Brief Description of Kieselguhr Investigations in Aflenzer Becken during the Field Season of 1978

As shown in Diagram 1, four kieselguhr promising areas are located within the Aflenzer Becken. Areas 1 and 2 border on the health resort of Aflenz and therefore do not warrant further exploration activity. Area 3 is relatively small and steep and thus uninteresting. Area 4, principally farmland, was therefore the prime target of our 1978 field prospecting for kieselguhr. The basic objective of this phase of the work was to more accurately locate the kieselguhr-containing zones within Area 4.

Sample material was collected from a number of exploration holes (EH), from three exploration trenches (ET), from 63 shallow drill holes (BP) in three drill profiles, from new road exposures, house excavations, and from telephone pole diggings. (See Diagram 2)

Thin sections were made from the sample material and qualitively analyzed for diatom presence under 350 - 400 magnification. Diatom presence was characterized according to the following scale:

(-)	No diatoms observed microscopically
(+)	Diatoms rare, one or two in entire thin section
+	Diatoms occassionally observed, several in field of view
++	Diatoms are frequent in glass slide
+++	Microscopic field consists primarily of diatoms.

Results Sample areas within Area 4 with diatom amounts corresponding to ++ and +++ are signified red in Diagram 2.

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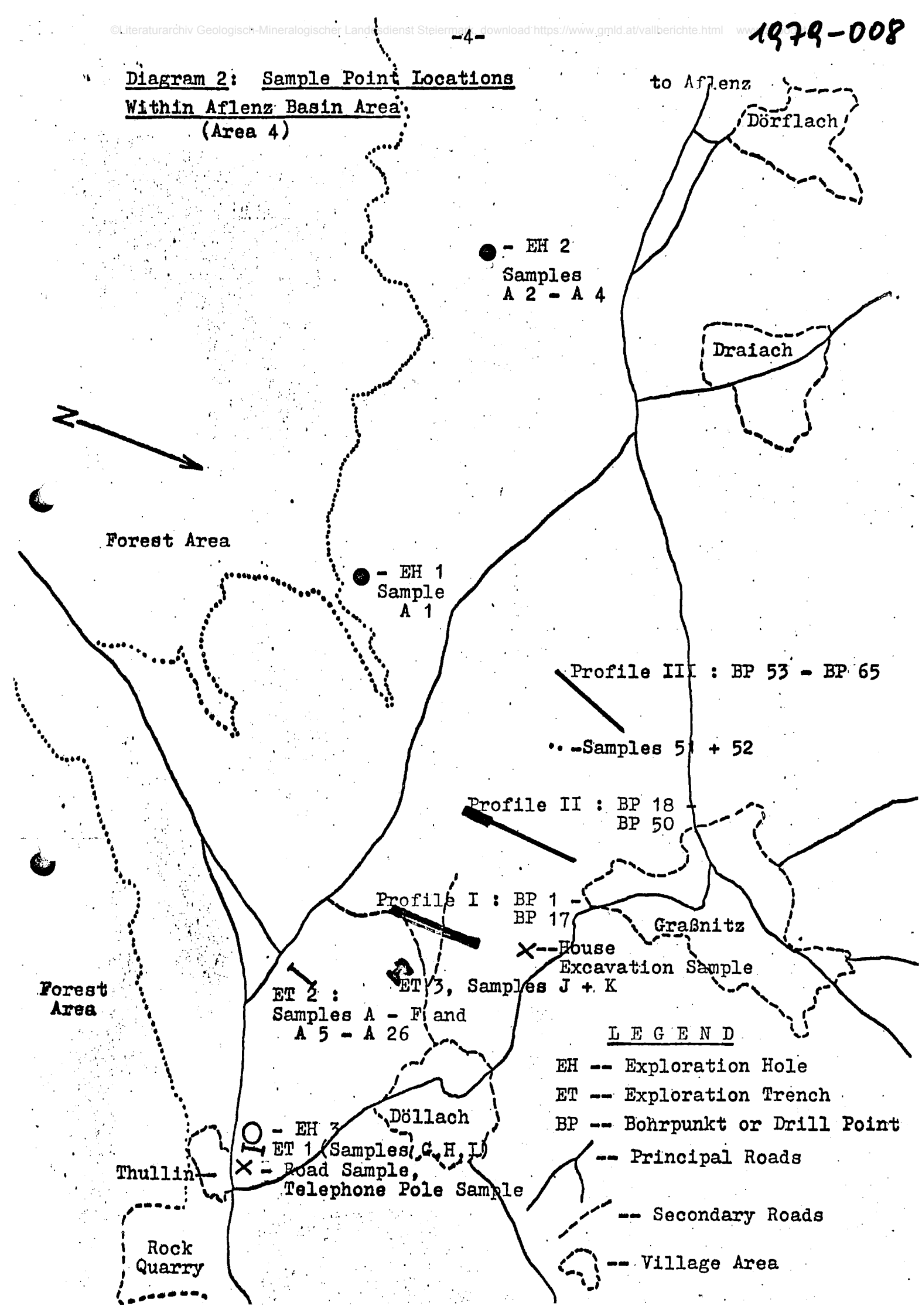
Diagram 2: Sample Point Locations Within Aflenz Basin Area (Area 4)



Report on the Spring and Summer Kieselguhr Investigations in the Aflenz Basin Area (1978)

L. Gould

Based on the geological field investigations of W. Pfeffer during the summer of 1977 ("Bericht über eine geologische Übersichtsprospektion auf Kieselgur im Aflenzer Becken" von W. Pfeffer), four kieselguhr-promising areas were located in the vicinity of Aflenz. (see Diagram 1) Areas 1 and 2, although evidencing good-quality kieselguhr, were not further investigated because of their immediate proximity to the internationally known health resort of Aflenz. Area 3 also yielded good field samples of kieselguhr, but further investigations were not carried out here because of the relatively small areal extent and steepness of the area. Located furthest from Aflenz and consisting primarily of agriculturally used land, Area 4 was therefore the prime target of our kieselguhr investigations.

The basic purpose of this phase of the work was to more accurately determine the extent of the kieselguhr-containing layers (within Area 4) so that future exploration trenches could be better planned. The emphasis here was to qualitively determine the presence of kieselguhr at the sample points. Sample material was collected from exploration holes, exploration trenches, from 63 shallow drill holes, telephone pole diggings, new road exposures, and from house foundation excavations. (see diagram 2)

Preparation and Investigation of Sample Material

All samples were first hand-broken into small pieces, air-dried and then carefully crushed (not grinded!) in a systematic manner. After three sievings a uniform powder

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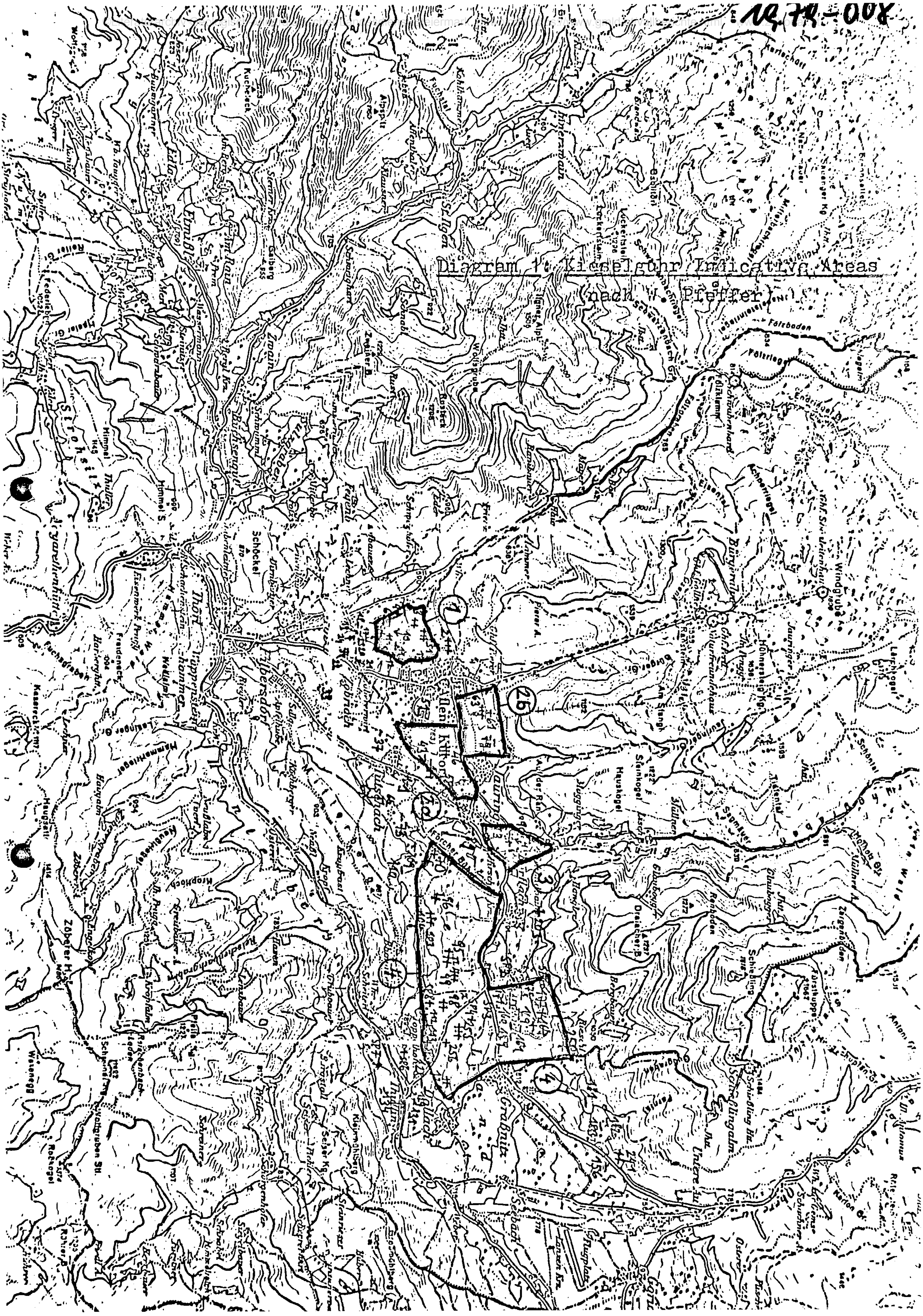

Diagram 1: Kieselguhr Indicative Areas (nach W. Pfeffer)

of maximum 0.1 mm diameter remained from which permanent glass slides were made and microscopically analyzed. This method of sample preparation is rapid and simple, allowing an accurate qualititive determination of the presence of diatoms in the prepared glass slides. A microscopic magnification of 400 times is adequate in identifying intact diatoms as well as their broken shell parts. No attempt was made to quantitively determine the kieselguhr content of the samples. This step is reserved for a later stage of the investigation, once the boundaries of the kieselguhr-containing layers are located.

Explanation of Symbols

(-)	No diatoms observed microscopically
(+)	Diatoms rare; perhaps one or two seen in entire glass slide
+	Diatoms occassionally observed, several in field view
++	Diatoms are frequent in glass slide
+++	Microscopic field consists principally of diatoms

EH = exploration hole, ET = exploration trench, BP = Bohrpunkt

Description and Results of Sampling Procedure

Sample sites within Area 4 were selected on the basis of their relative high degree of kieselguhr-find probability (as determined from the Pfeffer investigation). A total of three exploration trenches, three drilling profiles, three exploration holes, one new road exposure sample as well as one telephone and house excavation sample were made (as seen in diagram 2) in the attempt to locate kieselguhr-containing layers. The results and description of the sampling procedure are shown in the following list.

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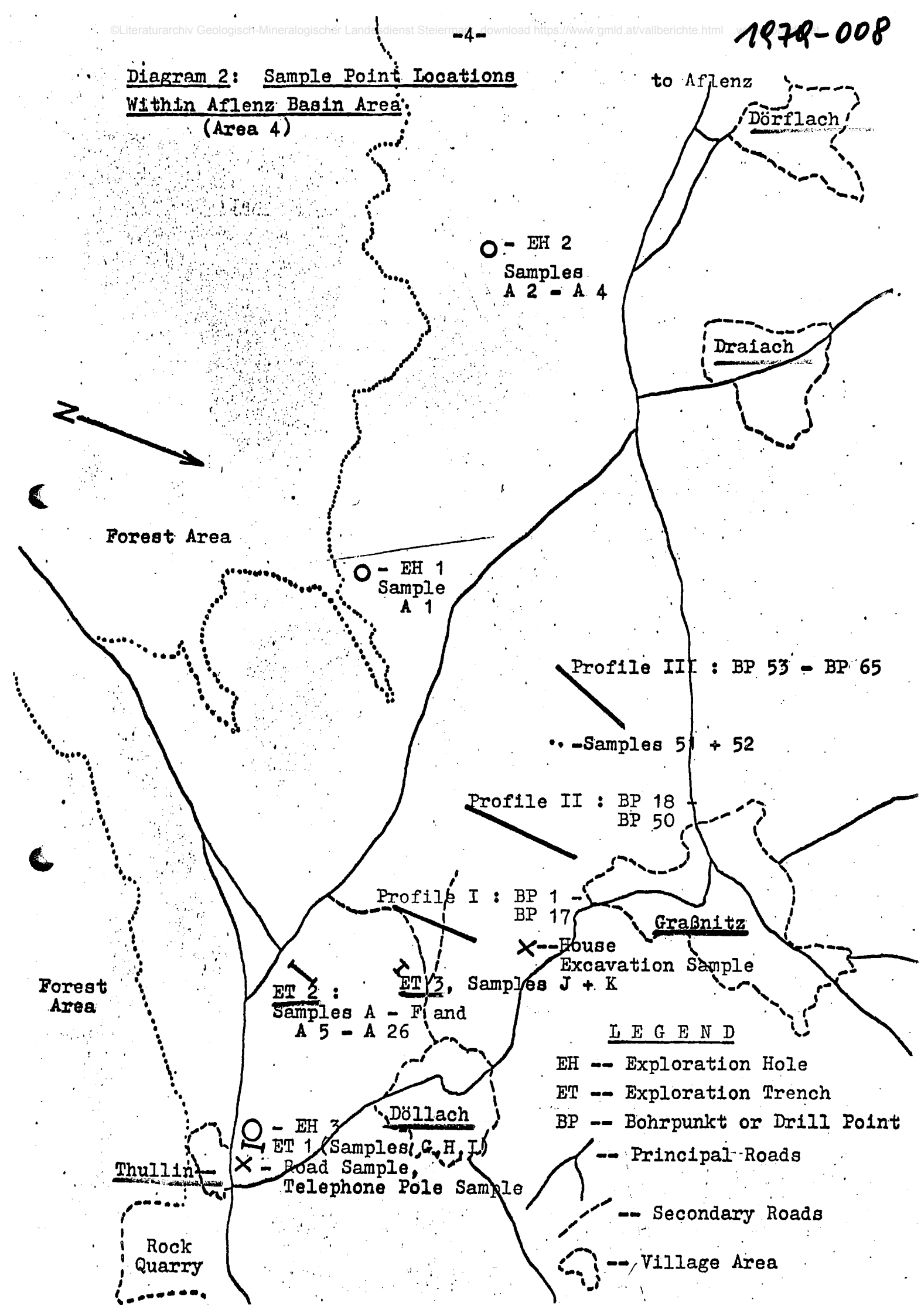
Diagram 2: Sample Point Locations Within Aflenz Basin Area (Area 4)



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Sample Nr.	Frequency of Diatoms	Sample Site	Remarks
A 1	+++	EH 1	4.7 m thick soil covering, sample gra with white streaks, rock fragments much lighter in weight than expected
A 2	++	EH 2	from 60 cm thick zone at lowest level of EH 2 (about 3 m deep) sample mater mostly gray colored, eroded zones red colored through limonite
A 3	++	EH 2	from middle zone of EH 2, redish colo predominant, sample soft and plastic
A 4	+++	EH 2	from upper zone of EH 2 below soil covering (which is about 1 m thick) gray and darker colors prevail
-		EH 3	orientation of rock layers: SS 20/108 20 - 30 cm thick soil covering, leaf impressions frequent
A 5	-	ET 2	gravel from uppermost zone of ET 2
A 6	(+)	ET 2	clay rich, reddish brown color domina
A 7	(-)	ET 2	grayish-white clay, soft, with numero fossils (leaf impressions)
A 8	(-)	ET 2	massive cubic-shaped gray-colored cla stones, displayiny black surface colo and thin layered fragments (lamellen) with alternating white and brown colo
A 8a	(+)	ET 2	thin layered fragments of A 8 examine
A 9	(-)	ET 2	sample is grayish and clay-rich, seve fragments with lamellen characteristi
A 9a	(-)	ET 2	fragments with lamellen from above examined
A 10	(+)	ET 2	Sample with alternating white and brown lamellen
A 11	(-)	ET 2	similar to A 10
A 12	(-)	ET 2	clayish, soft and gray-colored

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Sample Nr.	Frequency of Diatoms	Sample Site	Remarks
A 13	(-)	ET 2	Sample material with alternating white and brown lamellen
A 14	(-)	ET 2	soft, gray clayey shales, numerous leaf impressions
A 15	(-)	ET 2	sample material similar to A 13
A 16	(-)	ET 2	sample material similar to A 14
A 17	(-)	ET 2	hard, compact clay, blocky in form numerous concretions
A 18	(-)	ET 2	sample material similar to A 14
A 19	(-)	ET 2	soft orange-white clay
A 20	(-)	ET 2	sample material similar to A 14
A 21	(-)	ET 2	fossiliferous clayey shales with numerous concretions
A 22	(-)	ET 2	sample material similar to A 14
A 23	(-)	ET 2	brown shaley material, more compacted as A 14 sample
A 24	(-)	ET 2	reddish clay-shales with fossils
A 25	(-)	ET 2	similar to A 24, but redder in color
A 26	(-)	ET 2	end of exploration trench 2, sample material similar to A 25, but sand content increasing

Large bulldozer samples each weighing about a ton were taken from each of the exploration trenches and analyzed for diatom presence. This served as a cross-check to the above investigation and each of the large samples A - Ka represent average rock-type for the zone from which the samples were taken. The results of the "Baggerproben" are as follows:

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Sample No.	Frequency of Diatoms	Sample Site	Remarks
A	(-)	ET 2	sample taken from uppermost or northernmost part of trench
B	(+)	ET 2	sample position below that of A
C	(+)	ET 2	sample position below that of B
D	(+)	ET 2	sample position below that of C
E	(-)	ET 2	sample position below that of D
F	(-)	ET 2	sample position at lower end of trench, below that of E
G	(-)	ET 1	sample position at upper end of ET
H	(-)	ET 1	sample position below that of G
I	(-)	ET 1	sample position at lower end of ET below that of H
J	(+)	ET 3	sample position at upper end of ET
K	+++	ET 3	sample position at lower end of ET
Ka	+++	ET 3	selected sample material from K, whitish colored, light-weighted fragments analyzed here

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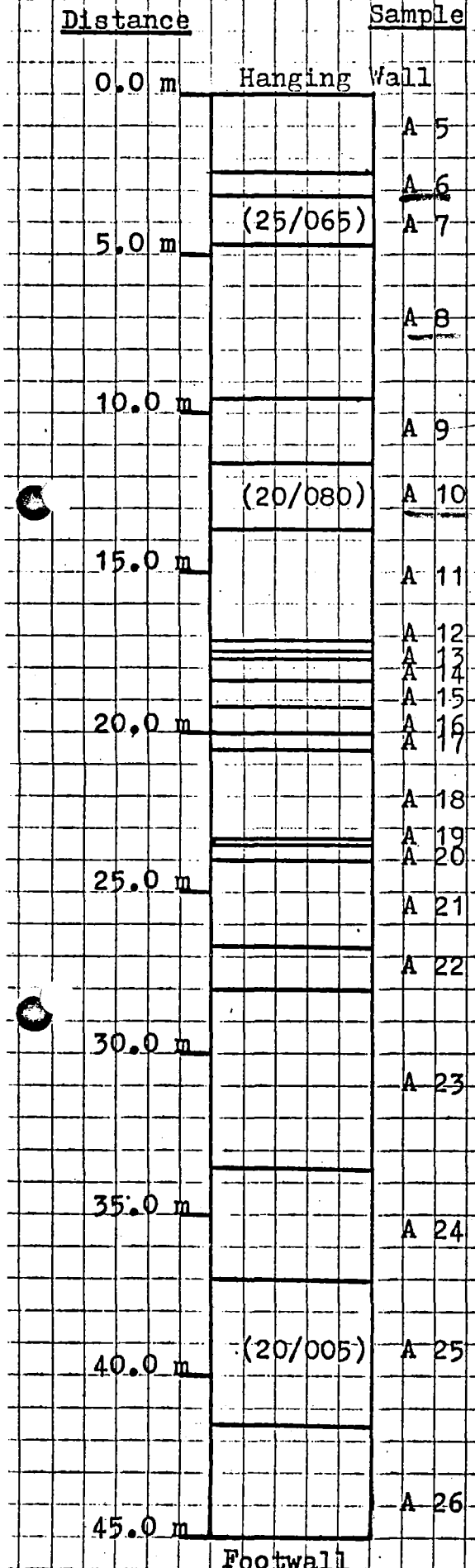
Diagram 3:
Detail Sketch of Exploration Trench 2
With Corresponding Sample Positions



Location: Along fence on west border of field above Wurzenberger Gastha

Orientation of Trench: N 20° E, parallel to maximum slope of field (20°)

Depth of Trench: about 1 meter (average)

Soil Thickness: 20 - 30 cm

Rock Description: A 5 and the above lying area consists of gravel and some clay. A 6 is a weathered zone, red-brown in color, consisting of clay mixed with gravel. A 7 to the end of the trench consists basically of clayey shales, evidencing varying degrees of solidification, hardness, oxydation and weathering. Most of the layers evidenc concretions and fossil-leaf imprints. Towards the end of the trench, the foot wall, a slight reddish color was appare due to an increasing sand content of th layers. Sample A 19 was a 7 cm thick white-orange clay layer.

Sampling Procedure: Sample material was taken within natural boundaries representing lithologic, color or texture changes. Lighter colored rock fragment within the sample area were occassional biased in material selection as they ar more indicative of kieselguhr-containin layers. 6 larger bulldozer samples were taken from along the entire length of exploration trench 2 in roughly equal spacings from the top to the bottom of the trench.

Diatom Presence: With the exception of A 6 A 8a and A 10, which contained only diatom traces, no diatom concentration are evidenced anywhere within this trench.

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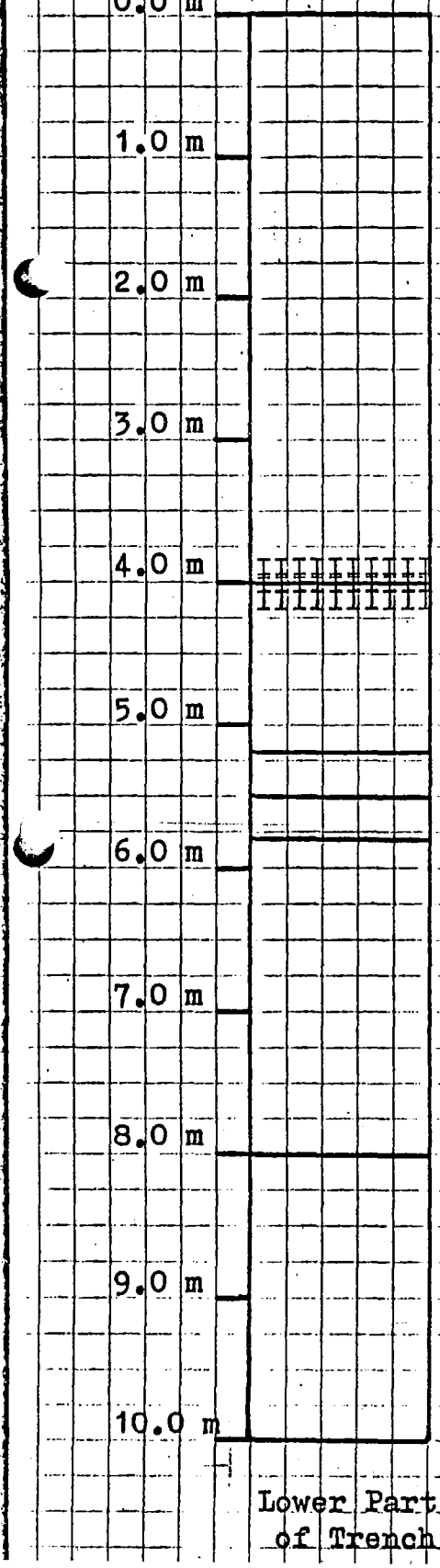
Diagram 4:
Detail Sketch of Exploration Trench 3
With J and K Sample Areas Shown



Location: Approx. 250 m ESE of Döllach

Orientation: N 60° E, parallel to max. slope of field (15°)

Depth of Trench: about 1.5 m (average)

Soil Depth: 20 - 30 cm

Geological Sequence: (from upper to low part of trench)

0.0 - 5.20 m limey shales with br to black surface oxydation colors, inner rock soft and grayish, clayı concretions frequent.

5.20 - 5.50 m soft, gray-colored, clayey shales with frequent concr

5.50 - 5.80 m thick (25cm) brick- layer rather hard.

5.80 - 8.0 m clayey shales with orange and black surface oxydatio colors, fresh exposures in gray a beige colors, soft.

8.0 - 10.0 m soft and fossil-ric clayey-shale layers, rich in foss and "Kohlenhechsel", muscovite evidenced on surface layers, orie of layers here; (43/030)

Sampling Procedure: two large "Baggerp were taken from the trench, the " sample was taken between 0.0 and 4 meters, and the K and Ka sample taken from about 4 m to 10 m.

Diatom Presence: The J sample had only of diatoms (+), but the K and Ka sample were abundant in diatoms (