00F            LDV/  SPE+15,X     LN
061F 6E06F9            RTJ/  MLM
0622 E09FFE            LDA/  SPE-2,X
0625 607C              LDX   ZTA
0627 6E3F93            RTJ/  SNR
062A 08                RQ1
062B 80BA              LDX   ZSP
062D EEA013            LDV/  SPE+19,X
0630 63CE              JMP•  MI6
                       •
0632 0000        MI7   DC    ••
0634 6E08D8            RTJ/  MI2
0637 6E08CE            RTJ/  NZT
063A 63F6              JMP•  MI7
                       •
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                        *
                        *
                        * UP=6: WO1 VOLL MIT 6,7:ODER VORZEI. *
                        *
0678 0000       UP6     DC    **
0674 0B                 RG4
0675 F8BA               STV   W01+8
0677 09                 RG8
0678 87ABB0             LDX=  X'ABB0'
067B F8B8               STV   W01
067D 63F3               JMP*  UP0
                        *
067F 0000       UP1     DC    **
0681 0A                 RG3
0682 F8B8               STV   W01+3
0684 EFABB0B0           LDV=  X'ABB0BC'
0688 F8B8               STV   W01
068A 63F8               JMP*  UP1
                        *
068C 0000       UP8     DC    **
068E 08                 RG1
068F F8B8               STV   W01
0691 63F9               JMP*  UP8
                        *
                        * UP3 : IN FL *
                        *
0693 0000       UP3     DC    **
0695 09                 RG8
0696 8700B8             LDX=  A'W01'
0699 4E1BB4             RTJ/  CDB
069C 4E1BD4             RTJ/  CEF
069F 0B                 RG4
06A0 63F1               JMP*  UP3
                        *
                        * UP4 : TRANSF. IN DEZ *
                        *
06A2 0000       UP4     DC    **
06A4 87AFAF             LDX=  X'AFAF'
06A7 1F08               NAX   **10
06A9 0A                 RG3
06AA EFAFAFAF           LDV=  X'AFAFAF'
06AE 66974F             JMP/  AC4
06B1 0B                 RG6
06B2 8700BE             LDX=  A'W08'
06B5 4E19TA             RTJ/  SDF
06B8 63E9               JMP*  UP4
                        *
                        *
                        * DEZ : CONV. V. EDP IN DEZ-FORM *
                        *
06BA 0000       DEZ     DC    **
06BC 4E06A8             RTJ/  UP4
06BF 08                 RG1
06C0 E8C8               LDV   W08+10
06C2 F8C9               STV   W08+11
06C4 09                 RG8
06C5 E8C9               LDV   W08+11
06C7 87ABB6             LDX=  X'ABB6'
06CA 1F0F               NAX   DX8
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PAGE 014

06CC 4E07A6             RTJ/  DE1
06CF 0B                 RG6
06D0 E8C0               LDV   W08+8
06D2 F8CC               STV   W03+1
06D4 E8C4               LDV   W08+4
06D6 F8D0               STV   W03+5
06D8 660791             JMP/  DX7
06DB 87ABB5       DX8   LDX=  X'ABB5'
06DE 1731               JAX   DX0
06E0 87ABB4             LDX=  X'ABB4'
06E3 1737               JAX   DX1
06E5 87ABB3             LDX=  X'ABB3'
06E8 1747               JAX   DX2
06EA 87ABB2             LDX=  X'ABB2'
06ED 1757               JAX   DX3
06EF 87ABB1             LDX=  X'ABB1'
06F2 1767               JAX   DX4
06F4 87ABB0             LDX=  X'ABB0'
06F7 1777               JAX   DX5
06F9 87ADB1             LDX=  X'ADB1'
06FC 1710               JAX   DX6
06FE 4E07A6             RTJ/  DE1
0701 E8C0               LDV   W08+8
0703 F8D3               STV   W03+8
0705 870007             LDX=  7
0708 6E0797             RTJ/  UDE
070B 660791             JMP/  DX7
070E 660783       DX6   JMP/  DX6
0711 6E07A6       DX0   RTJ/  DE1
0714 87B0               LDV=  X'D0'
0716 F8D3               STV   W03+8
0718 0B                 RG6
0719 E8C0               LDV   W08+8
071B F8CC               STV   W03+1
071D 0A                 RG3
071E E8C4               LDV   W08+8
0720 F8D0               STV   W03+8
0722 6160               JMP   DX7
0724 6E07A6       DX1   RTJ/  DE1
0727 870001             LDX=  1
072A 6E0797             RTJ/  UDE
072D 0B                 RG6
072E E8C0               LDV   W08+8
0730 F8CD               STV   W03+8
0732 0A                 RG3
0733 E8C4               LDV   W08+8
0735 F8D1               STV   W03+8
0737 6158               JMP   DX7
0739 6E07A6       DX2   RTJ/  DE1
073C 870008             LDX=  8
073F 6E0797             RTJ/  UDE
0742 0B                 RG6
0743 E8C0               LDV   W08+8
0745 F8CE               STV   W03+3
0747 09                 RG8
0748 E8C4               LDV   W08+6
074A F8D0               STV   W03+7
074C 6143               JMP   DX7
074E 6E07A6       DX3   RTJ/  DE1
```

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PAGE 015

0751 870003             LDX=  3
0754 6E0797             RTJ/  UDE
0757 0B                 RG6
0758 E8C0               LDV   W08+8
075A F8CF               STV   W03+4
075C 08                 RG1
075D F8C4               LDV   W08+6
075F F8D3               STV   W03+8
0761 612E               JMP   DX7
0763 6E07A6       DX4   RTJ/  DE1
0766 870004             LDX=  4
0769 6E0797             RTJ/  UDE
076C 0B                 RG6
076D E8C0               LDV   W08+8
076F F8D0               STV   W03+5
0771 611E               JMP   DX7
0773 6E07A6       DX5   RTJ/  DE1
0776 870005             LDX=  5
0779 6E0797             RTJ/  UDE
077C 0A                 RG3
077D E8C0               LDV   W08+8
077F F8D1               STV   W03+8
0781 610E               JMP   DX7
0783 6E07A6       DX6   RTJ/  DE1
0786 870006             LDX=  6
0789 6E0797             RTJ/  UDE
078C 09                 RG8
078D E8C0               LDV   W08+8
078F F8D8               STV   W03+7
0791 6E18A6       DX7   RTJ/  ARD
0794 67C6BA             JMP*  DEZ
                        *
                        * UP=8 : HILFSPRO. *
                        *
0797 0000       UDE     DC    **
0799 08         DE0     RG1
079A EFB0               LDV=  X'B0'
079C FE80CB             STV/  W03+X
079F 45                 DCX
07A0 1308               JNZ   DE0
07A2 61F3               JMP   DE8
07A4 63F1       DE0     JMP*  UDE
                        *
07A6 0000       DE1     DC    **
07A8 08                 RG1
07A9 68BE               LDV   W08
07AB F8CB               STV   W03
07AD 63F7               JMP*  DE1
                        *
                        *
                        * UP=9 : DATEN IN FL *
                        *
07AF 0000       PFL     DC    **
07B1 0B                 RG4
07B2 E07C               LDX   ETA
07B4 EEAB05             LDV/  TAB+5,X
07B7 6E0678             RTJ/  UP0
07BA 6E0693             RTJ/  UP3
07BD 6E08B6             RTJ/  DEZ
```

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PAGE 016

07C0 F834               STV   P
07C2 63EB               JMP*  PFL
                        *
07C4 0000       TFL     DC    **
07C6 0A                 RG3
07C7 607C               LDX   ETA
07C9 EEAB0A             LDV/  TAB+10,X
07CC 6E0679             RTJ/  UP1
07CF 08                 RG1
07D0 EEAB09             LDV/  TAB+9,X
07D3 6E068C             RTJ/  UP8
07D4 6E0693             RTJ/  UP3
07D7 6E08B6             RTJ/  DEZ
07DA F830               STV   T
07DC 63BA               JMP*  TFL
                        *
07DE 0000       TFF     DC    **
07E0 0A                 RG3
07E1 607C               LDX   ETA
07E3 EEAB0E             LDV/  TAB+14,X
07E6 6E0679             RTJ/  UP1
07E9 08                 RG1
07EA EEAB0D             LDV/  TAB+13,X
07ED 6E068C             RTJ/  UP8
07F0 6E0693             RTJ/  UP3
07F3 6E08B6             RTJ/  DEZ
07F6 F834               STV   TF
07F8 63B4               JMP*  TFF
                        *
07FA 0000       LPF     DC    **
07FC 0A                 RG3
07FD 607C               LDX   ETA
07FF EEAB25             LDV/  TAB+37,X
0802 6E0679             RTJ/  UP1
0805 6E0693             RTJ/  UP3
0808 6E08B6             RTJ/  DEZ
080B F844               STV   PL
080D 63EB               JMP*  LPF
                        *
080F 0000       LNF     DC    **
0811 0A                 RG3
0812 607C               LDX   ETA
0814 EEAB28             LDV/  TAB+40,X
0817 6E0679             RTJ/  UP1
081A 6E0693             RTJ/  UP3
081D 6E08B6             RTJ/  DEZ
0820 F848               STV   ML
0822 63EB               JMP*  LNF
                        *
0824 0000       DZE     DC    **
0826 87BA95             LDX=  A'NB'
0829 6E17D1             RTJ/  DVF
082C 63F6               JMP*  DZE
                        *
                        *
                        * FORMEL  ET , NR.10 *
                        *
082E 0000       PCE     DC    **
0830 607C               LDX   ETA
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PAGE 017

0834 08                  RO1
0835 EEA80D              LDV/   TAB+13,X
0838 87FFAD              LDX=   X'FFAD'
083B 1781                ANX    SC1
083D 08                  RO4
083E E8D6                LDV    ZV1
0840 87BA9B              LDX=   A'KB'
0843 6E1733              RTJ/   MLP
0846 87BAA1              LDX=   A'KB'        8373
084C F8D6                STV    ZWT
084E E8D6                LDV    ZV1
0850 87BA9D              LDX=   A'KA'        75
0853 6E1733              RTJ/   MLP
0856 8100D4              LDX=   A'ZWT'
085C 611F                JMP    SC8
085E 08          SC1     RO4
085F E8D6                LDV    ZV1
0861 87BA9B              LDX=   A'KB'
0864 6E1733              RTJ/   MLP
0867 87BA99              LDX=   A'K7'        6655
086A 6E167B              RTJ/   ADP
086D F8D4                STV    ZWT
086F E8D6                LDV    ZV1
0871 87BAA5              LDX=   A'KE'        99
0874 6E1733              RTJ/   MLP
0877 8700D4              LDX=   A'ZWT'
087A 6E17D1              RTJ/   DVP
087D 6E169C              RTJ/   IXD
0880 87BAC1              LDX=   A'KD'
0883 6E1733              RTJ/   MLP
0886 87BAF1              LDX=   A'K9'        1001  KD=611
0889 6E17D1              RTJ/   DVP
088C 63A8                JMP=   PC8
                *
                *
                * FORMEL F, E,S,RF,TV , KR = 11 *
                *
088E 0000        PC4     DC     **
0890 08                  RO4
0891 E830                LDV    T
0893 870004              LDX=   A'T3'
0896 6E1681              RTJ/   SBP
0899 87BA91              LDX=   A'K1'        1
089C 6E1733              RTJ/   MLP
089F 870034              LDX=   A'P'
08A2 6E1733              RTJ/   MLP
08A5 87BA99              LDX=   A'K3'
08A8 6E17D1              RTJ/   DVP          K3=10084
08AB F8D6                STV    ZV1
08AD E83C                LDV    ZTP
08AF 8700D8              LDX=   A'ZW1'
08B2 6E1681              RTJ/   SBP
08B5 F8D8                STV    E
08B7 870038              LDX=   A'ET'        RP
08BA 6E17D1              RTJ/   DVP
08BD 87ABB1              LDX=   A'K9'        100
08C0 6E1733              RTJ/   MLP
```

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PAGE 018

08C3 F80C                STV    RP
08C5 E8D8                LDV    E            3
08C7 87BAB5              LDX=   A'KA'        338
08CA 6E1733              RTJ/   MLP
08CD 87BAB9              LDX=   A'KE'        1000
08D0 6E17D1              RTJ/   DVP
08D3 F8D8                STV    ZV1
08D6 E83e                LDV    T
08D7 8700D8              LDX=   A'ZW1'
08DA 6E1681              RTJ/   SBP
08DD F8D6                STV    ZV1
08DF E8D8                LDV    E
08E1 87BAAD              LDX=   A'KG'        688
08E4 6E1795              RTJ/   MLP
08E7 8700D8              LDX=   A'ZW1'
08EA 6E17D1              RTJ/   DVP
08ED F810                STV    E
08EF 87148A              LDX=   A'K8K'
08F3 6E1733              RTJ/   MLP
08F6 87BAB9              LDX=   A'KB'        1000
08F9 6E17D1              RTJ/   DVP
08FC 87BABD              LDX=   A'KC'        8
08FF 6E167B              RTJ/   ADP
0901 6E03C3              RTJ/   NUS
0904 6708EE              JMP=   PC4
                *
                *
                * PD1 : PT-FORMEL,NR 18 *
                *
0907 0000        PD1     DC     **
0909 EEBAB9              LDV/   KB          1000
090C 870034              LDX=   A'P'
090F 6E17D1              RTJ/   DVP
0912 6E1B07              RTJ/   LDN
0915 87BAB5              LDX=   A'KB'        8
0918 6E1733              RTJ/   MLP
091B 87BAB9              LDX=   A'KP'        7
091E 6E17D1              RTJ/   DVP
0921 6E1A86              RTJ/   EXN
0924 F8D6                STV    ZV1          1000/P , E-1B/7
0926 870006              LDX=   A'E7'
0929 6E1733              RTJ/   MLP
092C 87BACD              LDX=   A'KK1'       1B70
092F 6E1733              RTJ/   MLP
0932 87BC3e              LDX=   A'P'
0935 6E17D1              RTJ/   DVP
0938 F8D4                STV    ZWT          DT
093A 63CB                JMP=   PD1
                *
                *  PT *
                *
093C 0000        PC3     DC     **
093E 6E0907              RTJ/   PD1
0941 EEBAC1              LDV/   KK8         8738
0944 87BA93              LDX=   A'KB'        10
0947 6E17D1              RTJ/   DVP
094A 870030              LDX=   A'T'
094D 6E167B              RTJ/   ADP
```

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PAGE 019

0950 8700D8              LDX=   A'ZW1'
0953 6E1733              RTJ/   MLP
0956 F840                STV    PT
0958 63E8                JMP=   PD3
                *
                *  EPT - FORMEL *
                *
095A 6E0930      PD8     RTJ/   PD3
095D E840                LDV    PT
095F 8700D4              LDX=   A'ZWT'
0962 6E167B              RTJ/   ADP
0965 F818                STV    EPT
0967 6408B8              JMP/   SC3+3
                *
                *
                * OB FEUCHTIGKEIT VORHANDEN *
                *
096A 0000        OBF     DC     **
096C 807C                LDN    ETA
096E E8A80D              LDA/   TAB+13,X
0971 87AFAF              LDX=   X'AFAF'
0974 63F4                JMP=   LBF
                *
                * L- EICHWERTE IN PL *
                *
0976 0000        EL1     DC     **
0978 0A                  RO3
0979 E854                LDV    PL0
097B 6E0677              RTJ/   UP1
097E 6E0693              RTJ/   UP3
0981 6E08B6              RTJ/   DZE
0984 F8D8                STV    ZV1
0986 0A                  RO3
0987 E858                LDV    NL0
098A 6E0677              RTJ/   UP1
098D 6E0693              RTJ/   UP3
0990 6E08B6              RTJ/   DZE
0993 F8D4                STV    ZWT
0995 63X0                JMP=   EL1
                *
                *
                * PE1 : FORMEL  <L-<L, */* , L  >  NR. 14 *
                *
0998 0000        PE1     DC     **
099A 6E0976              RTJ/   EL1
099D E844                LDV    PL
099F 6E09CF              RTJ/   MID
09A2 8700D8              LDX=   A'ZW1'
09A5 6E17D1              RTJ/   DVP
09A8 F844                STV    PL
09AA E848                LDV    ML
09AC 6E09CF              RTJ/   MID
09AF 8700E4              LDX=   A'ZW7'
09B2 6E17D1              RTJ/   DVP
09B5 F848                STV    ML
09B7 870044              LDX=   A'PL'
09BA 6E167B              RTJ/   ADP
09BD F850                STV    L
09BF E844                LDV    PL
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09B7 870048              LDX=   A'NL'
09BA 6E17D1              RTJ/   DVP
09BD 87BA95              LDX=   A'KB'
09C0 6E1733              RTJ/   MLP
09C3 F840                STV    VPN
09C5 63C7                JMP=   PE1
                *
09C7 0000        MID     DC     **
09C9 87BAD5              LDX=   A'MK3'       443
09CC 6E1733              RTJ/   MLP
09CF 87BA91              LDX=   A'K9'        100
09D2 6E17D1              RTJ/   DVP
09D5 63F0                JMP=   MID
                *
                *
                * PE8 : IN E,S,RF,TV,EPT,GR-E,S-RF  '//// ' TRANSF.
                *
09D7 0000        PE8     DE     **
09D9 87001J              LDX=   19
09DC 08                  RO1
09DD AFAF        SC4     LDV=   X'AF'
09DF FE8008              STV/   E,X
09E2 A5                  DEX
09E3 1DFA                JXN    SC4
09E5 08                  RO4
09E6 63EF                JMP=   PE8
                *
                * PF1 : FORMEL INS / NR. ..... 15 *
                *
09E8 0000        PF1     DC     **
09EA 0A                  RO4
09EB E8DA                LDV    ZWT          ...Z IN KM
09ED 87BADD              LDX=   A'KK5'       4CB
09F0 6E1733              RTJ/   MLP
09F3 87BAB9              LDX=   A'KB'        1000
09F6 6E17D1              RTJ/   DVP
09F9 6E1A86              RTJ/   EXN
09FC 87BAD9              LDX=   A'KK4'       1869
09FF 6E1733              RTJ/   MLP
0A02 87BAB9              LDX=   A'KB'
0A05 6E17D1              RTJ/   DVP
0A08 F8D6                STV    INS
0A0A 63DE                JMP=   PF1
                *
                *
                * PF8 : FORMEL INR  / NR.16 *
                *
0A0C 0000        PF8     DC     **
0A0E 0B                  RO4
0A0F E8E4                LDV    ZV8          ... Z8
0A11 8700E0              LDX=   A'ZW3'       ... Z1
0A14 6E1681              RTJ/   SBP
0A17 F8E4                STV    ZV4
0A19 E8DE                LDV    ZVB
0A1B 8700D8              LDX=   A'ZW1'
0A1E 6E1681              RTJ/   SBP
0A21 87BAE1              LDX=   A'KK6'       ...60
0A24 6E17D1              RTJ/   DVP
0A27 8700E4              LDX=   A'ZW6'
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0A38 6E17D1           RTJ/  DVP
0A39 F8DC             STV   EV8          ... KB1
0A3A 8700D4           LDX=  A'EVT'
0A3B 6E1733           RTJ/  MLP
0A3C F8D4             STV   EVT
0A3D E8D8             LDV   EV1
0A3E 67BAE1           LDX=  A'KK6'
0A3F 6E17D1           RTJ/  DVP
0A40 F8D8             STV   EV1          ..B
0A41 E8DC             LDV   EV8          EI
0A42 8700E0           LDX=  A'EV3'
0A43 6E1733           RTJ/  MLP
0A44 F8E0             STV   EV3          C
0A45 E8D4             LDV   EVT          B
0A46 8700D8           LDX=  A'EV1'
0A47 6E1678           RTJ/  ADP          C
0A48 8700E0           LDX=  A'EV3'
0A49 6E1681           RTJ/  SBP
0A4A 8700C0           LDX=  A'IN8'
0A4B 6E1678           RTJ/  ADP
0A4C F8BC             STV   IY
0A4D E8B809           LDV/  K1K          39
0A4E 67BA95           LDX=  A'KB'
0A4F 6E17D1           RTJ/  DVP
0A50 F8D8             STV   EV1
0A51 E8BC             LDV   IY
0A52 8700D8           LDX=  A'EV1'
0A53 6E1681           RTJ/  SBP
0A54 F8BC             STV   IY
0A55 6394             JMP=  PF8

                      *
                      *
                      * PF3 : WELCHE E1,E8 VERDEN BENUTZT ?  NR. 17 *
                      *
0A56 0000     PF3     DC    **
0A57 80AA             LDX   RX
0A58 44               INX
0A59 68E8             STX   EVR
0A5A 80E8     8F8     LDX   EVR
0A5B 09               RDB
0A5C E8A000           LDV/  8PE,X
0A5D 807C             LDX   ETA
0A5E CEA8C1           CPV/  TAB+1,X
0A5F 1009             JGV   8F1
0A60 E0E8             LDA   EVR
0A61 A70007           ADA=  7
0A62 F0E8             STA   EVR
0A63 41EA             JMP   8F8
0A64 E0E8     8F1     LDA   EVR          E8-EEILE
0A65 B70007           SBA=  7
0A66 F0FA             STA   ASP
0A67 63DA             JMP=  PF3          E1-EEILE IN ASP
                      *
                      *
                      * DATEN E1,E8,RAD-1,RAD-8,E IN FL ; NR. 18 *
                      *
0A68 0000     PF4     DC    **
0A69 80FA             LDX   ASP
0A6A 6E0AEA           RTJ/  HIE

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0B0C 878AB9           LDX=  A'KB'
0B0F 6E17D1           RTJ/  DVP
0B10 F8DC             STV   EV8          B
0B11 E8D8             LDV   EV1
0B12 878AE0           LDX=  A'KK9'       38
0B13 6E1733           RTJ/  MLP
0B14 878AB1           LDX=  A'K8'
0B15 6E17D1           RTJ/  DVP
0B16 F8D8             STV   EV1
0B17 E8BAF1           LDV/  K1K          8686J IN EV1 IST E
0B18 878AB9           LDX=  A'KB'
0B19 6E17D1           RTJ/  DVP
0B1A F8E4             STV   EV4          D
0B1B E8D8             LDV   EV1
0B1C 8700E4           LDX=  A'EV4'
0B1D 6E1681           RTJ/  SBP
0B1E F8D8             STV   EV1          E-D
0B1F E8D0             LDV   L
0B20 8700EE           LDX=  A'KL'
0B21 6E1733           RTJ/  MLP
0B22 878D08           LDX=  A'K8K'       37186
0B23 6E1733           RTJ/  MLP
0B24 878AB1           LDX=  A'K9'
0B25 6E17D1           RTJ/  DVP
0B26 6E1807           RTJ/  LBN
0B27 8700D8           LDX=  A'EV1'
0B28 6E1733           RTJ/  MLP
0B29 8700DC           LDX=  A'EV8'
0B2A 6E1678           RTJ/  ADP
0B2B 8700D4           LDX=  A'EVT'
0B2C 6E1681           RTJ/  SBP
0B2D 6E1A68           RTJ/  INN
0B2E F8EA             STV   N
0B2F 670B0B           JMP=  PG4
                      *
                      *
                      * FORMEL LAB ...KL ; NR. 80 *
                      *
0B30 0000     PG8     DC    **
0B31 08               RDA
0B32 E8BAF1           LDV/  K1K          8686
0B33 878AB9           LDX=  A'KB'
0B34 6E17D1           RTJ/  DVP
0B35 F8DC             STV   EV8
0B36 E8E4             LDV   EV4
0B37 6E1B1E           RTJ/  LGD
0B38 F8EA             STV   EV4          LOG RAD
0B39 878AE0           LDX=  A'KK9'       38
0B3A 6E1733           RTJ/  MLP
0B3B 878AB1           LDX=  A'K9'
0B3C 6E17D1           RTJ/  DVP
0B3D 8700DC           LDX=  A'EV8'
0B3E 6E1681           RTJ/  SBP
0B3F F8DC             STV   EV8
0B40 E8BAE9           LDV/  KK6          19458
0B41 878AB9           LDX=  A'KB'
0B42 6E17D1           RTJ/  DVP
0B43 F8E0             STV   EV3
0B44 E8E4             LDV   EV4

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0AAD F8E0             STV   EV3
0AAF 40FA             LDF   ASP          IN EV3 IST E1 IN KM
0AB1 6E0AFB           RTJ/  MIF
0AB4 F8D8             STV   EV1          RAB-1
0AB6 80EE             LDX   EVX
0AB8 6E0AEA           RTJ/  MIE
0ABB F8E4             STV   EV4          E8 IN KM
0ABD 80E8             LDX   EVR
0ABF F8BC             STV   EV8          RAB-8
0AC1 CA               RCS
0AC2 807C             LDX   ETA
0AC4 BEA801           LDV/  TAB+1,X
0AC7 BE0E7F           RTJ/  UP1
0ACA 6E0E7A           RTJ/  UP3
0ACC 67BAB1           LDX=  A'K8'        100
0ACF 6E17D1           RTJ/  DVP
0AD2 63CC             JMP=  PF4          IN EVT  IST E IN KM
                      *
0AD4 0000     PF7     DC    **
0AD5 6E0AB0           RTJ/  PF3
0AD6 6E0AA6           RTJ/  PF4
0AD7 6E09FC           RTJ/  PF1
0AD8 6E0A1A           RTJ/  PF8
0AD9 63F0             JMP=  PF7
                      *
0ADA 0000     MIE     DC    **
0ADB 0A               RCS
0ADC BEA000           LDV/  8PE,X
0ADF 6E067F           RTJ/  UP1
0AE0 6E0693           RTJ/  UP3
0AE1 67BAB1           LDX=  A'K8'
0AE4 6E17D1           RTJ/  DVP
0AE7 63BC             JMP=  MIE
                      *
0AE9 0000     MIF     DC    **
0AEA BEA003           LDV/  8PE+3,X
0AED 6E067B           RTJ/  UP0
0AEE 6E0693           RTJ/  UP3
0AF1 63F1             JMP=  MIF
                      *
                      *
                      * PG4 : FORMEL FUER M ; NR.= 19 *
                      *
                      *
0AF4 0000     PG4     DC    **
0AF5 08               RDA
0AF6 E8DC             LDV   IY
0AF8 67BAE1           LDX=  A'KK6'       5C
0AFB 6E1733           RTJ/  MLP
0AFC 6E1B1E           RTJ/  LGD
0AFF F8D8             STV   EV1
0B00 67BAE5           LDX=  A'KK7'       455
0B03 6E1733           RTJ/  MLP
0B04 67BAB9           LDX=  A'KB'
0B07 6E17D1           RTJ/  DVP
0B0A F8E4             STV   EVT          A
0B0B E8BAB9           LDV/  KK8          19458
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0BC0 67BAE5           LDX=  A'KK7'       455
0BC3 6E1733           RTJ/  MLP
0BC4 67BAB9           LDX=  A'KB'
0BC7 6E17D1           RTJ/  DVP
0BC8 67C5F8           LDX=  A'ROK'
0BCB 6E1678           RTJ/  ADP
0BCC 6700E0           LDX=  A'EV3'
0BCF 6E1681           RTJ/  SBP
0BD0 6700DC           LDX=  A'EV8'
0BD3 6E17D1           RTJ/  DVP
0BD6 F8D8             STV   EV1
0BD7 E8BB81           LDV/  KBK          8918
0BDA 67BAB9           LDX=  A'KB'
0BDD 6E17D1           RTJ/  DVP
0BE0 F8DC             STV   EV8          B; IN EV1 IST A
0BE2 E8D8             LDV   EV1
0BE4 6700DC           LDX=  A'EV8'
0BE7 6E1681           RTJ/  SBP
0BE8 67BAB6           LDX=  A'KW'
0BEB 6E17D1           RTJ/  DVP
0BEE F8BC             STV   KL
0BEF 670B4A           JMP=  PG8
                      *
                      *
                      * LN <EUERAT RECHNEN ; NR 81 *
                      *
0BF1 0000     PG3     DC    **
0BF2 67B1B8           LDA=  X'B1B8'
0BF5 F8DC             STA   EV8
0BF6 670000           LDX=  0
0BF8 68FC             STX   ETA
0BF9 807C     8G6     LDX   ETA
0BFB 09               RDB
0BFC BEA801           LDV/  TAB+1,X
0BFF 1E8C             LEX   EV8
0C00 1708             JAX   8G8
0C01 6E05CE           RTJ/  NFT
0C03 61F1             JMP   8G6
0C05 6E07FC     8G5   RTJ/  LFT
0C07 6E0A11           RTJ/  LNF
0C0A 6E0E41           RTJ/  PEX
0C0D E8E8C            LDV   L
0C0E F8F6             STV   L%
0C0F 63D8             JMP=  PG3
                      *
                      *
                      * PC1 : RAD -W SUCHEN ; IN FL ; NR. 86 *
                      *
0C10 0000     PG1     DC    **
0C11 80AA             LDX   RX
0C12 44               INX
0C13 68FA             STX   ASP
0C14 80FA     8G8     LDX   ASP
0C16 09               RDB
0C17 E6A000           LDA/  8PE,X
0C1A 67B1B8           LDX=  X'B1B8'
0C1D 1709             JAX   8G1
0C1E E0FA             LDA   ASP
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0C3F A70007           ABA=  7
0C42 F0FA             STA   ASP
0C44 615C             JMP   SG8
0C46 08         SG1   RO4
0C47 E0FA             LDX   ASP
0C49 E1A003           LDV/  SPB+3,X
0C4C 6B047B           RTJ/  UP0
0C4F 6E0603           RTJ/  UP3
0C52 F9EA             STV   ZW4          PAR=V
0C54 0000             ***   **
0C56 E7A701           LDV/  SPB+1,X
0C59 6B047C           RTJ/  UP0
0C5C 6B0603           RTJ/  UP3
0C5F 673AB1           LDY=  A'X9'
0C62 6E17D1           RTJ/  DVF
0C65 601009           RTJ/  LCF
0C68 F9FE             STV   KOK
0C6A 63BF             JMP=  PG1
                  *
                  *
                  * LTA : EINGEMISSE (IN FL) IN TAB ; NR.= 83 *
                  *
0C6C 0000         LTA   DC    **
0C6E 08               RO4
0C6F E846             LDV   PT
0C71 FEAB11           STV/  TAB+17,X
0C74 E81E             LDV   EPT
0C76 FEAB15           STV/  TAB+81,X
0C79 E806             LDV   E
0C7B FEAB19           STV/  TAB+85,X
0C7E E81C             LDV   S
0C80 FEAB1D           STV/  TAB+89,X
0C83 E80C             LDV   HF
0C85 FEAB21           STV/  TAB+93,X
0C88 E814             LDV   TV
0C8A FEAB25           STV/  TAB+53,X
0C8D E83C             LDV   IT
0C8F FEAB4D           STV/  TAB+77,X
0C92 E85A             LDV   N
0C94 FEAB51           STV/  TAB+81,X
0C97 E54A             LDV   PL
0C99 610CBC           RTJ/  PG1
0C9C FEAB55           STV/  TAB+37,X
0C9F 08               RO4
0CA0 E8AB             LDV   ML
0CA2 640CBC           RTJ/  PG1
0CA5 FEAB59           STV/  TAB+CD,X
0CA8 08               RO4
0CA9 E84C             LDV   VPN
0CAB 610CBC           RTJ/  PG1
0CAE FEAB5B           STV/  TAB+43,X
0CB1 08               RO4
0CB2 E856             LDV   L
0CB4 61ECBC           RTJ/  PG1
0CB7 FEAB5E           STV/  TAB+46,X
0CBA 6380             JMP/  ETA
                  *
0CBC 0000         PG1   DC    **
0CBE 6106BA           RTJ/  DEZ

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0CC1 807C             LDX   ZYA
0CC3 0A               RO1
0CC4 2BCF             LDV   =D344
0CC5 63F4             JMP=  PG1
                  *
                  *
                  * TAE : ENDE V. TAB ? ; NR = 84 *
                  *
0CC8 0000         TAE   DC    **
0CCA 08               RO4
0CCB 807C             LDX   ZYA
0CCD EBAB00           LDV/  TAB,X
0CD0 07FFA0           LDX=  X'FFA0'      BLANK
0CD3 1703             JAX   SA8          MASCHSTER TEIL
0CD5 08               RO4
0CD6 E7FC             LDY/  TAE
0CD8 670000       SA8 LDX=  0
0CDB 847C             STX   ZYA
0CDD 640B94           JMP/  SP6
                  *
                  * PN1 : FORMEL DN ) NR. = 85 *
                  *
0CE0 0000         PN1   DC    **
0CE2 08               RO4
0CE3 E8DA             LDV   ZW1
0CE5 670068           LDX=  A'P0'
0CE8 6E17D1           RTJ/  DVF
0CEB 601009           RTJ/  LCH
0CEE F9D6             STV   ZW1          LH PIK/P0
0CF0 EBBAB1           LDV/  KRE          8730
0CF3 670A05           LDX=  A'K0'        10
0CF6 6E17D1           RTJ/  DVF
0CF9 F9DC             STV   ZW8
0CFB E870             LDV   T1
0CFD 67008C           LDX=  A'EV0'
0D00 6E1678           RTJ/  ADF
0D03 F870             STV   T1           IN K.
0D05 E870             LDV   T8
0D07 67008C           LDX=  A'EV0'
0D0A 6E1678           RTJ/  ADF
0D0D F870             STV   T8
0D0F 670074           LDX=  A'T1'
0D12 6E1678           RTJ/  ADF
0D15 67BAC9           LDX=  A'RE'        8
0D18 6E17D1           RTJ/  DVF
0D1B 67008C           LDX=  A'EV1'
0D1E 6E1733           RTJ/  MLF
0D21 67BAF0           LDX=  A'6AH'       89384
0D24 6E1733           RTJ/  MLF
0D27 67BAB9           LDX=  A'YB'
0D2A 6E17D1           RTJ/  DVF
0D2D F89E             STV   DN
0D2F 63AF             JMP=  PN1
                  *
                  *
                  * PN0 : DATEN IN FL ; NR = 86 *
                  *
0D31 0000         PN0   DC    **
0D33 6E07AF           RTJ/  PFL

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0D36 E834             LDV   P
0D38 F88E             STV   P8
0D3A 6E07C4           RTJ/  TFL
0D3D E830             LDV   T
0D3F F870             STV   T8
0D41 6E08CE           RTJ/  NEI
0D44 6E0D73           RTJ/  TAF
0D47 6E07AF           RTJ/  PFL
0D4A E834             LDV   P
0D4C F88A             STV   P1
0D4E 6E07C4           RTJ/  TFL
0D51 E838             LDV   T
0D53 F874             STV   T1
0D55 E88A             LDV   P1
0D57 670068           LDX=  A'P0'
0D5A 6E1681           RTJ/  SBF
0D5D 6700FC           LDX=  A'F'
0D60 611733           RTJ/  MLF
0D63 67BAB1           LDX=  A'X9'
0D66 6E17D1           RTJ/  DVF
0D69 67008A           LDX=  A'P1'
0D6C 6E1678           RTJ/  ADF
0D6F F87A             STV   ZW7
0D71 63BE             JMP=  PN8
                  *
                  *
                  * TAF : ENDE DER TAB ( WIE TAE ) ; NR = 87 *
                  *
0D73 0000         TAF   DC    **
0D75 08               RO1
0D76 807C             LDX   ZTA
0D78 EEA200           LDV/  TAB,X
0D7B 67FFA0           LDX=  X'FFA0'
0D7E 1703             JAX   SA4
0D80 08               RO4
0D81 63F0             JMP=  TAF
0D83 660356       SA4 JMP/  SP5
                  *
                  *
                  * FN1 : FORMEL GPA ; =WELFSPNC. ; NR = 88 *
                  *
0D86 0000         PN1   DC    **
0D88 08               RO4
0D89 E8D8             LDV   ZW1
0D8B 67008C           LDX=  A'EV8'
0D8E 6E1681           RTJ/  SBF
0D91 67C09E           LDX=  A'DM'
0D94 6E17D1           RTJ/  DVF
0D97 672AB1           LDX=  A'K9'
0D9A 6E1733           RTJ/  MLF
0D9D F84C             STV   GPA
0D9F 63E5             JMP=  PN1
                  *
0DA1 0000         PN8   DC    **
0DA3 08               RO4
0DA4 E874             LDV   T1
0DA6 F8E8             STV   ZW1
0DA8 E870             LDV   T8
0DAA F8DC             STV   ZW8

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0DAC 63F9             JMP=  PN8
                  *
0DAE 0000         PN3   DC    **
0DB0 6EBC09           RTJ/  PSH
0DB3 EEAA19           LDV/  TAB+85,X
0DB6 6E0DD8           RTJ/  P08
0DB9 EEAA19           LDV/  TAB+85,X
0DBC F8F6             STV   ZW1
0DBE 63E5             JMP=  PN3          81,88
                  *
0DC0 0000         PN4   DC    **         81,88
0DC2 6EBC89           RTJ/  PSH
0DC5 EEAA19           LDV/  TAB+89,X
0DC8 6E0DD8           RTJ/  P08
0DCB EEAA19           LDV/  TAB+89,X
0DCE F8D8             STV   ZW1
0DD0 63E5             JMP=  PN4
                  *
0DD2 0000         P08   DC    **
0DD4 F8DC             STV   ZW8
0DD6 4E               TXA
0DD7 670003           SBA=  X'99'
0DDA 4C               TAX
0DDB 63F9             JMP=  P08
                  *
0DDD 0000         PN5   DC    **
0DDF 6EBC55           RTJ/  PSH
0DE2 EEAA31           LDV/  TAB+33,X
0DE5 6E0DD8           RTJ/  P08
0DE8 EEAA31           LDV/  TAB+33,X
0DEB F8D8             STV   ZW1
0DED 63E5             JMP=  PN5
                  *
0DEF 0000         PN6   DC    **
0DF1 08               RO4
0DF2 807C             LDX   ZTA
0DF4 EEAA11           LDV/  TAB+17,X
0DF7 6E0DD8           RTJ/  P08
0DFA EEAA11           LDV/  TAB+17,X
0DFD F8D8             STV   ZW1
0DFF 63E5             JMP=  PN6          PT1.PT8   UND IN PN5 RP
                  *
0E01 0000         PN7   DC    **
0E03 08               RO4
0E04 807C             LDX   ZTA
0E06 EEAA51           LDV/  TAB+81,X
0E09 F8F6             STV   N8
0E0B 6E0DD8           RTJ/  P08
0E0E EEAA51           LDV/  TAB+81,X
0E11 F8F2             STV   N1
0E13 63EC             JMP=  PN7          N1,N8
                  *
                  * AUSTAUSCH *
                  *
0E15 0000         P11   DC    **
0E17 08               RO4
0E18 6EBB1E           RTJ/  CE1
0E1B E88A             LDV   P1
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0E19 870074          LDX=  A'TI'
0E1C 6E17D1          RTJ/  OVF
0E1F F8D8            STV   EVI
0E21 E8EE            LDV   P8
0E23 870070          LDX=  A'TB'
0E26 6E17D1          RTJ/  OVF
0E29 870080          LDX=  A'EBI'
0E2C 6E1078          RTJ/  ABF
0E2F F8D8            STV   EVI
0E31 E8F8            LDV   H1
0E33 6E8B00          RTJ/  RCB
0E36 F8F8            STV   H1
0E38 E8E6            LDV   H0
0E3A 6E8B00          RTJ/  RCB
0E3D F8F8            STV   H1
0E3F 870092          LDX=  A'H1'
0E42 6E17D1          RTJ/  OVF
0E45 F8F8            STV   H1
0E47 E8E6            LDV   H0
0E49 6E8B00          RTJ/  RCB
0E4C F8F6            STV   H0
0E4E E8EA88          LDV/  H0
0E51 870096          LDX=  A'H0'
0E54 6E17D1          RTJ/  OVF
0E57 F8F6            STV   H0
0E59 E8E8            LDV   H1
0E5B 870096          LDX=  A'H0'
0E5E 6E1681          RTJ/  SBF
0E61 F8F8            STV   H1
0E63 870092          LDX=  A'H1'
0E66 6E1733          RTJ/  MLF
0E69 F8F8            STV   H1
0E6B E8EA            LDV   P1
0E6D 87008E          LDX=  A'P8'
0E70 6E1681          RTJ/  SBF
0E73 F8DC            STV   EV8
0E75 87008C          LDX=  A'EV8'
0E78 6E1733          RTJ/  MLF
0E7B F8DC            STV   EV8
0E7D 87BAF6          LDX=  A'KBX'          643
0E80 6E1733          RTJ/  MLF
0E83 87BAB1          LDX=  A'KB'           100
0E86 6E17D1          RTJ/  OVF
0E89 87BAB9          LDX=  A'KB'           1000
0E8C 6E17D1          RTJ/  OVF
0E8F 87BAB9          LDX=  A'KB'
0E92 6E17D1          RTJ/  OVF
0E95 870088          LDX=  A'EW1'
0E98 6E17D1          RTJ/  OVF
0E9B 870098          LDX=  A'HI'
0E9E 6E17D1          RTJ/  OVF
0EA1 F8B6            STV   AUS
0EA3 E8DC            LDV   EV8
0EA5 87FAF9          LDX=  A'K3M'          373
0EA8 6E1733          RTJ/  MLF
0EAB 87BAB1          LDX=  A'K9'
0EAE 6E17D1          RTJ/  OVF
0EB1 870088          LDX=  A'EW1'
0EB4 6E17D1          RTJ/  OVF
0EB7 870088          LDX=  A'EW1'
0EBA 6E17D1          RTJ/  OVF
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PAGE 030

0EC0 870098          LDX=  A'HI'
0EC3 6E17D1          RTJ/  OVF
0EC6 F88A            STV   DIF
0EC8 870E18          JMP=  PII
                     *
                     * PRI : ....  ... TAB + INHALT AN UNA++TUNG AB
                     *
0ECB 0000      PRI   DC    **
0ECD E088            LDA   EVI
0ECF E07C            SBA   ETA
0ED1 1A00            JGE   PRI
0ED3 63F3            JMP=  PRI
0ED5 DC        PR1   RG1
0ED6 63F8            JMP=  PRI
                     *
                     *
0ED8 0000      PR8   DC    **              PT
0EDA 08              R04
0EDB 807C            LDX   ETA
0EDD E8A811          LDV/  TAB+17,X
0EE0 6E048A          RTJ/  DEZ
0EE3 08              R04
0EE4 E8C8            LDV   W03+3
0EE6 807C            LDX   ETA
0EE8 F8A811          STV/  TAB+17,X
0EEB 6E0EC8          RTJ/  PRI
0EEE 63E8            JMP=  PR8
                     *
                     *
0EF0 0000      PR4   DC    **              E
0EF2 08              R04
0EF3 807C            LDX   ETA
0EF5 E8A819          LDV/  TAB+25,X
0EF8 6E0F03          RTJ/  P03
0EFB F8A819          STV/  TAB+25,X
0EFE 6E0EC8          RTJ/  PRI
0F01 63ED            JMP=  PR4
                     *
0F03 0000      P03   DC    **
0F05 6E048A          RTJ/  DEZ
0F08 08              R04
0F09 E8C7            LDV   W03+4
0F0B 807C            LDX   ETA
0F0D 63F4            JMP=  P03
                     *
                     *
0F0F 0000      PK9   DC    **              DH
0F11 08              R04
0F12 807C            LDX   ETA
0F14 E8A831          LDV/  TAB+49,X
0F17 6E0F03          RTJ/  P03
0F1A 08              R04
0F1B E8CD            LDV   W03+2
0F1D F8A831          STV/  TAB+49,X
0F20 6E0EC8          RTJ/  PRI
0F23 63EA            JMP=  PK9
                     *
```

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                     *
                     * PORTSETZUNG V. NR. 30 ;   NR + 31  *
                     *
0F25 0000      P1N   DC    **
0F27 08              R04
0F28 807C            LDX   ETA
0F2A E8A853          LDV/  TAB+83,X
0F2D 6E048A          RTJ/  DEZ
0F30 6E0F41          RTJ/  P04
0F33 F8A835          STV/  TAB+83,X
0F36 0A              R03
0F37 E8D0            LDV   W03+8
0F39 F8A836          STV/  TAB+84,X
0F3C 6E0EC8          RTJ/  PRI
0F3F 63E4            JMP=  P1N
                     *
0F41 0000      P04   DC    **
0F43 08              R01
0F44 E8CB            LDV   W03
0F46 807C            LDX   ETA
0F48 63F7            JMP=  P04
                     *
0F4A 0000      P7N   DC    **
0F4C 08              R04                   A
0F4D 807C            LDX   ETA
0F4F E8A857          LDV/  TAB+87,X
0F52 6E048A          RTJ/  DEZ
0F55 6E0F65          RTJ/  P05
0F58 F8A855          STV/  TAB+85,X
0F5B E8D0            LDV   W03+8
0F5D F8A858          STV/  TAB+88,X
0F60 6E0EC8          RTJ/  PRI
0F63 63E5            JMP=  P7N
                     *
0F65 0000      P05   DC    **
0F67 0A              R03
0F68 E8CD            LDV   W03+2
0F6A 807C            LDX   ETA
0F6C 63F7            JMP=  P05
                     *
                     *
0F6E 0000      P8N   DC    **
0F70 08              R04
0F71 807C            LDX   ETA
0F73 E8A85D          LDV/  TAB+93,X
0F76 6E048A          RTJ/  DEZ
0F79 6E8B36          RTJ/  CE8
0F7C F8A85B          STV/  TAB+91,X
0F7F E8CF            LDV   W03+4
0F81 F8A85E          STV/  TAB+94,X
0F84 6E0EC8          RTJ/  PRI
0F87 63E5            JMP=  P8N
                     *
                     * P9N : IN AUS -DIF VORNE STATT RG AD BRINGEN *
                     *
0F89 0000      P9N   DC    **
0F8B 08              P01
0F8C 807C            LDX   ETA
```

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0FEE E8A855          LDV/  TAB+85,X
0FF1 6E0FC8          RTJ/  P06
0FF4 F8A855          STV/  TAB+85,X
0FF7 E8A856          LDV/  TAB+86,X
0FFA 6E0FC8          RTJ/  P06
0FFD F8A856          STV/  TAB+86,X
1000 E8A857          LDV/  TAB+87,X
1003 6E0FC8          RTJ/  P06
1006 F8A857          STV/  TAB+87,X
1009 807C            LDX   ETA
100B E8A858          LDV/  TAB+91,X
100E 6E0FD8          RTJ/  P07
1011 F8A858          STV/  TAB+91,X
1014 E8A85C          LDV/  TAB+98,X
1017 6E0FD8          RTJ/  P07
101A F8A85C          STV/  TAB+98,X
101D E8A85D          LDV/  TAB+93,X
1020 1E0FD4          RTJ/  P07
1023 F8A85D          STV/  TAB+93,X
1026 6E0EC8          RTJ/  PRI
1029 63DE            JMP=  P9N
                     *
102B 0000      P06   DC    **
102D 87FFB0          LDX=  X'FFB0'
1030 1FE7            MAX   SM1
1032 E8A0            LDV=  X'A0'
1034 807C            LDX   ETA
1036 63F3            JMP=  P06
                     *
1038 0000      P07   DC    **
103A 87FFB0          LDX=  X'FFB0'
103D 1FE7            MAX   SM8
103F E8A0            LDV=  X'A0'
1041 807C            LDX   ETA
1043 63F3            JMP=  P07
                     *
                     *
                     * UP F. PRINT ; NR. + 33 *
                     *
1045 0000      PR8   DC    **
1047 6E118A          RTJ/  PPT
104A 6E118A          RTJ/  PRT
104D 63F6            JMP=  PR8
                     *
104F 0000      PP3   DC    **
1051 6E118A          RTJ/  PHT
1054 6E0FF5          RTJ/  PH8
1057 63F6            JMP=  PR3
                     *
1059 0000      PP4   DC    **
105B 6E0FE7          RTJ/  PR3
105E 6E118A          RTJ/  PRT
1061 63F6            JMP=  PP4
                     *
1063 0000      CO1   DC    **
1065 E8AC            LDV=  C'.
1067 6E85F8          RTJ/  OUT
106A 6E118A          RTJ/  PRT
106D 63F4            JMP=  CO1
```

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PAGE 033

                    *
1007 0000      C08  DC   **
1011 4E1003         RTJ/  C01
1014 4E119A         RTJ/  PRT
1017 63F6           JMP*  C08
                    *
                    *
                    * HOFF 1 + S ) HR + 36 *
                    *
1019 0000      H01  DC   **
101B 070017         LDA=  23
101E 52A091    P40  LDA/  A00,X
1021 4E00F8         RTJ/  OUT
1024 46             DEX
1025 1DF7           BNE   P40
1027 070017         LDA=  23
102A 52A089    P43  LDA/  A03,X
102D 4E00F8         RTJ/  OUT
1030 43             DEX
1031 1DF7           BNE   P43
1033 070017         LDA=  23
1036 52AA01    P46  LDA/  A01,X
1039 4E00F8         RTJ/  OUT
103C 46             DEX
103D 1DF7           BNE   P46
103F 4E117A         RTJ/  WRE
1042 070000         LDA=  0
1045 8E7E           STA   STA
1047 6300           JMP*  H01
                    *
1049 0000      H00  DC   **
1049 070016         LDA=  22
104E 52AA10    P46  LDA/  A00+10
1051 4E00F8         RTJ/  OUT
1054 46             DEX
1055 1DF7           BNE   P46
1057 070016         LDA=  22
105A 52AA30    P66  LDA/  A00+30
105D 4E00F8         RTJ/  OUT
1060 46             DEX
1061 1DF7           BNE   P66
1063 070016         LDA=  22
1066 52AAAA    P67  LDA/  A07+X
1069 4E00F8         RTJ/  OUT
106C 46             DEX
106D 1DF7           BNE   P67
106F 4E117D         RTJ/  WRE
1072 070000         LDA=  0
1075 8E7C           STA   STA
1077 6300           JMP*  H00
                    *
                    * UP P. PRINT + ZVI ) HR.+ 38 *
                    *
1079 0000      P40  DC   **
107B 4E00F9         RTJ/  PR4
107E 4E11A9         RTJ/  ZVI
1081 63F6           JMP*  P40
                    *
1083 0000      P31  DC   **
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PAGE 034

1085 4E00F5         RTJ/  P30
1088 4E1003         RTJ/  C01
108B 4E11A9         RTJ/  ZVI
108E 63F8           JMP*  P31
                    *
1090 0000      P00  DC   **
1093 4E00F5         RTJ/  P00
1096 4E1003         RTJ/  C01
1099 4E11A9         RTJ/  ZVI
109C 63F8           JMP*  P00
                    *
109E 0000      P40  DC   **
10A1 4E00F9         RTJ/  PR4
10A4 4E1003         RTJ/  C01
10A7 4E11A9         RTJ/  ZVI
10AA 63F3           JMP*  P40
                    *
10AC 0000      P11  DC   **
10AF 4E00F63        RTJ/  PRX
10B2 4E0C07         RTJ/  I7I
10B5 63F6           JMP*  P11
                    *
10B7 0000      P01  DC   **
10BA 4E00F5         RTJ/  P00
10BD 4E1003         RTJ/  C01
10C0 4E11A9         RTJ/  ZVI
10C3 63F8           JMP*  P01
                    *
10C5 0000      P40  DC   **
10C8 4E00FF7        RTJ/  PR4
10CB 4E1009         RTJ/  C09
10CE 63F6           JMP*  P40
                    *
                    *
                    * P1: - PRINT 1.TAIL V. TAB ) HR. + 36 *
                    *
10D0 0000      PT1  DC   **
10D2 8E7C           LDA   STA
10D4 4E10AA         RTJ/   P11          A
10D7 4E1079         RTJ/  P40           N
10DA 4E107E         RTJ/  P46           P
10DD 4E1042         RTJ/  P01           T
10E0 4E1088         RTJ/  P31           TT
10E3 4E107E         RTJ/  P40
10E6 4E1079         RTJ/  P40    EPT.   PT'
10E9 4E1090         RTJ/  P00           S
10EC 4E1090         RTJ/  P00           S
10EF 4E10B4         RTJ/  P01
10F2 4E
10F3 4E10BA         RTJ/  P01           +L
10F6 4E10B4         RTJ/  P01           -L
10F9 4E118A         RTJ/  PRT           +/-
10FC 4E1009         RTJ/  C09
10FF 4E11A9         RTJ/  ZVI
1102 4E00F5         RTJ/  P00           L
1105 4E1003         RTJ/  C01
1108 4E117D         RTJ/  WRE
110B 63C3           JMP*  PT1
                    *
```

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PAGE 035

110D 0000      PT0  DC   **
110F 8E7C           LDA   STA
1111 4E10BA         RTJ/  P11     I
1114 46             TXA
1115 A9D0B8         ADA=  F'88'
1118 8E7A           STA   ASP
111A 070000         LDA=  0
111D 4E117E         RTJ/  ZWR
1120 52FA           LDA   ASP
1122 4E1131         RTJ/  PTA
1125 63B6           JMP*  PT0
                    *
1127 0000      PT3  DC   **
1129 8E7C           LDA   STA
112B 4E0FA1         RTJ/  IXB
112E 4E0BAF         RTJ/  SBA
1131 4E1131         RTJ/  PTA
1134 63F1           JMP*  PT3
                    *
1136 0000      PT4  DC   **
1138 4E1079         RTJ/  P40
113B 4E1090         RTJ/  P00           0T
113E 4E1090         RTJ/  P00           0S
1141 4E1090         RTJ/  P00           55
1144 4E1090         RTJ/  P00           ERF
1147 4E1C90         RTJ/  P00           CPT
114A 4E1090         RTJ/  P00           1
114D 4E1090         RTJ/  P00           N
1150 4E1CC1         RTJ/  PAK
1153 4E11A9         RTJ/  ZVI
1156 4E0BCF         RTJ/  6E3
1159 8E7C           LDA   STA
115B 4E2F63         RTJ/  PRX
115E 4E117D         RTJ/  WRE
1161 63D3           JMP*  PT4
                    *
                    *
                    *
                    * ENT : TEIL T.F/L ENTPASLLT *
                    *
1163 0000      ENT  DC   **
1165 070003         LDA=  3
1168 EFAD      EN1  LDA=  X'AD'
116A 6EE8F8         RTJ/  OUT
116D 45             DEY
116E 1DF8           BNZ   EN1
1170 4E1BR8         RTJ/  RU6
1173 63EE           JMP*  ENT
                    *
                    *
                    * UP ( WRI. PRT PRS.ZVI.ZWR ...  ) HR.+ 38 *
                    *
1175 0000      WRI  DC   **
1177 EF8D           LDA=  X'8D'
1179 4E2BF6         RTJ/  OUT
117C EF8A           LDA=  X'8A'
117E 4E2BF8         RTJ/  0.T
1181 63F8           JMP*  WRE
                    *
```

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PAGE 036

1183 0000      ZWR  DC   **
1185 EFA0           LDA=  X'A0'
1188 4E2BF8         RTJ/  OUT
118B 45             DEX
118C 1DF8           BNZ   ZWR+8
118E 63F4           JMP*  ZWR
                    *
1190 0000      PRT  DC   **
1192 52AE00         LDA/  TAB,X
1195 4E2BF8         RTJ/  OUT
1198 46             INX
1199 63F5           JMP*  PRT
                    *
119B 0000      PRS  DC   **
119D 52A000         LDA/  SPE,X
11A0 4E2BF8         RTJ/  OUT
11A3 46             INX
11A4 63F8           JMP*  PRS
                    *
11A6 0000      COM  DC   **
11A8 EFAC           LDA=  C','
11AA 4E00F8         RTJ/  OUT
11AD 63F7           JMP*  COM
                    *
11AF 0000      ZVI  DC   **
11B1 EFA0           LDA=  X'A0'
11B4 4E00F8         RTJ/  OUT
11B7 63F7           JMP*  ZVI
                    *
                    *
                    * UP - RIRLESEN WIT SLE *
                    *
11B9 0000      CIY  DC   **
11BB 20             RDI   20
11BC 070000         LDA=  0
11BF 9400FA         STA/  ASP
11C2 39C8           OBA   4,8
11C4 4E11E2    IMP  RTJ/  SLE
11C7 D10079         ADA=  X'79'
11CA 4100E0         ADA=  X'E0'
11CD 8400FA         LDX/  ASP
11D0 FEA000         STU/   SPE,X
11D3 8100FF         LDX=  X'FF'
11D6 17EC           JAX   IMP
11D8 8100BA         LDX=  X'BA'
11DB 17E7           JAX   IMP
11DD 81008D         LDX=  X'8D'
11E0 17E0           JAX   IMP
11E2 8100A0         LDX=  X'A0'
11E5 17DD           JAX   IMP
11E7 B69BA8         LDX/  CAS
11EA 1705           JAX   EX1
11EC 7600FA         IWS/  ASP
11EF 61D3           JMP   IMP
11F1 3998      EX1  OBA   4,8
11F3 4187           JMP   CIX
11F5 0000      SLE  DC   **
11F7 4E11FE         RTJ/  RTA
11FA 63F9           JMP*  SLE
11FC 1003           MOV   ZRR
```

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PAGE 037

11F7 08                 SO1
11F8 63FA               JMP*  6,A
11FA 9968       ERR     JSR   4,B
11FC 00                 HLT
11FD 0001               DC    1
11FE 0000       RTA     DC    **
1200 58881FFD           ISN   1,B,RTA-1
1202 E700               LDV*  X'81'
1204 0000               DC    RTA-1
1205 11FD               JMP   **-2
1207 E700               LDV*  X'81'
1209 0001               JMP   RTA-1
120A 1101               SO1   **+2
120C 08                 SO1
120D 0108               JSR   0,B
120F 63E9               JMP*  RTA
1211 63F8       EIX     JMP*  EIT
                *
                **
                *
                * EMISON. WELCHE STELL IN PRINT  ANSTEU. *
                *
1417 0000       RUD     DC    **
1419 1002               JSV   SRX
141B 6404B6             JMP/  SR6+5
141E E4B8AE     SRX     LDA/  0A6
1421 E70004             LDX=  X'0004'
1424 1797               JAE   RU1
1425 E70006             LDB=  X'0006'
1427 1797               JAE   RU3
1429 E70007             LDB=  X'0007'
142B 1797               JAE   RU3
142D 6407C             JMP/  R4U
142F 6389               JMP*  RUD
1431 6404A8     RU1     JMP/  R1U
1433 6389               JMP*  RUD
1435 6405D6     RU6     JMP/  R5U
1437 6389               JMP*  RUD
1439 6405BE     RU3     JMP/  R3U
143B 6383               JMP*  RUD
                *
143D 6E1170     VRA     RTJ/  VRE
1440 6401CE             JMP/  B01
                *
1442 6E1170     VRB     RTJ/  VRE
1445 6401B0             JMP/  B08
                *
1447 6E1170     VRC     RTJ/  VRE
144A 6401D4             JMP/  B03
                *
144C 6E1170     VRD     RTJ/  VRE
144F 6401AE             JMP/  B04
                *
1451 6E1170     VRE     RTJ/  VRE
1454 6401B6             JMP/  BE6
                *
1456 0000       BLK     DC    **
1458 E707D0             LDX=  8000
145B 08         BLA     SO1
```

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PAGE 038

145C E7A0               LDV=  X'A0'
145E FEA800             STV/  TAB,X
1461 45                 SCX
1462 1DF7               XSR   BLA
1464 63F0               JMP*  FLE
                *
1466 0000       SWX     DC    **
1468 E70000             LDX=  0
146B 07000C             STX   ZTA
146D E7B000             LDA=  X'B000'
1470 FEA803             STA/  TAB+3,X
1473 6E04CE             RTJ/  NST
1476 45                 TXA
1477 E70000             AAX=  X'0000'
147A 1008               NAN   TR1
147C 61ED               JMP   TRS
147E 63B4       TR1     JMP*  B6E
                *
1480 0000       BLY     DC    **
1482 E70000             LDX=  0
1485 FEA000             LDA/  SPE,X
1488 E7ADA8             LDX=  X'ADA8'
148B 1795               JAE   BY1
148C 6E1068             RTJ/  BLK
148F 63CE               JMP*  BLY
1491 6E1196     BY1     RTJ/  SHT
1494 08                 SO1
1495 63E0               JMP*  BLY
                *
                * AUFRUNDEN AN  'NST' LDX=  .. KOMMASTELLEN*
                *
14A7 0000       ARD     DC    **
14A9 08                 RS1
14AA E8A8               LDX   NST       KOMMASTELLEN
14AC E84DB1             LDV/  W03+6,X
14AF E7FFB6             EDA=  X'FFB5'
14B2 1C08               NAN   PR1
14B3 63F1               JMP*  ARD
14B5 7468CF     PR1     IWN/  W03+8,X
14B8 FE9D00             LDV/  W03+5,X
14BB E7FFBA             LDX=  X'FFBA'
14BE 1F8E               MAX   MA1
14C0 E7B0               LDV=  X'B0'
14C2 80A8               LDX   NST
14C4 FE9DD0             STV/  W03+5,X
14C7 7468CE             IWN/  W03+3,X
14CA E79DCF             LDV/  W03+4,X
14CD E7FFBA             LDX=  X'FFBA'
14D0 1F1E               MAX   MA1
14D2 E7B0               LDV=  X'B0'
14D4 80A8               LDX   NST
14D6 FE9DCF             STV/  W03+4,X
14D9 7468CD             IWN/  W03+2,X
14DC EE50CE             LDV/  W03+3,X
14DF E7FFBA             LDX=  X'FFBA'
14E2 1F0A               MAX   MA1
14E4 E7B0               LDV=  X'B0'
14E6 80A8               LDX   NST
```

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PAGE 039

14E8 FE90CE             STV/  W03+2,X
14EB 7480CC             IWN/  W03+1,X
14EE 63B6       MA1     JMP*  ARD
                *
                *  DURCHRECHNITT *
                *
14F0 0000       PR1     DC    **
14F2 E70000             LDX=  0
14F5 6E8E8D             RTJ/  POT
14F8 F830               STV   T
14FA E70011             LDX=  17
14FD 6E136D             RTJ/  PIX
1500 F840               STV   PT
1502 E70019             LDX=  81
1505 6E136D             RTJ/  PIX
1508 F818               STV   EPT
150A E70019             LDX=  85
150D 6E136D             RTJ/  PIX
1510 F808               STV   E
1512 E70018             LDX=  89
1515 6E136D             RTJ/  PIX
1518 F810               STV   S
151A E700B1             LDX=  33
151D 6E136D             RTJ/  PIX
1520 F80C               STV   AF
1522 E70000             LDX=  0
1525 6E2E3A             RTJ/  POV
1528 F850               STV   L
152A E70035             LDX=  93
152D 6E136D             RTJ/  PIX
1530 F814               STV   TV
1532 E700BC             LDX=  186
1535 6E136D             RTJ/  PIX
1538 F888               STV   QRT
153A E700A0             LDX=  160
153D 6E136D             RTJ/  PIX
1540 F81C               STV   QRE
1542 E700A4             LDX=  164
1545 6E136D             RTJ/  PIX
1548 F884               STV   QRS
154A E700A8             LDX=  168
154D 6E136D             RTJ/  PIX
1550 F88C               STV   QRF
1552 E700AC             LDX=  172
1555 6E136D             RTJ/  PIX
1558 F83C               STV   QPT
155A E700B1             LDX=  81
155D 6E136D             RTJ/  PIX
1560 F8EA               STV   N
1562 E700BA             LDX=  186
1565 6E136D             RTJ/  PIX
1568 F886               STV   NUS
156A 668C8F             JMP   EPR-4
                *
156D 0000       PIX     DC    **
156F 0B                 RO9
1570 807C               STX   ZTA
1572 E70000             LDX=  0
1575 F8DA               STA   ZW1+8
```

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1577 6E8FB3             RTJ/  PX8
157A 807C       PRE     STX   ZTA
157C 6E8C7B             RTJ/  PR1
157F E700D8             LDX=  A'EV1'
1582 6E0FBD             RTJ/  PR3
1585 F8D8               STV   ZV1
1587 6E019E     PR3     RTJ/  NST
158A 70E8               INF   ZVX
158C E700D8             LDA=  X'D'
158F 8086               LDX   ZVX
1591 1F67               NAX   PRE
1593 8AD6               LDV   ZW1
1595 09                 RS8
1596 E8E0               LDV   ZV2
1598 6E15D4             RTJ/  CEF
159B F8EA               STV   ZV4
159D E8D8               LDV   ZW1
159F E700EA             LDX=  A'ZV4'
15A2 6E17D1             RTJ/  DVF
15A5 63C6               JMP*  PIX
                *
                *
                * HOEHE IN MP *
                *
15A7 08         VYB     RSA
15A8 E8AE               LDV   TTX             UP P. HOEHE IN MP
15AA F89E               STV   PE
15AC EXBBBF             LDV/  T17
15AF 7870               STV   T8
15B1 E70000             LDX=  0
15B4 807C               STX   ZTA
15B6 6E07AF             RTJ/  PPL
15B9 E836               LDV   P
15BB F88A               STV   PI
15BD 6E07CA             RTJ/  TPL
15C0 E830               LDV   T
15C2 F87A               STV   TI
15C4 E88A               LDV   PI
15C6 E7D09E             LDX=  A'PR'
15C9 6E1681             RTJ/  SHF
15CC E700FC             LDX=  A'F'
15CF 6E1733             RTJ/  MLF
15D2 E7BAB1             LDX=  A'K9'
15D5 6E17D1             RTJ/  DVF
15D8 E700BA             LDX=  A'V1'
15DB 6E167B             RTJ/  ACF
15DE F8DA               STV   ZV1
15E0 6E0CED             RTJ/  PM1
15E3 E8AA               LDV   TX              HOEHE 1700
15E5 E7009E             LDX=  A'DM'
15E8 6E1681             RTJ/  SBF
15EB E70000             LDX=  0
15EE 807C               STX   ZTA
                *
                * HOEHE P. MP *
                *
15F0 807C       VY3     LDX   ZTA
15F2 FEA801             STV/  TAB+1,X
15F5 F8D8               STV   ZV1
```

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13F7 6E05CE          RTJ/  NET        NOEMS V+ I+ MP *
13FA 6E1418          RTJ/  TAK        OB ENDB
13FD 8EAB91          LDV/  TAB+49,X
1400 F8DC            STV   ZV8
1402 E8D6            LDV   ZV1
1404 8700DC          LDX+  A'ZV8'
1407 6E1681          RTJ/  SBP
140A 61EA            JNP   VY3
1408 8700000   VY4   LDX+  0
140F 807C            STA   ETA
1411 6A1A00          RTJ/  GWD
1414 1008            JOU   VY5
1416 61F9            JNP   VY4+5
1418 640085    VY5   JNP/  SBD
*
141B 0000      TAK   DC    **
141D 08              RA1
141E EEAB00          LDV/  TAB,X
1421 87FFA0          LDX+  X'FFA0'
1424 1705            JAX   VY8
1426 807C            LDX   ETA
1428 DB              RO4
1429 63F0            JNP+  TAK
142B 6614DC    VY8   JNP/  VYA
*
142E 0000      PNV   DC    **
1430 DB              RC4
1431 807C            LDX   ETA
1433 EEAB01          LDV/  TAB+1,X
1436 6E06BA          RTJ/  DEZ
1439 DB              RO4
143A E8CD            LDV   W03+2
143C 807C            LDX   ETA
143E FEAB01          STV/  TAB+1,X
1441 6E2E46          RTJ/  PNF
1444 63E8            JNP+  PNV
*
* KONSTANTEN ( NR - 46 *
*
1446 BAD3D9C1  AN1   DC    C'=SUAEVIN-TPUAN'
144A C3D8C9CE
144E ADD4D0D9
1452 C1C8
1454 4E353E00  X8X   DC    X'4EJ53E00'
8901               ORG   X'89D1'
*
*
89D1 A0A0C6D6  AN8   DC    C'  FT    T    F    N  S'
89D5 A0A0A0A0
89D9 A0D4A0A0
89DD A0A0D0A0
89E1 A4A0A0A0
89E5 C8A0A0DA
89E9 A0A0A0D3  AN3   DC    C'  S    E   TPE   TP  '
89ED A0C0A0A0
89F1 A0C5A0A0
89F5 A0A0D4D0
89F9 C5A0A0A0
```

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PAGE 042

89FD DAE0A0A0
8A01 A0A0CEA0  AN4   DC    C'  L  -+=   L=   L=   FR '
8A05 A0A0BAAB
8A09 A0A0A0CC
8A0D A0A0A0A0
8A11 CCABA0A0
8A15 A0C4BAA0
8A19 A0A0E3AD  AN5   DC    C'  S-0   T-0   VT   WD  I'
8A1D 07A0A0A0
8A21 BAABE7A0
8A25 A0A0BABA
8A29 A0A0A0A0
8A2D E8CAA0A0
8A31 BA
8A32 A0A0A0C9  AN6   DC    C'  I    TP-0  FR-0  S-0 '
8A36 A0A0A0A0
8A3A A0A0A0C9
8A3E A0A0C4BA
8A42 ADC1A0A0
8A46 D3ADE7A0
8A4A DAA0A0A0  AN7   DC    C'I    D       A       N  '
8A4E ADC4A0A0
8A52 A0A0A0A0
8A56 ADC1A0A0
8A5A A0A0A0A0
8A5E C1A0A0
8A61 BABB0BB4  AN8   DC    C'=BUTAABPHET-PH'
8A65 C1B0CBB0
8A69 CDCBD4BD
8A6D D0C0
8A6F BABA0BC8  AN9   DC    C'=TIEKGITHEVEJ-PH'
8A73 CBE7C9B4
8A77 CBC3BAC5
8A7B C5A0B0C0
8A7F BABA0BC8  ANA   DC    C'=TIEKBIHEAFTIBL-PH'
8A83 CBC7C9C8
8A87 CBC1C6DA
8A8B C9C9CCA0
8A8F 90C9
8A91 40000001  N1    DC    X'$0000001'
8A95 40000004  N2    DC    X'$0000004'
8A99 7BF00000  N3    DC    X'7BF00000'
8A9D 4B000007  N4    DC    X'4B000007'
8AA1 4A000006  N5    DC    X'4A000006'
8AA5 8F000007  N6    DC    X'8F000007'
8AA9 8BF8000C  N7    DC    X'8BF8000C'
8AAD 4DC0000A  N8    DC    X'4BC0000A'
8AB1 64000007  N9    DC    X'64000007'
8AB5 9B000009  NA    DC    X'9B000009'
8AB9 7D00000A  NB    DC    X'7D00000A'
8ABD 40000001  NC    DC    X'40000001'
8AC1 4C60C00A  ND    DC    X'4C60000A'
8AC5 40000008  NE    DC    X'4D000008'
8AC9 700000C3  NF    DC    X'70000003'
8ACD 3B80000B  NX1   DC    X'3B800008'
8AD1 9B400006  NX2   DC    X'9B400006'
8AD5 6BC00009  NX3   DC    X'6BC00009'
8AD9 7610000B  NXA   DC    X'7610000B'
8ADD 64800009  NX8   DC    X'64800009'
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PAGE 043

8AE1 64000006  NX6   DC    X'6400[illegible]'
8AE5 71C00009  NX7   DC    X'71C00009'
8AE9 7B5B300E  YKE   DC    X'7B5B000E'
8AED 40000006  NX9   DC    X'40000006'
8AF1 5B10000C  NJE   DC    X'5B10000C'
8AF5 50060006  NJH   DC    X'50600006'
8AF9 775CBB08  NJR   DC    X'775CB008'
8AFD 78480007  NJS   DC    X'78000007'
8B01 6C780008  NJK   DC    X'6C780008'
8B05 48920010  NJH   DB    X'48920010'
8B09 4E000006  NJN   DC    X'4E000006'
*
8B0D 0000      RCE   DC    **
8B0F DB              RO4
8B10 6E1B07          RTJ/  LOW
8B13 87BAC5          LDX+  A'KE'
8B16 6E17D1          RTJ/  DVF
8B19 6E1A86          RTJ/  EZR
8B1C 63EF            JNP+  RCE
*
*
8B1E 0000      GE1   DC    **
8B20 E898            LDV   W1
8B22 87BAB9          LDX+  A'KB'
8B25 6E1733          RTJ/  RLF
8B28 F898            STV   W1
8B2A E896            LDV   W8
8B2C 87BAB9          LDX+  A'KB'
8B2F 6E1733          RTJ/  RLF
8B32 F896            STV   W8
8B34 63E8            JNP+  GE1
*
*
8B36 0000      GE2   DC    **
8B38 0A              RO3
8B39 E8CC            LDV   W03+1
8B3B 807C            LDX   ETA
8B3D 63F7            JNP+  GE2
*
*
8B3F 0000      GE3   DC    **
8B41 6E11A9          RTJ/  ZV1
8B44 6E11A9          RTJ/  ZV1
8B47 6ECFF9          RTJ/  P8A
8B4A 6E09F97         RTJ/  PIX
8B4D 63F0            JNP+  GE3
*
*
8B4F 03C0      GE4   IC    **
8B51 4E              TXA
8B52 A70031          AEA+  F'49'
8B55 4C              TAX
8B56 6E11A9          RTJ/  ZV1
8B59 6E8FA9          RTJ/  P3D
8B5C 63F1            JNP+  GE4
*
8B5E C050      SRK   DS    80
8B6E 0008      CAS   DS    4
8B6F 0004      Y17   DS    4
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PAGE 044

8B80 0000      CBA   DC    **
8B82 4C              TAX
8B83 EE8BAF          LDV/  CAS+1
8B86 F8B6            STA   W01
8B88 4E              TXA
8B89 80B8            LDX   W01
8B8B 63F3            JNP+  CBA
8B8D 0000      NUB   DC    **
8B8F F8D8            STV   ZV1
8B91 EE8AD1          LDV/  KRB
8B94 87BAB8          LDX+  A'KB'
8B97 6E17D1          RTJ/  DVF
8B9A F8DC            STV   ZV8
8B9C M70D3C          LDX+  A'I'
8B9F 6E1678          RTJ/  ADF
8BA2 8700D8          LDX+  A'ZW1'
8BA5 6E1733          RTJ/  RLF
8BA8 8700DC          LDX+  A'ZV8'
8BAB 6E1681          RTJ/  SBP
8BAE F814            STV   TV
8BB0 63D8            JNP+  NUB
8BB2 0000      NUB   DC    **
8BB4 6E1170          RTJ/  VRZ
8BB7 6E09CE          RTJ/  NET
8BBA 63F6            JNP+  NUB
*
8BBC 0000      OUT   DC    **
8BBE 06              RU1
8BBF 3800            OBS   0,0
8BC1 63F9            JNP+  OUT
8BC3 DB              RO1
8BC4 F90C            STV   BUF
8BC6 3183            IBA   1,3
8BC8 DF0A            ABU+  X'A'
8BCA 11FA            JAZ   *-4
8BCC E904            LDV   BUF
8BCE 3903            OBA   0,3
8BD0 63EA            JNP+  OUT
8BD2 0001      NUF   DS    1
*
*
8BD4 0000      P3H   DC    **
8BD6 DB              RO4
8BD7 807C            LDX   ETA
8BD9 E6A819          LDA/  TAB+85,X
8BDC 87AFAF          LDX+  X'AFAF'
8BDF 1711            JAX   $31
8BE1 807C            LDX   ETA
8BE3 6E0DD8          RTJ/  P08
8BE6 E6A819          LDA/  TAB+85,X
8BE9 87AFAF          LDX+  X'AFAF'
8BEC 1706            JAX   $31
8BEE 807C            LDX   ETA
8BF0 63E8            JNP+  P3H
8BF2 AFAFAFAFAF  $31  LDV+  X'AFAFAFAF'
8BF7 640888          JNP/  FRB
*
*
8BFA 0000      PAH   DC    **
```

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PAGE 045

8C31 48                 R04
8C32 007C               LDX  ETA
8C34 E6AB1D             LDA/ TAB+29,X
8C37 07AFAF             LDX= X'AFAF'
8C3A 1711               JAX  S01
8C3C 007C               LDX  ETA
8C3E 6EEDDD             RTJ/ POB
8C41 E6AB1D             LDA/ TAB+29,X
8C44 07AFAF             LDX= X'AFAF'
8C47 1701               JAX  S01
8C49 007C               LDX  ETA
8C4B 63FB               JNP= PXR
8C4D 07AFAFAFAF    S01  LDX= X'AFAFAFAFAF'
8C52 6A0CF0             JNP/ PRE+16
                        *
                        *
8C55 0000          PXR  DC   **
8C57 48                 R04
8C58 007C               LDX  ETA
8C5A E6A4D1             LDA/ TAB+53,X
8C5D 07AFAF             LDX= X'AFAF'
8C60 1711               JAX  S01
8C62 007C               LDX  ETA
8C64 6EEDDD             RTJ/ POB
8C67 E6A4D1             LDA/ TAB+53,X
8C6A 07AFAF             LDX= X'AFAF'
8C6D 1704               JAX  S04
8C6F 007C               LDX  ETA
8C71 63FB               JNP= PXR
8C73 07AFAFAFAF    S11  LDX= X'AFAFAFAFAF'
8C78 6A0CF0             JNP/ PRE+16
                        *
                        *
8C7B 0000          PXI  DC   **
8C7D E6A4D0             LDA/ TAB,X
8C80 07AFAF             LDX= X'AFAF'
8C83 1701               JAX  S01
8C85 007C               LDX  ETA
8C87 E6A4D0             LDA/ TAB,X
8C8A 63EF               JNP= PXI
8C8C 6A13B7        SX1  JNP/ PRB
                        *
                        *
                        *
                        *
8C8F 48                 R01
8C90 07006A             LDX= 10
8C93 E6AB4D        SPR  LDV/ AMB,X
8C96 6EEBF8             RTJ/ OUT
8C99 45                 DEX
8C9A 1DF9               BXH  SPR
8C9C 6E1170             RTJ/ VRE
8C9F 6E1170             RTJ/ VRE
8CA2 070000             LDX= 0
8CA5 6EEDE1             RTJ/ POE
8CA8 070030             LDX= X'30'
8CAB 6EEDE7             RTJ/ POA
8CAE FEAB09             STV/ TAB+9,X
8CB1 070040             LDX= X'40'

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8CB4 6EEDE1             RTJ/ POB
8CB7 FEAB11             STV/ TAB+17,X
8CBA 070010             LDX= X'10'
8CBD 6EEDE1             RTJ/ POB
8CC0 FEAB15             STV/ TAB+21,X
8CC3 070010             LDX= X'10'
8CC6 6EEDE7             RTJ/ POA
8CC9 FEAB59             STV/ TAB+89,X
8CCC 070000             LDX= X'0'
8CCF 6EEDE0             RTJ/ POC
8CD2 FEAB19             STV/ TAB+25,X
8CD5 070010             LDX= X'10'
8CD8 6EEDE0             RTJ/ POC
8CDB 07000C             LDX= X'0C'
8CDE 6EEDE0             RTJ/ POC
8CE1 FEAB31             STV/ TAB+33,X
8CE4 070050             LDX= X'50'
8CE7 6EEDE0             RTJ/ POC
8CEA FEAB2E             STV/ TAB+46,X
8CED 070008             LDX= X'08'
8CF0 6EEDF5             RTJ/ POD
8CF3 FEAB37             STV/ TAB+55,X
8CF6 070010             LDX= X'1C'
8CF9 6EEDF5             RTJ/ POD
8CFC FEAB3D             STV/ TAB+61,X
8CFF 070084             LDX= X'84'
8D02 6EEDF5             RTJ/ POD
8D05 FEAB41             STV/ TAB+65,X
8D08 070080             LDX= X'80'
8D0B 6EEDF5             RTJ/ POD
8D0E FEAB49             STV/ TAB+49,X
8D11 07000C             LDX= X'0C'
8D14 6EEDF5             RTJ/ POD
8D17 FEAB75             STV/ TAB+73,X
8D1A 07008A             LDX= X'8A'
8D1D 6EEDE0             RTJ/ POC
8D20 FEAB51             STV/ TAB+81,X
8D23 0B                 R04
8D24 E0B4               LDV  AUB
8D26 6EDA9A             RTJ/ DEZ
8D29 0B                 R04
8D2A E8CD               LDV  W03+8
8D2C 007C               LDX  ETA
8D2E FEAB55             STV/ TAB+85,X
8D31 68E0               STX  EWX
8D33 0B                 R01
8D34 6E1018             RTJ/ RDI
8D37 E4B8               LDX  EWX
8D39 0084               STX  ETA
8D3B 007C               RTJ/ PTI
8D3D 6E10CB             RTJ/ VRE
8D40 6E1170             RTJ/ MOP
8D43 6E1049             LDX  EWX
8D46 60E6               STX  ETA
8D48 007C               RTJ/ PTP
8D4A 6E1108             RTJ/ VRE
8D4D 6E1170             RTJ/ VRE
8D50 671BF0             JNP= PRI

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                        *
8D53 0000          POA  DC   **
8D55 6EEDD6             RTJ/ PAB
8D58 6EEDED             RTJ/ T81
8D5B 63F6               JNP= POA
                        *
8D5D 0000          POB  DC   **
8D5F 6EEDD6             RTJ/ PAB
8D62 6EEDF9             RTJ/ K31
8D65 63F6               JNP= POB
                        *
8D67 0000          POC  DC   **
8D69 6EEDD6             RTJ/ PAB
8D6C 6EEDA4             RTJ/ K01
8D6F 63F6               JNP= POC
                        *
8D71 0000          POD  DC   **
8D73 6EEDD6             RTJ/ PAR
8D76 6EED7F             RTJ/ T1B
8D79 63F6               JNP= POD
                        *
8D7B 0000          T1B  DC   **
8D7D 0A                 R03
8D7E E0D6               LDV  W03+6
8D80 F8CC               STV  W03+1
8D82 0B                 R04
8D83 E8CB               LDV  W03
8D85 007C               LDX  ETA
8D87 63F8               JNP= T1B
                        *
8D89 0000          T81  DC   **
8D8B 0A                 R03
8D8C E8CF               LDV  W03+4
8D8E F8CC               STV  W03+1
8D90 0B                 R04
8D91 E8CB               LDV  W03
8D93 007C               LDX  ETA
8D95 63F8               JNP= T81
                        *
8D97 0000          K31  DC   **
8D99 0B                 R04
8D9A E8CE               LDV  W03+3
8D9C 007C               LDX  ETA
8D9E 63F9               JNP= K31
                        *
8DA0 0000          K81  DC   **
8DA2 0A                 R03
8DA3 E4CF               LDV  W09+4
8DA5 007C               LDX  ETA
8DA7 63F7               JNP= K81
                        *
8DA9 BAC8DAD8      AMB  DC   C'*ETREW *TIM'
8DAD C5D7ADAE
8DB0 D4C9CD
                        *
                        *
                        *
8DB3 0000          PAB  DC   **
8DB5 0B                 R04

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8DB6 EC                 LDV-
8DB7 6EDA8A             RTJ/ DEZ
8DBA 63F7               JNP= PAB
                        *
8DBC 0000          POE  DC   **
8DBE 007C               STX  ETA
8DC0 07000D             LDX= X'D'
8DC3 68E0               STX  EWX
8DC5 6E05CE             RTJ/ WZT
8DC8 98E0               MUL  EWX
8DCA 48                 TBX
8DCB 007C               STX  ETA
8DCD 63ED               JNP= POE
                        *
8DCF 0000          POY  DC   **
8DD1 98D8               STX  EW1
8DD3 88DA               STX  EW1+8
8DD5 68E6               STX  FWX
8DD7 007C               STX  ETA
8DD9 63F4               JNP= POF
                        *
8DDB 0000          POD  DC   **
8DDD 007C          PRY  LDX  ETA
8DDF 6B07E4             RTJ/ TPL
8DE2 6EEED3             RTJ/ POI
8DE5 1FF6               MAX  PRY
8DE7 63FB               JNP= POD
                        *
8DE9 0J00          POH  DC   **
8DEB 09                 R08
8DEC E8F8               LDV  EWX
8DEE 6E19D4             RTJ/ CEF
8DF1 08                 R04
8DF2 F8E4               STV  EW4
8DF4 E8D8               LDV  EW1
8DF6 070084             LDX= A'84'
8DF9 6E1151             RTJ/ DVF
8DFC 63J3               JNP= TCH
                        *
8DFE 0000          POI  DC   **
8E00 070008             LDX= A'EW1'
8E03 6E167B             RTJ/ ADF
8E06 F8D8               STV  EW1
8E08 6E05CE             RTJ/ WZT
8E0B 70E8               INX  EWX
8E0D E4A8D0             LDA/ TAB,X
8E10 07AAA0             LDX= X'ACA0'
8E13 63E9               JNP= POI
                        *
8E15 0000          POK  DC   **
8E17 070006             LDX= 6
8E1A 007C               STX  ETA
8E1C 007C          PRE  LDX  ETA
8E1E 6E0811             RTJ/ LNF
8E21 6EEED3             RTJ/ POI
8E24 1FF6               MAX  PRE
8E26 63ED               JNP= POK
                        *
8E28 0000          POT  DC   **
```

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8E2F 6E2DD4          RTJ/  POF
8E32 6E2DB0          RTJ/  POG
8E35 6E2DE2          RTJ/  PON
8E38 63F3            JMP*  POT
                *
8E3A 0000       POV  DC    **
8E3C 6E2DD4          RTJ/  POF
8E3F 6E2E1A          RTJ/  PON
[illegible]
8E45 63F3            JMP*  POV
                *
8E47 0000       PRE  DC    **
8E49 870000          LDX*  0
8E4C 8870            STX   ZTA
[illegible]
8E50 E6A800          LDA/  TAB,X
8E53 87A0A0          LDX*  X'A0A0'
8E56 1708            JAX   RN1
8E58 6E09CE          RTJ/  NET
8E5B 61F1            JMP   RNE
8E5D 607C       RN1  LDX   ZTA
8E5F 18D8            STX   ZV1
8E61 870000          LDX*  0
8E64 63E1            JMP*  PRE
                *
                *
8E66 0000       PNF  DC    **
8E68 0E              RO1
8E69 607C            LDX   ZTA
8E6B E2A800          LDV/  TAB,X
8E6E 87FFA0          LDX*  X'FFA0'
8E71 1708            JAX   SN1
8E73 6E09CE          RTJ/  NET
8E76 63EE            JMP*  PNF
8E78 0C         SN1  RO1
8E79 63EB            JMP*  PNF
                *
                *
8E7B 0000       NIP  DC    **
8E7D 0D              RO4
8E7E 607C            LDX   ZTA
8E80 E2A835          LDV/  TAB+53,X
8E83 6E06BA          RTJ/  DEZ
8E86 6E0F41          RTJ/  PO4
8E89 F2A835          STV/  TAB+53,X
8E8C 0A              RO3
8E8D E8CF            LDV   VO3+6
8E8F F2A836          STV/  TAB+54,X
8E92 6E0EC0          RTJ/  PN1
8E95 63E4            JMP*  NIP
                *
                *
8E97 0003       PGX  DC    **
8E99 6E2EE2          RTJ/  LNV
8E9C 6E0C01          RTJ/  PO3
8E9F 63F6            JMP*  PGX
                *
                *
8EA1 0000       PEX  DC    **


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8EA3 807C            LDX   ZTA
8EA5 E6A828          LDA/  TAB+40,X
8EA8 87AFAF          LDX*  X'AFAF'
8EAB 1F30            SAX   SP4
8EAD 6E0976          RTJ/  ELI
8EB0 E844            LDV   PL
[illegible]
[illegible]          LDX*  A'EUI'
[illegible]          RTJ/  EVF
[illegible]          STV   PL
[illegible]          LDX*  A'VLS'
8EC0 6E17D1          RTJ/  LVF
[illegible]
8EC6 6E1678          RTJ/  ADF
8EC9 F8B0            STV   L
8ECB E8AFB0          LDV/  VLS
8ECE 87B8F9          LDX*  A'NS'
8ED1 6E1733          RTJ/  NLF
8ED4 F848            STV   VPN
8ED6 87AFAF          LDX*  X'AFAF'
8ED9 F048            STA   NL
8EDB 63C4            JMP*  PEX
8EDD 6E0990     SP4  RTJ/  PEI
8EE0 63BF            JMP*  PEX
                *
                *
8EE2 0000       LNV  DC    **
8EE4 870000          LDX*  0
8EE7 807C            STX   ZTA
8EE9 807C       RN3  LDX   ZTA
8EEB E6A828          LDA/  TAB+40,X
8EEE 87AFAF          LDX*  X'AFAF'
8EF1 1F08            NAX   RN4
8EF3 6E09CE          RTJ/  NET
8EF6 61F1            JMP   RN3
8EF8 870000     RN4  LDX*  0
8EFB 88D8            STX   ZV1
8EFD 88DA            STX   ZV1+2
8EFF 88DC            STX   ZV2
8F01 88DE            STX   ZV2+2
8F03 6E07FC     SP3  RTJ/  LPF
8F06 6E0811          RTJ/  LNF
8F09 E844            LDV   PL
8F0B 8700D8          LDX*  A'ZV1'
8F0E 6E2F31          RTJ/  AC1
8F11 E848            LDV   NL
8F13 6E2F3A          RTJ/  AC2
8F16 6E09CE          RTJ/  NET
8F19 08              RO1
8F1A E6A800          LDV/  TAB,X
8F1D 87FFA0          LDX*  X'FFA0'
8F20 1721            NAX   SP3
8F22 08              RO4
8F23 6E2F46          RTJ/  AC3
8F26 6E17D1          RTJ/  LVF
8F29 F908            STV   VLS
8F2B 63B6            JMP*  LNV
8F2D 0004       VLS  DS    4
                *


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                *
8F31 0000       AC1  DC    **
8F33 6E1678          RTJ/  ADF
8F36 F8D8            STV   ZV1
8F38 63F7            JMP*  AC1
                *
                *
8F3A 0000       AC2  DC    **
8F3C 8700DC          LDX*  A'ZV2'
8F3F 6E1678          RTJ/  ADF
8F42 F8DC            STV   ZV2
8F44 63F4            JMP*  AC2
                *
                *
8F46 0000       AC3  DC    **
8F48 E8D8            LDV   ZV1
8F4A 8700DC          LDX*  A'ZV2'
8F4D 63F7            JMP*  AC3
                *
                *
8F4F F8C8       AC4  STV   VO3
8F51 F8CB            STV   VO3+3
8F53 F8D1            STV   VO3+6
8F55 6706BA          JMP*  DEZ
                *
                *
8F58 0000       NAS  DC    **
8F5A E0D4            LDA   ZSP
8F5C A70016          ADA*  F'02'
8F5F F0D4            STA   ZSP
8F61 63F5            JMP*  NAS
                *
8F63 0000       PRX  DC    **
8F65 E6A861          LDV/  TAB+97,X
8F68 6E0DF8          RTJ/  OUT
8F6B E6A862          LDV/  TAB+98,X
8F6E 6E0DF8          RTJ/  OUT
8F71 63F0            JMP*  PRX
                *
                *
8F73 0000       NLZ  DC    **
8F75 80D4            LDX   ZSP
8F77 E69FFB          LDA/  SPZ+2,X
8F7A 607C            LDX   ZTA
8F7C F6A861          STA/  TAB+97,X
8F7F 08              RO1
8F80 F2A800          STV/  TAB,X
8F83 63EE            JMP*  NLZ
                *
8F85 0000       ZNR  DC    **          ZEILE NR IN TAB
8F87 F6A861          STA/  TAB+97,X
8F8A F2A800          STV/  TAB,X
8F8D 63F6            JMP*  ZNR
                *
8F8F 0000       ZXI  DC    **
8F91 6E11A9          RTJ/  ZV1
8F94 44              INX
8F95 63F8            JMP*  ZXI
                *


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8F97 0000       PIX  DC    **
8F99 6E119A          RTJ/  PRT
8F9C 6E11A9          RTJ/  ZVI
8F9F 63F6            JMP*  PIX
                *
8FA1 0000       IX2  DC    **
8FA3 6E0F63          RTJ/  PPK
8FA6 44              INX
8FA7 63F8            JMP*  IX2
                *
8FA9 0000       P30  DC    **
8FAB 6E0FEF          RTJ/  PR3
8FAE 6E11A9          RTJ/  ZVI
8FB1 63F6            JMP*  P30
                *
8FB3 0000       PX2  DC    **
8FB5 F0D8            STA   ZV1
8FB7 F0E0            STA   ZVN
8FB9 F0E0            STA   ZV3
8FBB 63F6            JMP*  PX2
                *
8FBD 0000       PX3  DC    **
8FBF 6E1678          RTJ/  ADF
8FC2 70E0            IVM   ZV3
8FC4 63F7            JMP*  PX3
                *
8FC6 0000            END   AM

PASS 8
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13. ABSTRACT
The investigations continued during the reporting period essentially as described in preceding reports. The objectives were:
a. To shield the cable car telemetry systems against all effects of the weather and to obtain by them homogeneous series of recordings;
b. to develop and apply the physical and mathematical bases for the complete numeric evaluation of the recording runs, up to and including computation of the incremental exchange coefficients;
c. to continually record at the three stations the Aitken nuclei concentrations, natural radioactivity (RaB, RaC), and polar conductivities, and to utilize them in the evaluations; and
d. to derive initial deductions from the results.
The entire evaluation technique was completely changed. A new computer (Intertechnique Multi 8) with 12 k words (1 word = 9 bit) affords us the possibility to perform the entirety of all computation processes in one single operation, and to print them out in tables.

Key words:
Aerosol; gradient; troposphere; boundary layer; exchange coefficient.

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