The soils of the Trabzon catena north east Turkey

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Volume 2

PROFILE DESCRIPTIONS

THE RED CLAY SOILS

Profile 1 SIRTE

Classification	Glossic Paleudalf (40b)
Date of Examination	24th June, 1966.
Location	Between Soğuksu and Boz Tepe, about 2·5 km. south of Trabzon. Bearing N.35°E. on Boz Tepe water tower.
Elevation	281m.
Land Form	Broad, smooth ridge top, rising gently to the south but dropping steeply to valleys on the east and west, and abruptly truncated to the north by east-west faulting.
Slope	Convex, 0 to 6°
Vegetation	Mixed forest of Quercus sp. and occasional Pinus sylvestris, more than 20m. high, casting a deep shade. Understorey of young trees and Rhododendron ponticum, and a thick carpet of mosses with few herbaceous species.
Human Influence	The site has probably not been cultivated in modern times. It is accessible only from the south and cultivation has recently receded southwards along the ridge top. Abandoned land carries scrub, cultivated land bears poor crops of maize and hazelnuts but fair rye.
Parent Material	Highly-weathered Pliocene molasse sediments derived mainly from basic and intermediate lavas and tuffs.
Drainage	Class 2-3, imperfectly drained.
Moisture Conditions in the Soil	Dry to 20 cm., moist below.

Depth to Ground Water	Permanent water table below 2m. in nearby well. Seasonal perched water table fluctuates close to the surface.
Surface Stones and Rock Outcrops	None on the ridge top, but the volcanic basement rocks outcrop on either flank.
Present Soil Erosion	None under forest vegetation.

Profile Description

A deep, stone-free clay. Thin surface organic and A_1 horizons, incorporating mor humus, overly a pale-coloured, structureless albic horizon and a reddish brown argillic horizon which also contains small, rounded ironstone concretions. Below 60 cm. the profile becomes increasingly gleyed with grey colours on ped faces in the B(g) horizon becoming dominant in the almost massive Cg horizon.

Horizon	Depth (cm.)	
1. O	0•5-0	Litter of moss, twigs, leaves and acorns
2. A_1	0-0•5	Light brown grey (2.5Y 6/2 dry) clay loam mixed with very dark mor humus in a spongey fabric. Merging boundary.
3. A_2	0•5-21	Pale brown (10YR 6/3 moist, 10YR 6/6 dry). Silty clay; structureless; consistence wet - slightly sticky and plastic, moist-firm, dry - slightly hard; stone free. Frequent fine to coarse woody roots with mycorrhiza. A few fragments of charcoal.
4. Bt	21-60	Reddish rbown (5 to 7•5YR 4/4 moist, 7•5YR 4•5/4 dry). Clay; moderate coarse subangular blocky structure; consistence wet - slightly sticky and plastic, moist-firm; a little small, rounded ironstone gravel, and small (1-5 mm.) irregularly-shaped black manganese oxide nodules. Frequent

fine to coarse woody roots, often with mycorrhiza. Gradual wavy boundary.

5. B(g) 60-120 Dark red (2•5YR to 5YR 3/5 moist) with films of light brown (7•5YR 5•5/4) on ped faces. Clay; strong coarse prismatic structure with peds 30 cm. x 10 cm.^{2}; consistence wet - slightly sticky and plastic, moist - very firm. A few fine manganese nodules. Roots follow ped faces. Gradual wavy boundary.

6. Cg 120-150+ Light grey (2•5Y 7/2 moist) marbled with veins of dark reddish brown (5YR 3/3). Clay; massive to polyhedral structure; consistence wet - slightly sticky and plastic, moist - very firm. A few woody roots following structural faces and forming a secondary thin platy structure along the planes of weakness.

Profile 1 SIRTE

Analytical Data

Horizon		Sample Depth (cm)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations m.equiv. per 100g					C.E.C	% Base Saturation		Phosphorus mg/100g		Acid Oxalate Extractable mg/100g Sesquioxides		Fielde's NaF
				C. S.	F. S.	Am. Si	Int. Si	Clay		% C	% N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+	me/100g	(a)	(b)	Total	Acetic Soluble	Fe_2O_3	Al_2O_3	
2	A_1	0-0.5	1.95	46.7		34.9	18.1	35.0	21.05	9.28	0.64	14.2	4.62	21.1	13.47	5.81	1.92	0.62	59.1	64.3	36.9	13.29	0.24	118	330	N.D.
3	A_2	5-15	1.64	3.9	24.2	45.1	27.3	42.4	9.9	3.93	0.41	9.6	4.41	11.7	3.03	2.74	0.46	0.49	45.4	74.3	14.8	9.27	0.04	140	287	-
4	Bt	32-42	2.58	2.6	19.1	27.7	20.2	58.0	7.8	0.89	0.29	3.1	4.89	12.2	10.73	4.36	2.33	0.38	45.1	72.9	39.5	11.81	<.02	262	541	++
5	B(g)	80-90	2.17	3.2	15.3	20.5	14.8	66.7	7.5	N.D.	N.D.	N.D.	4.69	10.7	5.96	7.02	0.58	0.50	52.5	79.8	26.9	13.76	<.02	167	402	+

Mineralogical Analysis of the Coarse Sand Fraction, sample 80-90 cm.

Light Fraction — 86.9 per cent – of which 41 per cent comprised un-dispersed haematite-quartz-clay granules; remainder entirely quartz.

Heavy Fraction — 13.1 per cent. – mainly black opaque material (from X-ray diffraction pattern a mixture of haematite and manganite, remainder zircon, tourmaline, rutile, epidote, garnet and muscovite.

Note Results are expressed in terms of oven dry soil, i.e. less % water.

Profile 2 ÇUKUÇAYIR II

Classification — Glossic Paleudalf (40b)

Date of Examination — 29th May, 1966

Location — On left side of track leading up from the Değirmendere to Boz Tepe, about 2·5 km. S of Trabzon. Compass bearing on water tower on Boz Tepe - N.340°E., bearing on radio masts N.289°E.

Elevation — 240m.

Land Form — Smooth convex upper slopes of ridge, with a long smooth slope from the crest to the profile site.

Slope — Convex, 8-12°

Aspect — N.315°E.

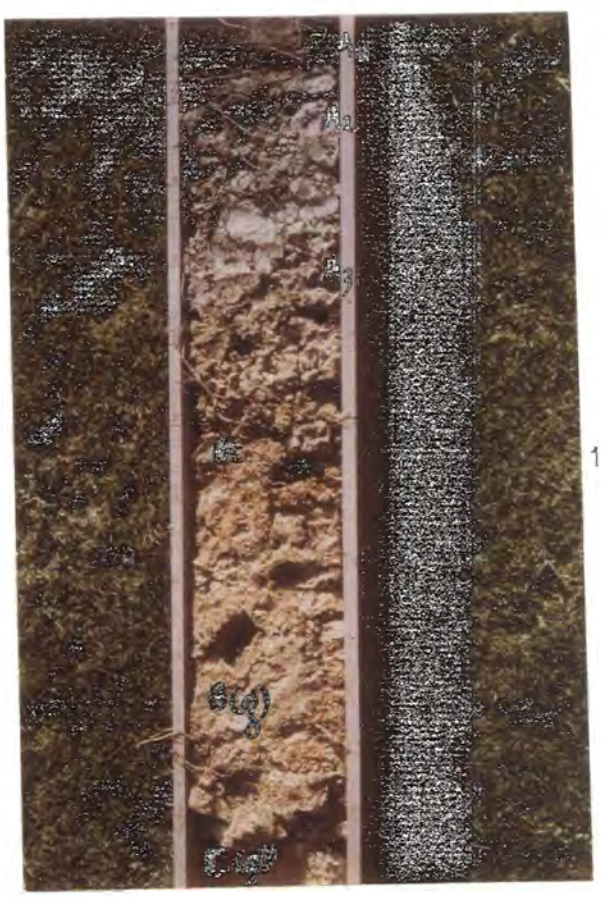
Vegetation — Long-established secondary woodland with mixed deciduous and coniferous species and a well-developed shrubby undergrowth.

Quercus dschorochensis Koch.	(E)	Rhododendron ponticum L.	(E)
Castanea sativa Mill.	(E)	Erica arborea L.	(M)
Populus tremula L.	(E)	Cistus creticus L.	(M)
Pinus sylvestris L.	(E)	Agyrolobium calycinum Bieb.	(M)
Picea orientalis L.	(E)	Pteridium aquilinum	
Carpinus betulus L.	(E)	Vicia cassubica L.	
Coryllus avellana L.	(E)	Festuca montana Bieb.	
		Dorycnium graecum L. Ser.	(M)

[Note: (E) denotes Euxine species
(M) denotes Mediterranean species]

Parent Material — Extremely weathered-coarse molasse derived largely from basic and intermediate volcanic materials. The sediment is of Pliocene age, the original lavas, tuffs and agglomerates are of Upper Cretaceous and Eocene age.

Monolith, profile 2 Çukuçayır II



Drainage	Class 3, moderately well drained.
Moisture Conditions in the Soil	Upper 26 cm. dry, moist below.
Depth to Ground Water Table	Permanent water table not encountered, probably below 2 metres, but a perched water table fluctuates up to about 20 cm. in winter.
Surface Stones and Rock Outcrops	None.
Present Soil Erosion	None on slopes up to 12^{o}, soil creep on steeper slopes below site, even under thick woodland.
Human Influence	Soil now under semi-natural vegetation, but almost certainly cultivated at some time in the past.

Profile Description

A deep red-yellow clay soil with highly weathered igneous and sedimentary rock, apparently in situ, in the lower part of the profile. Transported upper horizons contain ironstone gravel. The upper part of the profile is freely drained and has undergone a recent leaching phase; at greater depth drainage is progressively impeded by massive clay horizons.

Horizon	Depth (cm.)	
1.	O_1 2-1·5	Loose dry leaves and twigs, chiefly oak, rhododendron and spruce, with a little moss.
2.	O_2 1·5-0	Grey-brown fibrous mor humus, loosely bound by white mycelia and rhizoids, incorporating a few bleached quartz grains and drops of resin.
3.	A_2 0-13	Light grey (10YR 6·5/2 dry). Clay loam; massive but minutely honeycombed, loose above 6 cm. and weakly indurated below this depth; very slightly hard consistence (class 1-2). A little rounded gravel, dark brown, c5mm. diameter, possibly iron or manganese concretions. Few wiry and fibrous roots, large tree roots. Abrupt, irregular tongueing boundary.

4. A_3 13-26 Yellowish brown (10YR 5/4 dry) with randomly distributed rust spots 1mm. diameter. Clay; moderate to coarse blocky structure; consistence dry-hard, weakly indurated. A little rounded fine gravel as above; a few rounded stones, up to 3 cm., weathered, mostly igneous. Common fine dendritic pores of former root system; frequent fine to coarse roots and Pteridium rhizomes. Charcoal fragments. Clear wavy boundary.

5. Bt 26-62 Light reddish brown (5YR 4/6 moist). Clay; weak coarse prismatic structure, breaking to coarse blocky; compact, firm moist consistence. Loose finely granulated grey soil between major peds, especially near the top of the horizon. Pteridium rhizomes and wiry Erica roots are largely concentrated in the pockets of finely granulated soil, where ants and earthworms are also found, but fine dendritic pores of some former root system penetrate the compact peds. Few small stones and angular fragments, mostly highly weathered; fine gravel as above. Clear, irregular tongueing boundary.

6. Bt(g) 62-110 Light reddish brown (5YR 4/6) and reddish yellow (7·5YR 5·5/6) coarsely mottled and flecked matrix, with paler buff ped faces. Clay; very coarse prismatic structure; consistence moist - compact and very firm. Frequent highly weathered stones clearly outlined but no harder than the matrix, igneous rocks completely kaolinised, flysch sandstones giving fine sand. Stones have caps of translocated clay (subsequently identified in thin section) and dendritic pores are filled with

similar material. Present-day roots follow ped faces, Picea orientalis roots have numerous foliose mycorrhizæ flattened between the peds, Pteridium rhizomes extend to about 110 cm. Clear irregular boundary.

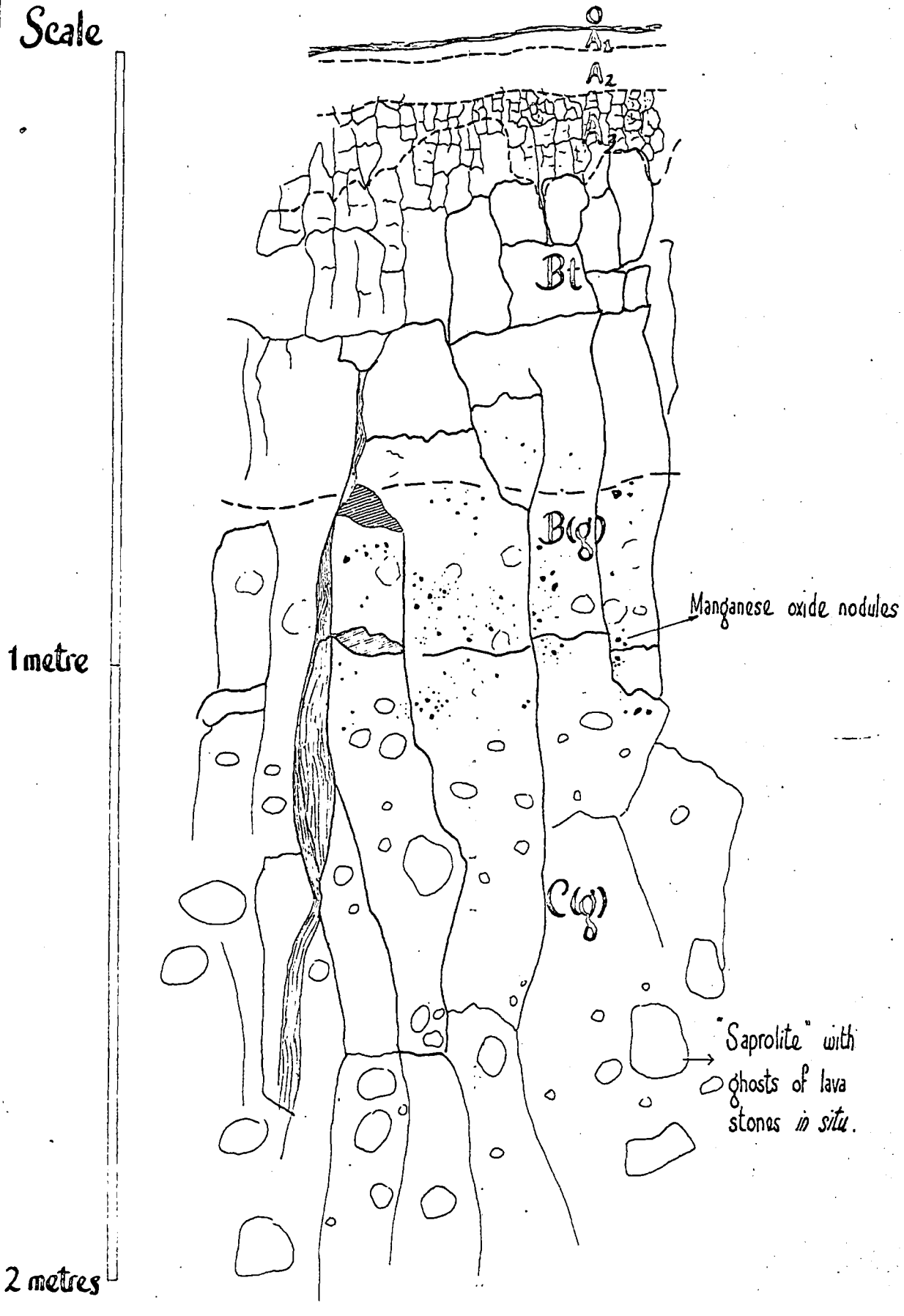
Sampling: within this horizon vaguely defined zones appear to retain rather more original rock structure than the matrix; sample 80-90 cm.a was taken from the matrix and sample 80-90 cm.b from a zone with better preserved parent material structure.

7. C(g) 110-150+ Reddish yellow (7·5YR 5/6), with dark red and bluish white marbling in ped cores, frequently coarsely mottled red, yellow and brown. Clay; massive; dense and plastic. Frequent highly-weathered, rounded stones up to 15 cm. diameter, some showing concentric weathering zones. Pale clay skins on tops of stones, very fine dark red skins below. Fine dendritic pores filled with translocated clay. A few small, soft, irregular manganese oxide nodules. Tree roots follow structural fissures to below 150 cm.

Sampling: as in horizon 6 there are vaguely-defined zones of greater and lesser weathering; sample 125-135 cm.a is from a more-weathered zone, sample 125-135 cm.b is from a less-weathered zone.

Structure in a Red Clay Soil

Major peds on a dried-out face of profile under *Quercus*, *Rhododendron*, *Erica* and *Pteridium* close to Profile 2



Profile 2 ÇUKUÇAYIR II

Analytical Data

Horizon		Sample Depth (cm.)	% water	Mechanical Analysis % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations m.equiv. per 100g.					C.E.C. me/100g	% Base Saturation		Phosphorus, mg./100g		Acid Oxalate Extractable Sesquioxides, mg./100g	
				C.S.	F.S	Am. Si.	Int. Si.	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+		(a)	(b)	Total	Acetic Soluble	Fe_2O_3	Al_2O_3
3	A_2	2-12	1.27	25.7	22.6	37.3	22.0	29.7	6.25	2.83	0.22	12.9	4.9	7.96	3.75	2.83	0.82	0.44	21.9	63.8	35.8	3.64	<.02	N.D.	N.D
4	A_3	15-25	3.06	7.1	18.9	29.9	18.7	55.3	8.9	1.20	0.12	10.0	5.1	11.43	5.57	8.03	0.90	0.53	50.7	77.5	29.7	3.93	<.02	N.D.	N.D
5	Bt	40-50	3.85	9.1	21.7	22.7	18.1	51.0	9.4	0.60	0.17	3.5	5.1	10.81	6.55	9.56	0.61	0.61	72.5	85.0	24.4	4.60	<.02	N.D.	N.D.
6	B(g)	80-90a	4.18	5.4	17.9	34.4	21.7	55.0	9.8	0.68	0.16	4.3	5.3	12.36	7.82	11.09	0.49	0.74	47.6	74.2	42.2	3.46	<.02	N.D.	N.D
		80-90b	4.20	8.6	25.0	26.0	16.5	51.0	9.9	0.63	0.09	7.0	5.3	13.60	7.83	11.20	0.49	0.76	40.8	66.7	49.5	4.10	<.02	N.D.	N.D.
7	C(g)	125-135a	5.10	10.0	31.0	27.9	17.3	41.8	9.15	0.34	N.D.	N.D.	5.4	14.17	14.65	17.68	0.56	0.91	61.2	76.7	55.2	3.39	<.02	267	332
		125-135b	4.50	15.4	30.5	33.7	22.0	32.2	8.4	<.20	N.D	N.D.	5.5	10.76	20.35	18.88	0.58	0.93	51.5	79.0	79.0	3.03	<.02	203	174

Profile 2 ÇUKUÇAYIR II Analyses of Monolith

Results are expressed in terms of oven-dry soil

Trends are averages of results from each sample and the sample above and below it, e.g trend of sample 6-8 cm. is the average from samples 4-6 cm., 6-8 cm. and 8-10 cm. Trends are used for drawing smoothed curves.

Sample Depth (cm)	H_2O %	pH water	Cation Exchange Capacity		Exchangeable Hydrogen		Base Saturation (a) %	Acid Oxalate Extractable Fe_2O_3		Acid Oxalate Extractable Al_2O_3		Fieldes's NaF Test
			me./100g	trend	me./100g	trend		mg./100g	trend	mg./100g	trend	
0-2	2.52	5.100	62.7	62.1	17.20	16.58	72.7	343	335	251	247	N.D.
2-4	2.36	4.913	60.8	57.7	15.35	16.01	74.2	318	345	238	253	N.D
4-6	2.09	4.640	49.7	52.2	15.48	15.05	68.8	374	359	269	251	N.D.
6-8	1.64	4.420	46.0	45.6	14.32	14.54	68.2	386	416	247	251	N.D.
8-10	1.57	4.336	41.2	40.4	13.83	12.75	66.4	488	457	236	242	N.D.
10-12	1.20	4.410	34.9	35.3	10.09	11.29	68.6	497	488	242	230	N.D.
12-14	1.24	4.751	29.8	30.9	9.94	9.87	66.8	418	474	211	243	–
14-16	1.04	4.855	27.9	29.9	9.58	9.39	65.8	508	476	277	251	–
16-18	1.17	4.661	32.0	29.7	8.64	8.85	73.0	503	488	266	284	–
18-20	1.10	4.991	29.2	29.6	8.32	8.20	71.5	453	454	316	302	–
20-22	1.17	5.133	27.6	28.4	7.64	7.84	71.8	406	446	324	334	–
22-24	1.07	5.225	28.4	27.9	7.56	7.82	73.4	478	386	332	324	–
24-26	1.28	5.272	27.8	29.6	8.25	8.15	70.4	273	375	317	337	(+)
26-28	1.73	5.279	32.6	31.2	8.74	8.80	73.2	375	323	362	366	+
28-30	1.89	5.124	33.1	36.6	9.40	9.58	72.5	321	369	418	430	+
30-32	2.17	5.177	44.2	39.7	10.31	10.43	76.7	410	348	510	422	+
32-34	2.32	5.135	41.7	45.5	11.59	11.16	72.3	314	358	338	460	+
34-36	2.81	5.083	50.6	47.6	11.66	11.66	76.7	349	320	532	446	+
36-38	2.37	5.141	50.4	51.7	11.72	11.42	76.7	298	306	469	511	++
38-40	2.40	5.293	54.1	52.9	11.82	12.07	78.2	270	281	532	519	++
40-42	2.94	5.354	54.1	55.7	12.67	12.59	76.7	274	273	555	496	++
42-44	3.64	5.316	58.8	56.9	13.29	12.81	77.6	275	263	400	498	++
44-46	4.00	5.361	57.7	59.0	12.48	13.02	78.3	239	251	540	523	++
46-48	3.82	5.359	60.6	57.0	13.28	12.51	78.1	239	384	630	668	++
48-50	4.07	5.305	52.7	56.0	11.78	11.39	79.5	675	618	834	734	++
50-52	3.96	5.391	54.8	51.8	8.11	8.84	85.2	940	746	739	749	++
52-54	3.74	5.337	47.9	49.4	6.62	7.17	86.2	623	697	674	667	++
54-56	3.88	5.374	45.5	48.3	6.77	7.17	83.2	527	587	588	627	++
56-58	3.42	5.314	51.4	48.4	8.12	7.60	84.2	612	696	619	616	++

Sample Depth (cm)	H_2O %	figure 6.10 pH water	figure 6.9 Cation Exchange Capacity me./100g	trend	Exchangeable Hydrogen me./100g	trend	Base Saturation (a) %	figure 6.8 Acid Oxalate Extractable Sesquioxides Fe_2O_3 mg./100g	trend	Al_2O_3 mg./100g	trend	Fielde's NaF Test
58-60	4.14	5.337	48.2	50.5	7.90	7.00	83.6	949	769	641	626	+ +
60-62	3.53	5.335	53.0	51.3	4.99	7.46	90.6	746	721	619	592	+ +
62-64	4.14	5.318	52.8	51.2	8.49	6.70	83.9	467	631	517	635	+ +
64-66	4.00	5.380	47.7	51.3	6.63	7.44	86.1	681	577	768	667	+ +
66-68	3.79	5.326	53.5	48.1	7.21	7.25	86.5	584	605	717	752	
68-70	3.62	5.328	43.1	48.9	7.92	8.26	80.9	550	536	772	731	
70-72	3.32	5.230	50.0	47.3	9.66	8.90	80.8	473	423	704	635	+
72-74	3.85	5.394	49.3	50.7	9.12	9.62	81.5	246	336	430	506	
74-76	4.02	5.416	52.9	50.9	10.08	10.30	80.9	290	280	384	413	
76-78	3.93	5.393	50.6	51.6	11.70	11.87	76.8	304	306	414	416	
78-80	4.07	5.396	51.1	49.2	13.84	12.87	72.9	325	298	451	442	+
80-82	4.14	5.336	45.9	46.7	13.07	13.79	72.5	266	263	462	414	
82-84	2.62	5.329	43.0	44.6	14.47	13.62	66.3	198	249	339	439	
84-86	3.58	5.445	44.8	44.5	13.33	14.25	70.2	282	260	515	415	+ + -
86-88	3.71	5.287	45.8	42.4	15.04	14.45	66.1	300	302	392	461	
88-90	3.92	5.468	36.5	41.2	13.97	14.51	61.7	324	322	477	403	
90-92	3.24	5.440	41.2	40.0	14.62	13.24	64.4	341	323	339	452	
92-94	3.06	5.441	42.3	43.2	11.14	12.64	73.0	304	307	541	436	+ +
94-96	3.07	5.288	46.0	45.4	12.16	11.80	73.6	277	276	427	441	
96-98	2.98	5.378	48.0	46.8	12.09	12.25	74.7	246	256	356	371	
98-100	3.24	5.423	46.5	46.5	12.51	12.49	73.2	244	308	330	403	
100-102	3.28	5.140	45.1	46.0	12.80	12.70	61.7	434	314	522	392	+
102-104	3.21	5.472	46.4	46.7	N.D.	12.35	N.D.	263	306	325	363	
104-106	3.10	5.400	48.6	48.2	11.91	11.84	75.5	221	292	241	353	
106-108	3.15	5.430	49.7	48.9	11.70	12.34	76.0	393	371	494	410	+
108-110	3.96	5.478	48.4	49.3	13.42	12.56	72.2	500	432	495	529	
110-114	3.54	5.430	49.7	49.3	N.D.	N.D.	N.D.	403	435	598	564	+

Profile 3 ÇUKUÇAYIR I

Classification	Typic Paleudult (40b) possibly Typic Paleudalf - the large manganese concretions in the Bt are aberrant.
Date of Examination	27th May, 1966.
Location	To the right of the track from Boztepe to Çukuçayir and Zulmera, on the crest of the ridge, about 2·5 km. south of Trabzon.
Elevation	265m.
Land Form	Smooth ridge with a gentle fall to the north and gentle convex slopes to east and west.
Slope	Smooth from crest of sirte, 10^{o}
Aspect	N.10^{o}E.
Vegetation[1]	Secondary oak woodland with a varied, almost impenetrable undergrowth.

Quercus dichorochensis Koch. (dominant, E)

Picea orientalis L.	(E)	Rhododendron ponticum L.	(E)
Coryllus avellana L.	(E)	Crataegus monogyna Lacq.	(E)
Cistus salviifolius L.	(M)	Erica arborea L.	(M)
Mespilus germanica	(E)	Ajuga aff. orientalis L.	
Polygala pruinosa Boiss. subsp pruinosa		Lathyrus laxiflorus (Desf.) Ktze.	
Carduus pycnocephalus L.	(E)	Argyrolobium calycinum Bieb.	(E)

Parent Material	Extremely weathered coarse molasse derived largely from basic and intermediate volcanic materials. Sediment is of Pliocene age, original lavas and tuffs are of Upper Cretaceous and Eocene age.
Drainage	Class 2, imperfectly drained.

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[1] (E) = Euxine species; (M) = Mediterranean species.

profile 3 Çukuçayır I

Moisture Conditions in the Soil — Upper 15 cm. of the profile dry, moist below.

Depth to Ground Water Table — Permanent ground water at 82 cm., fluctuating close to the surface in winter.

Surface Stones and Rock Outcrops — Nil.

Present Soil Erosion — None under woodland, solifluction of saturated surface soil on bare ground close by pack-horse track.

Human Influence — Soil now under semi-natural vegetation but almost certainly cultivated at various times in the past. Considerable erosion has taken place since the clearance of the original vegetation.

Profile Description

Strikingly red at the surface, the soil assumes a strongly mottled and finally pale, marbled appearance at depth. Clay content is high throughout and a particular feature is the occurrence of highly weathered, often completely kaolinised rock, apparently in situ; no fresh minerals other than quartz were observed in the field. There is an indurated layer close to the surface, being gradually broken down by tree roots, and massive "fossil" manganese concretions also occur at shallow depth.

Horizon	Depth (cm.)	
1.	O_1	4-1 Dry, little decomposed litter, mostly leaves of Rhododendron, Quercus and Coryllus.
2.	O_2	1-0 Very dark brown (10YR 2/2), loosely-felted leaf skeletons and partly decomposed leaves and stems, with a little incorporated mineral material. The whole layer peels off the underlying soil quite readily, a few soil crumbs adhering to the underside. Ants common.

3. A_1 0-6 Reddish brown (5YR 3•5/4). Clay loam; moderate medium and crumb structure; friable; stone-free. Mull or moder type of organic matter gradually decreasing with depth. Frequent fine roots of grasses and herbs; ants common. Abrupt, irregular, fingering boundary.

4. Bt 6-55 Yellowish Red (5YR 5•5/8) matrix with oval to sub-angular masses of yellowish brown to strong brown (10YR 6/4 to 7•5YR 5•5/6). Clay; massive and indurated at the top of the horizon, becoming gradually less indurated with depth, assuming a coarse prismatic structure. Frequent large, black (2•5YR to 5YR 2/1) manganiferous concretions - 1 cm. to 15 cm. in diameter, irregular, vesicular with clay-filled pores in which there is a chromatographic separation of iron. Few fine roots, penetrating only to 25-30 cm.; few medium and large woody roots, generally following ped faces. Gradual boundary.

5. B(g) 55-82 A transitional horizon distinguished from that above by the absence of large manganese concretions, and exhibiting a gradual change in character with depth.

Yellowish red (5YR 5•5/8), with light yellowish brown (10YR 6/4) inclusions which becomes larger with depth, leaving only aureoles of redder colours. Clay; strong, very coarse prismatic structure, peds 60 cm. x 12 $cm.^2$ continuous with the horizon above, fracturing transversely to angular blocks; plastic to very plastic, slightly sticky. Roots of trees and shrubs follow the ped faces and form a mesh within a fine platy structure

developed parallel to the faces of the major peds. Diffuse boundary.

6. Cg 82-130 Light grey (2•5Y 8/0) with crimson and dark red (2•5YR 3/4) veins. Clay; massive; very dense slightly sticky, very plastic. Frequent rounded stones of all sizes, originally igneous rock, strongly weathered and frequently completely kaolinised, displaying a variety of colours - red, green, buff, grey. Roots few, following ped faces. Smooth gradual boundary.

7. Cg 130-180+ White with veins up to 2mm. thick of dark reddish brown (5YR 3/3) on smoothly moulded faces. Clay; massive; very dense and plastic. More and generally larger weathered stones than above, again formerly various igneous rocks. Roots absent.

Profile 3 ÇUKUÇAYIR I

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations m.equiv. per 100g.					C.E.C. c.c. per 100g	% Base Saturation		Phosphorus, mg./100g.		Acid Oxalate Extractable Sesquioxides, c.g./100g	
				C.S.	F.S.	Am.Si	Int.Si.	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+		(a)	(b)	Total	Acetic Soluble	Fe_2O_3	Al_2O_3
3	A_1	1-5	1.9	18.7	24.2	36.0	17.5	39.6	12.0	4.32	0.42	10.1	5.4	9.19	11.91	27.38	0.98	0.47	51.8	82.5	78.8	14.51	0.02	22.1	4.07
4	Bt	25-35	2.1	8.4	15.2	33.6	22.3	54.1	5.4	0.24	0.03	8.0	5.1	5.42	4.48	2.68	0.38	0.34	39.1	65.2	20.2	6.92	<.02	19.8	3.49
5	B(g)	65-75	3.4	11.6	20.7	13.1	10.5	57.2	10.1	<.2	0.04	<5	5.1	7.03	14.90	8.36	0.66	0.87	53.9	87.0	45.9	3.03	<.02	23.7	4.17
6	Cg	100-110	3.2	5.2	16.4	24.6	16.7	61.8	10.2	<.2	0.10	<2	5.1	3.80	10.85	4.94	0.44	0.71	63.1	93.9	26.8	5.19	<.02	25.5	4.23

Profile 4 ÇUKUÇAYIR III

Classification	Eroded (Typic) Paleudalf (40b) base-saturation too high for an Ultisol.
Date of Examination	17th June, 1966.
Location	On right side of track leading from the Değirmendere to Boz Tepe 2•5 km. south of Trabzon. Compass bearing on water tower on Boz Tepe N.330°E.
Elevation	230m.
Land Form	Small stream cutting back transversely into the ridge has cut out a steep-sided valley. The valley slopes are about 16° and above the shoulder a smooth 8° slope rises to the crest of the ridge. The profile is situated on the steeper slope, about 10 metres below the shoulder.
Microtopography	Small contour terraces just above the site, elsewhere on this slope a faint tear-drop effect caused by solifluction.
Slope	Straight, 16°
Aspect	N.330°E.
Land Use	Hazel bahçe, with grass, herbs and Pteridium aquilinum L. ground vegetation cut for hay. Kara yemiş (Diospyros lotus), maize and cucumbers on terraces. Cultivation is by hand using mattock and hoe. No artificial fertilizers are used.
Parent Material	Extremely weathered Pliocene molasse sediment derived largely from basic and intermediate lavas and tuffs of Upper Cretaceous and Eocene age.
Drainage	Class 3, moderately well-drained, with rapid surface run-off.

Moisture Conditions in the Soil — Dry to 3 cm., moist below.

Depth to Ground Water Table — Permanent water table not encountered, but seasonal perched water table fluctuates up to 90 cm.

Surface Stones and Rock Outcrops — Nil.

Present Soil Erosion — Unprotected soil is subject to solifluction and moderate sheet erosion. Profile truncated.

Human Influence — A cultivated soil near the margin of economic cultivation at the present time. Many hectares of the smooth sirte surface just above the site have been abandoned to oak-spruce-rhododendron scrub.

Profile Description

Reddish brown, almost stone-free clay; freely drained to 90 cm. At greater depth drainage impeded by massive clay. A truncated profile with a thin surface wash and darker granular soil occurring mainly between residual peds.

Horizon	Depth (cm.)	
1. A_1	0-3	Reddish brown (7•5YR 4/4). Clay; very fine granular structure with a thin surface crust exhibiting polygonal cracking; dry consistence - slightly hard in mass, but individual granules are hard. Abundant fine roots; frequent small (< 1mm.) white nuclei, often associated with roots (possibly fungal colonies) numerous ants. This horizon is made up of soil material carried downslope. Abrupt, smooth boundary.
2. A_{12}	3-60	Dark reddish brown (7•5YR 4/6). Clay; medium crumb structure breaking to fine granular; moist friable consistence. Abundant fine roots and frequent medium woody roots of hazels, fungal mycelia; ants' nests which include comminuted plant material.

This horizon forms a complex pattern between the massive peds of horizon 3, but is clearly differentiated by colour and constitution, and is preferred by fibrous roots. Abrupt, irregular boundary.

3. B 9-90 Dark yellow brown (10YR 4/6). Clay; strong coarse subangular blocky structure becoming angular blocky at depth; very firm moist consistence (4). Peds show pressure faces and discontinuous cutans. Few rounded, weathered stones. Pteridium rhizomes and fine to medium roots: along the root network the soil is darker and powdery due to root and ant activity. Clear wavy boundary.

4. B(g) 90-165+ Coarsely mottled dark red (2·5YR 3/6) and yellow brown (10YR 5·5/6). Clay; strong, very coarse prismatic structure (peds 20 x 5 $cm.^2$) breaking to blocky, moist, very firm consistence. Peds show pressure faces and discontinuous cutans, probably of clay minerals and sesquioxides. Few rounded stones - highly weathered. Coarse hazel roots penetrate to more than 165 cm.

Profile 4 ÇUKUÇAYIR III

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations m.equiv. per 100g.					C.E.C. ma. per 100g	% Base Saturation		Phosphorus mg per 100g	
				C.S.	F.S.	Am. Si	Int. Si	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+		(a)	(b)	Total	Acetic Soluble
1	A1.1	0-3	3.50	7.6	14.6	21.0	13.9	63.9	12.0	2.45	0.30	8.2	4.95	11.76	13.67	9.18	1.85	0.45	60.5	80.6	41.5	6.94	0.02
2	A1.2	3-10	3.65	6.0	14.4	19.7	14.2	65.3	12.3	2.47	0.23	10.2	4.9	14.69	10.90	8.22	1.84	0.44	66.3	77.8	32.2	6.21	1.70
3	Bt	40-50	3.44	5.6	14.7	20.7	12.6	67.1	11.5	1.27	0.20	6.4	5.1	13.99	9.88	7.14	0.48	0.45	59.6	76.6	30.1	4.08	<.02
4	B(g)	130-140	5.27	4.1	12.2	18.6	14.2	69.5	10.1	N.D.	N.D.	N.D.	5.2	12.91	12.35	11.81	0.39	0.95	63.6	79.8	40.1	2.42	<.02

Mineralogical Analysis of Coarse Sand Fraction, Sample 130-140 cm.

Light Fraction 98.13 per cent. entirely quartz

Heavy Fraction 1.87 per cent. mostly black opaque material, a mixture of hæmatite and mangatite
very small amounts of zircon, garnet, rutile, epidote and green hornblende

Profile 5 BEŞTAŞ

Classification	Aquic Paleudult (40b)
Date of Examination	21st June, 1966.
Location	Beştaş, near Kanliğa village, where mule track leaves village eastwards for the Çukuçayir ridge. Compass bearings to water tower on Boz Tepe - N.27°E., to Soğuksu N.280°E.
Elevation	285m.
Land Form	Smooth ridge top with a long gentle slope to the north but with steep falls to valleys on either side. The volcanic basement is exposed on the valley sides and on denuded ridges to both east and west, although this particular ridge retains a sedimentary cover.
Slope	Gentle, 6°.
Aspect	N.26°E.
Land Use	Hazel bahçe, bushes 3-4 metres high; Kara yemiş (Diospyros lotus), apple, plum and acacia around farm-houses. Lush ground flora including

Trifolium medium L. var medium
Trifolium angustifolium L.
Trifolium campestre Schreb
Blackstonia perfoliata (L) Huds
Coronilla varia L. (M)
Rosa canina L. s.l.
Argyrolobium calycinum Bieb. (E)
Campanula rapunculoides L. (E)
C. aff hemishinica C. Koch (E)
Oenanthe sp.
Centaurium erythraea Rafn.
Hypericum sp. (E)
Hieracium pilosella L.sl.
Gramineae -
Lophochloa phleiodes (Vill) Reichb.
Phleum montanum C.Koch
Bromus matritensis L.
Dactylis hispanica Roth.
Brachypodium silvaticum (Huds) P.Beans
Agrostis capillaris L.

Daucus sp. or Pimpinella sp.

Vicia sp. Pteridium aquilinum

Bellis perennis mosses and lichens.

(E) = Euxine sp; (M) = Mediterranean sp.

Parent Material — Extremely weathered Pliocene molasse sediment, derived largely from basic and intermediate lavas and tuffs of Upper Cretaceous and Eocene age.

Drainage — Class 2, imperfectly drained.

Moisture Conditions in the Soil — Moist below 4 cm.

Depth of Water Table — Seasonal perched water table fluctuates up to about 50 cm.

Surface Stones and Rock Outcrops — Nil.

Present Soil Erosion — Nil.

Human Influence — Cultivated, probably over a long period. Hazel bahçe for more than 10 yrs.

Profile Description

A deep stone-free red clay soil, porous down to 50 cm. but very compact below this depth. Present-day roots are confined to ped faces, but dendritic pores, filled with translocated clay, permeate the entire soil mass down to at least one metre. Below 50 cm. the ped faces are strongly gleyed, but ped cores retain a dark red colour.

Horizon	Depth (cm.)	
1. A_{11}	0-0·5	Reddish brown (2·5YR 4/3). Clay; strong very fine granular structure; consistence wet - slightly sticky and plastic, moist - very friable, dry-soft (1). The granules are loosely bound together by moss rhizoids into crumbs, and are mixed with dry plant debris. Smooth merging boundary.

2. A_{12} 0•5-4•5 Dark red (2•5 YR 3/6). Clay; moderate small subangular blocky structure, breaking to strong fine granular; consistence wet - slightly sticky and plastic, moist - firm, dry - slightly hard. The wetted sample is difficult to rub down to a smooth consistency, fine dense granules being virtually unwettable. Very little small rounded gravel, highly weathered, possibly ironstone concretions. Abundant fine roots permeating and holding the peds. Boundary smooth, merging over 1 cm.

3. B 4•5-5•3 Dusky red (2•5YR 3/2). Clay; very coarse prismatic structure - peds 15 cm. x 5-9^{2}cm., consistence wet - slightly sticky and very plastic, moist - very firm, dry - hard. No detectable cutans. Stone free. Small, hard rounded manganese concretions. Worm casts deposited in burrows at about 25 cm., casts friable; many ped faces smeared with mucous; scorpion in burrow at 20 cm.; white fungal mycelia on ped faces and especially on worm casts and root runs; fine roots permeate the peds, medium and coarse roots show preference for ped faces, frequent Pteridium rhizomes. Clear broken boundary, the horizon appears to be invading the horizon below - irregular lumps of which occur up to 45 cm. Sample from 25-35 cm. taken for thin section.

4. Bt(g) 53-100+ Dark red (10R 3•5/6), veined with light olive grey (5Y 6•5/2). Clay, very coarse prismatic structure, massive at depth; consistence wet - slightly sticky and slightly plastic, moist - firm.

Gleying extends 2 to 5 mm. in from the major ped faces; these gleyed faces are stained rust along root channels. Major peds crack to moulded smaller units which have continuous shiny cutans. Dendritic pores, about 1 mm. in diameter are lined with translocated clay and sometimes organic material. Roots are entirely confined to ped faces which bear the impression of the root pattern. The horizon is stone-free. Sample from 65-75 cm. taken for thin section.

Profile 5 BEŞTAŞ I

Analytical Data

Horizon		Sample Depth (cm)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations, m.equiv. per 100g					C.E.C. me./100g	Base Saturation		Phosphorus, mg./100g		Acid Oxalate Extract: Sesquioxides, mg./100g	
				C.S.	F.S.	Am.Si	Int.Si	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+		(a)	(b)	Total	Acetic Soluble	Fe_2O_3	Al_2O_3
2	A1.2.	1-4	3.02	0.6	13.3	15.4	7.3	78.7	14.3	2.28	0.28	8.9	4.8	6.79	18.24	6.16	0.90	0.34	53.2	86.9	32.4	21.9	<.02	325	359
3	B	25-35	2.66	2.5	18.9	25.4	14.8	63.8	11.9	1.72	0.49	3.6	5.5	4.94	27.80	6.43	0.53	0.38	55.2	91.2	40.2	23.9	0.175	318	326
4	Bt(g)	65-75	2.96	0.3	8.1	12.9	8.2	83.2	11.5	0.10	0.31	<1	5.8	7.84	8.83	2.49	0.35	0.38	46.2	83.0	26.2	19.7	<.02	464	583

Mineralogical Analysis of Coarse Sand Fraction, sample 65-75 cm.

Light Fraction 96.94 per cent, of which 56 per cent. un-dispersed hæmatite-quartz-clay granules, remainder entirely quartz.

Heavy Fraction 3.06 per cent, mostly black opaque material - a mixture of hæmatite and mangatite, zircon, tourmaline, rutile, epidote, augite, hornblende and apatite.

BROWN CALCAREOUS SOILS

Profile 6 ÇUKU ÇAYIR VI

Classification Vertic Eutrochrept (40b)

Date of Examination 10-13th June, 1966.

Location Right hand side of track leading from the road bridge near the mouth of the Değirmendere to Boz Tepe, about 2 km. from the bridge, overlooking the Değirmendere gorge.

Elevation 70m.

Land Form Profile sited near the foot of the convex shoulder slope of the gorge of the Değirmen Dere.

Slope Convex, 16°

Aspect N.74°E.

Land Use Heavily grazed pasture, receiving no artificial fertilizers.

Species include:

Bellis perennis L.	Pteridium aquilinum (L.) Kuhn
Centaurea iberica Trev.	Salvia verbenacea L.
Medicago polymorpha L. var. vulgaris (Benth.) Shin	
Pallenis spinosa (L.) Cass	Scorpiurus muricatus L.
Potentilla reptans L.	Trifolium resupinatum L.

The flora has a strong Mediterranean element.

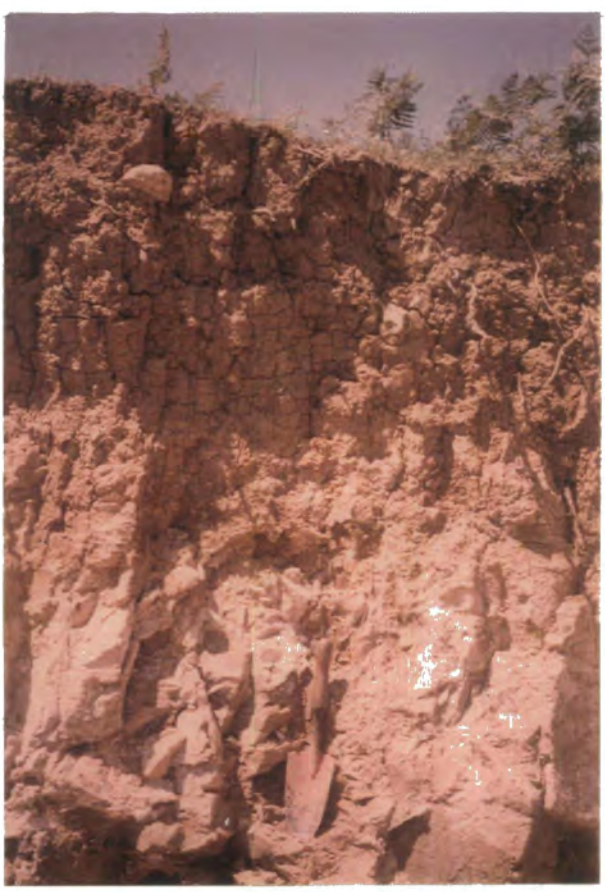
Parent Material Pliocene molasse. Silt loam, with few rounded stones from basic to intermediate lavas and tuffs.

Drainage Class 3-2, moderately well drained.

Moisture Conditions in the Soil Dry to 10 cm., moist below.

Depth to Ground Water Table Permanent ground water table not encountered in the profile. Seasonal perched water table fluctuates below about 10 cm.

profile 6 Çukuçayır VI



Surface Stones — A few small rounded stones and gravel on the surface.

Evidence of Erosion — Probably a long history of cultivation.

Profile Description

A deep, almost stone-free soil developed on slightly calcareous parent material. The upper horizons are a clay loam texture, almost completely free of carbonate and show indications of seasonal water-logging. Structure is poor at the surface due to cultivation. There are cutans of translocated clay between 63 and 77 cm. and a well developed calcareous horizon below this to 130 cm.

The Cca and C horizons are silt loams with 60-75 per cent American silt fraction and show a very coarse somewhat pyramidal structure with manganese cutans and almost horizontal zones of iron deposition, including brittle pans. Fragments of similar pans are found in the upper horizons.

Horizon	Depth (cm.)	
1. O	5-0	Dry moss and litter.
2. Ap	0-20	Dark yellowish (10YR 4/3 dry). Clay loam; very coarse prismatic structure (long axis 20 cm.), breaking to coarse subangular blocky, individual aggregates very dense; consistence wet - sticky and plastic, dry - extremely hard. A little smoothly rounded gravel exhibiting only surface weathering, rare rounded stones up to 15 cm. Few soft iron nodules 1-3 mm. occasionally up to 5 mm., yellow and rust in colour; randomly oriented fragments of brittle, laminated iron pan, 1-5 mm. thick, various diameters. White fungal mycelia on dead roots and Pteridium rhizomes, and on organic material lining earth-worm burrows. Earthworms not numerous; small

molluscs; numerous ants and other insects; insect eggs common in upper 16 cm. Frequent fine roots and Pteridium rhizomes.

Clear smooth boundary.

3. B 20-63 Dark yellowish brown (10YR 4/3 moist). Clay loam; very coarse prismatic structure breaking to angular blocky, peds clearly defined with pressure faces but some friable soil found in fissures between the peds; consistence wet, very sticky and slightly plastic, dry - extremely hard. Slightly calcareous, with flecks of carbonate on ped faces; few very fine rust mottles within peds. Rare worm casts down to about 30 cm. Few roots penetrate the compact peds but concentrate in the friable soil in fissures; rhizomes and large roots moulded in ped faces. Pteridium rhizomes to 50 cm.

Abrupt irregular boundary.

4. 63-77 Light yellowish brown (2·5Y 5·5/4) with almost horizontal streaks of rust giving a laminated appearance. Loam, very coarse prismatic structure with some darker, finely-divided material between the peds; consistence wet - sticky and slightly plastic, dry - very hard. Patchy cutans of fine silt and carbonate. Almost stone free. Slightly calcareous, with very fine pseudomycelia on some ped faces.

Fine roots penetrate the peds but are especially concentrated in the finely granulated soil between the peds and in old root channels. Ped surfaces show a delicately moulded relief impression of the root network.

Clear wavy boundary.

5. C(ca) 77-130 Light yellowish brown (2•5Y 5•5/4). Silt loam; very coarse polyhedral, somewhat pyramidal structure; consistence wet - slightly sticky and slightly plastic; dry - very hard to soft in zones of greatest carbonate deposition.

Patchy thin dark red cutans on major ped faces, probably manganese and iron oxides. Pseudomycelia of calcium carbonate superimposed on the dark cutans; few soft spherical amorphous nodules of calcium carbonate, up to about 8 cm. diameter, concentrated particularly between 80 and 100 cm. and between 120 and 130 cm. where they form a soft discontinuous pan.

Rare fine, woody roots follow ped faces and fracture planes to about 120 cm. Gradual smooth boundary.

6. C 130-200+ Light olive brown (2•5Y 5/4). Silt loam; very coarse polyhedral, somewhat pyramidal structure, units increasing in size with depth to over 20 cm. at the profile base; consistence wet - slightly sticky and slightly plastic, dry - hard and very compact.

Continuous black cutans, probably manganese oxides, on all ped faces. At 180 cm. there is a multiple rippled pan of iron and possibly manganese oxides in a wafer-like pattern. The pans run through a more yellow-brown zone 1-8 cm. deep, lying at 10^{o} to the horizontal with a northerly dip.

Occasionally the pan may finger downwards along a joint, but only for a few centimetres. The pan is extremely hard but brittle. The entire horizon has a laminated appearance due to rust staining in almost horizontal bands and streaks. Diffuse carbonate deposition. Stone free. No roots.

Profile 6 Çukuçayır VI

Analytical Data

Horizon		Sample Depth (cm)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	% $CaCO_3$	Exchangeable Cations, m.equiv per 100g					C.E.C. me./100g	% Base Saturation	Phosphorus mg./100g
				C.S.	F.S.	Am.Si	Int.Si	Clay		%C	%N	C/N			H^+	Ca^{++}	Mg^{++}	K^+	Na^+			
2	Ap	5-15	3.62	1.1	27.7	48.6	35.8	35.6	8.3	1.42	0.19	7.5	6.4	0.43	4.67	41.5	5.5	1.23	0.68	55.1	91.7	11.42
3	B	35-45	3.67	2.8	30.2	48.7	33.7	34.3	7.8	0.51	0.15	3.4	6.9	0.28	4.48	44.9	6.5	0.88	0.62	57.4	92.2	8.60
4		65-75	3.94	0.2	52.1	40.0	30.6	17.1	5.9	0.04	0.05	< 1	7.2	0.42	nil	48.0		0.60	0.90	49.5	100	11.94
5	Cca	105-115	3.08	3.0	48.5	72.5	42.4	6.1	12.0	N.D.	N.D.	N.D.	7.8	2.00	nil	20.8		0.66	0.99	22.4	100	9.34
6	C	155-175	3.40	0.5	58.2	62.8	32.8	6.3	8.5	N.D.	N.D.	N.D.	7.9	0.78	nil	31.6		0.88	1.23	33.7	100	12.51

Mineralogical Analysis of the Fine Sand Fraction, sample 155-175 cm.

Light Fraction 100 per cent., including quartz, calcite, plagioclase, but mostly unidentified.

Profile 6 Çukuçayır VI Monolith

Results are expressed in terms of oven-dry soil

Trends, used for drawing smoothed curves, are averages of the results from each sample and the samples immediately above and below it.

Sample Depths (cm.)	% Water	fig. 6.10 pH (water)	figure 7.3 Cation Exchange Capacity		figure 7.2 Acid Oxalate Extractable Sesquioxides Fe_2O_3		Al_2O_3	
			me./100g	trend	mg./100g	trend	mg./100g	trend
0-4	2·30	7·258	63·3	63·5	174	173	297	297
4-6	2·28	7·070	63·8	62·4	171	172	297	302
6-8	2·26	7·033	60 1	62·9	171	179	312	290
8-10	2·38	7·157	64·8	61·6	195	185	262	267
10-12	2·35	7·149	59·8	60·5	188	208	226	295
12-14	2·34	7·141	56·9	58·9	242	216	396	297
14-16	2·28	7·205	59·9	59·5	217	234	270	345
16-18	2·33	7·218	61·6	54·5	244	238	369	346
18-20	2·29	7·264	43·1	50·0	252	234	399	392
20-22	2·16	7·315	45·4	44·1	207	215	407	399
22-24	2·19	7·335	43·9	43·8	185	192	391	383
24-26	2·24	7·303	42·1	42·6	185	185	350	338
26-28	2·23	7·264	41·7	41·5	185	185	272	298
28-30	2·23	7·274	40·8	41·7	186	202	273	282
30-32	2·19	7·293	42·7	42·3	235	205	300	279
32-34	2·14	7·328	43·4	42·5	195	222	263	303
34-36	2·21	7·310	41·3	42·1	235	223	347	316
36-38	2·19	7·277	41·7	42·7	239	243	338	349
38-40	2·43	7·289	45·0	43·5	253	246	363	326
40-42	2·48	7·323	43·9	43·8	247	248	278	319
42-44	2·44	7·355	42·6	42·8	243	214	316·	281
44-46	N.D	7·339	41·9	42·7	192	218	250	283
46-48	taken as 2·5	7·293	42·7	42·3	219	219	284	301
48-50	hereafter	7·308	42·0	42·6	245	307	369	379
50-52		7·385	43·2	42·5	456	298	483	385
52-54		7·457	42·4	42·4	192	266	303	363
54-56		7·417	41·6	41·0	149	154	303	307
56-58		7·409	38·9	39·7	110	140	314	328
58-60		7·363	38·7	38·6	161	156	368	335

Sample Depth (cm.)	% Water	fig. 6.10 pH (water)	figure 7.3 Cation Exchange Capacity		figure 7.2 Acid Oxalate Extractable Sesquioxides Fe_2O_3		Al_2O_3	
			me./100g	trend	mg/100g	trend	mg./100g	trend
60-62	taken as 2.5	7.358	38.3	39.2	196	184	323	354
62-64		7.370	40.5	39.2	194	204	370	383
64-66		7.387	38.7	39.3	222	213	455	427
66-68		7.395	38.8	38.1				
68-70		7.437	37.2	38.5				
70-72		7.445	39.6	39.3				
72-74		7.916	41.0	38.8				
74-76		8.089	35.8	35.6				
76-78		8.152	30.0	32.3				
78-80		8.154	31.2	31.8				
80-82		8.090	34.1	32.0				
82-84		8.140	30.7	31.1				
84-86		8.179	28.6	29.5				
86-88		8.176	29.1	30.1				
88-90		8.163	32.8	31.6				
90-92		8.216	32.8	32.8				
92-94		8.131	32.8	33.8				
94-96		8.120	35.8	34.0				
96-98		8.099	33.4	34.6				
98-100		8.060	34.5	34.6				
100-102		8.111	35.8	35.2				
102-104		8.152	35.3	35.5				
104-106		8.108	N.D.					
106-108		8.148	N.D.					
108-110		8.134	N.D.					

Profile 7 ÇUKU ÇAYIR IV

Classification	Typic Udorthent
Date of Examination	15th June, 1966.
Location	Right hand side of track leading up from the Değirmen Dere to Boztepe, about 2•5 km. south of Trabzon.
Elevation	180m.
Land Form	Convex slope 10 to 15° below shoulder of ridge, tributary valley cutting into the side of the sirte has exposed the volcanic basement.
Slope	12°
Aspect	N.155°E.
Land Use	Intensive cultivation of maize, potatoes, beans and onions in various combinations of inter-culture; tobacco grown alone. Cultivation by mattocks and hoe. No artificial fertilizers used, but all available compost is worked into the soil. Profile dug in bean patch.
Parent Material	Pliocene molasse; silt loam with a few rounded stones derived from basic and intermediate lavas and tuffs.
Drainage	Class 2, imperfect.
Moisture Conditions in the Soil	Dry to 35 cm., moist below.
Depth of Ground Water Table	Permanent water table not determined, perched water table fluctuates close to the surface in winter.
Stones and Rock Outcrops	None above the tributary stream.
Evidence of Erosion	Profile truncated, sheet erosion of unprotected soil.

Human Influence Probably a long history of cultivation.

Profile Description

A deep, almost stone-free sticky clay loam, derived from base-rich parent material. There is a calcareous horizon at only 32-37 cm., suggesting truncation of the profile. Silt content increases below this depth and the peds become pyramidal with continuous manganese cutans and brittle iron pans at various depths.

Horizon	Depth (cm.)	
1. Ap	0-32	Dark yellowish brown (10YR 4/6) with a few fine rust mottles. Clay loam; strong cultivated cloddy structure; consistence wet - sticky and slightly plastic, moist - friable. Virtually stone-free. Soft lumps of moist clay, speckles of $CaCO_3$ below 10 cm. increasing with depth; irregularly shaped fragments of ca horizon and fragments of iron pan brought up by cultivation. Blackened but dry and incompletely decomposed organic material, probably compost, mixed with soil during cultivation. Fine roots of bean crop evenly distributed. Abrupt, irregular boundary marked by mattock cultivation.
2. Cca	32-37	Loose, crumbly $CaCO_3$ and broken iron pan. Abrupt, wavy boundary with the underlying horizon.
3. C	37-100	Pale olive (5Y 6•5/3). Loam; coarse polyhedral, somewhat pyramidal structure; consistence wet - sticky and slightly plastic, moist - friable to very friable (1-2). Virtually stone-free. Continuous thin manganese cutans on all vertical ped faces. Thin, brittle rippled iron pan complexes at 56-58 and 64-65 cm. multiple wafer-

like iron pans occur within horizontal zones of yellow-brown staining. Roots rare, following ped faces.

Profile 7 Çukuçayır IV

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations ma. per 100g					C.E.C. ma./100g	% Base Saturation	Phosphorus cg./100g
				C.S.	F.S.	Am.Si	Int.Si	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+			
1	Ap	10-20	3.51	1.3	39.7	37.2	27.0	32.0	5.7	0.69	0.13	6.5	6.45	8.71	20.3	17.2	0.82	0.70	47.4	81.6	16.16
3	C	50-60	3.50	0.1	57.8	50.7	20.5	21.7	4.5	<.1	0.20	<1	6.48	4.39	18.8	17.6	0.74	1.38	42.4	89.7	6.24

Profile 8 KISARNA II

Classification	Typic Udorthent (40b)
Date of Examination	28th June, 1966.
Location	West side of the valley of the Kisarnadere, about 5 km. southwest of Trabzon. Compass bearings to Karlik Tepe N.175°E., Aya Sofia N.22°E., Soğuksu N.73°E.
Elevation	208m.
Land Form	A smooth step in the valley side, dropping at 27° to the valley bottom in the east, and rising steeply again to the crest of a ridge in the west. A small patch of Pliocene molasse sediment is preserved on the step, while the volcanic basement rocks are exposed on the steep valley sides and on gently-rising ground to the south.
Slope	6°
Aspect	N.32°E.
Land Use	Cultivation extends to the very edges of the sedimentary cover. As soil depth decreases so does the quality of the crops. A thin crop of bearded wheat had just been harvested; maize growing on the remainder of the field was in poor condition. Somewhat xerophytic scrubby pasture on surrounding lithosols.
Parent Material	Calcareous silt loam.
Drainage	Class 5, somewhat excessively drained.
Moisture Conditions in the Soil	Dry to 15 cm., moist below.
Depth to Ground Water	Groundwater not encountered in profile.

Evidence of Erosion: Severe sheet erosion. Calcareous horizon, normally developing at about 1m. appears at the surface and there is a sharp drop of 20-50 cm. in the surface level of the cultivated fields compared with uncultivated ground.

Human Influence: Probably a long history of cultivation.

Horizon	Depth(cm.)	
1. Ap	0-20	Olive (5Y 4/3) silty clay loam to silt loam; moderate cultivated cloddy structure; consistence wet - slightly sticky and slightly plastic, dry - hard. Poor dense structure due to cultivation and low organic content. Few small rounded stones of weathered basic and intermediate lavas. Spotty calcium carbonate deposition throughout and small irregular calcareous nodules below 10 cm. Frequent evenly distributed fibrous roots. Abrupt irregular boundary defined by mattock cultivation.
2. Cca	20-50+	Olive (5Y 4/3) silt loam, moderate coarse blocky structure confused by heavy carbonate deposition; consistence wet - slightly sticky and slightly plastic, dry - slightly hard. A more fluffy structure than the Ap because of the heavy carbonate deposition. Few stones as above. Frequent randomly distributed calcium carbonate nodules, spherical to irregular in shape, increasing in size from 5mm. at the top of the horizon to 3 cm. at a depth of 50 cm. Roots of the crop reach about 25 cm.

Profile 9 KISARNA I

Classification	Vertic Eutrochrept (40b)
Date of Examination	26th June, 1966
Location	East side of the valley of the Kisarnadere, about 4 km. S.W. of Trabzon.
Elevation	176m.
Land Form	Steep valley side in highly dissected Trabzon platform.
Slope	Straight, $22 \cdot 5^{\circ}$. A section of almost straight slope between the convex shoulder of the ridge above and a complex valley bottom.
Aspect	N.260°E.
Land Use	Hazel bahçe with herbaceous ground vegetation.
Parent Material	Pliocene molasse, a silt loam containing frequent rounded stones derived from basic and intermediate volcanic materials of Upper Cretaceous and Eocene Age. The sediment lies on a basement of agglomerate and basalt, in this instance probably of Upper Cretaceous age, which is exposed on the valley sides below the profile site.
Drainage	Class 4, well drained.
Moisture Conditions in the Soil	Moist throughout.
Depth and Ground Water Table	Jointed basalt at 150 cm.
Surface Stones and Rock Outcrops	None above profile site, bedrock exposed on steeper slopes below.
Evidence of Erosion	Soil creep evidenced by upward curving tree trunks and downslope stone alignment in the soil.
Human Influence	Probably a long history of cultivation.

Profile Description

A brown clay loam, subjected to considerable downslope movement at some time in the past, overlying massive calcareous silt loam which is in situ below 65 cm. Soft carbonate nodules occur below 35 cm. and there is a lens or pan of carbonate at 65-70 cm. The volcanic basement is encountered at 150 cm.

Horizon	Depth(cm.)	
1. Ap/A	0-30	Brown (10YR 4/2). Clay loam; moderate medium crumb structure becoming medium to coarse blocky at depth; consistence moist - friable, becoming more compact at depth. Few stones of various shapes up to 6 cm. long axis, tending to be aligned downslope, mostly weathered basic to intermediate lavas. Abundant faunal activity - earthworms; larvae; chrysalis; spiders - particularly in the porous surface levels. Abundant evenly distributed fibrous roots. Smooth merging boundary.
2. B	30-65	Brown (10YR 4/3). Clay loam; moderate coarse blocky structure; consistence moist - firm. More stones than above, accounting for about 10 per cent by volume of the soil mass, clearly aligned downslope. Few irregular soft carbonate nodules, up to one cm. diameter. Frequent roots. Abrupt smooth boundary.
3. IICca	65-150	Pale olive (5Y 6/4). Silt loam; massive; compact and firm. Frequent dark rounded stones of weathered basic to intermediate lavas. Bands at iron concentration dipping at 12-15° to the horizontal in a northerly direction. Lens or pan of soft $CaCO_3$ up to 5 cm. thick below 65 cm.; whole horizon calcareous.

			Few hazel roots, penetrating along zones of weakness.
			Abrupt smooth boundary.
4.	IIIR	150+	Jointed, weathered basalt.

Profile 10 ÇUKU ÇAYIR V

Classification	Aquic Vertic Eutrochrept
Date of Examination	29th May, 1966.
Location	By the first farm on the right side of the track leading up from the Değirmen Dere to Boz Tepe.
Elevation	90m.
Land Form	Slightly rolling convex slope between the flat ridge top and the gorge of the Değirmen Dere.
Slope	13^{o}, steeper above site.
Aspect	N.62^{o}E.
Land Use	Intensive cultivation of potatoes, maize and intercultivated vegetables. Above this field on the same soil young hazel bahçe with intercultivated maize and vegetables, and widely spaced fruit trees. No artificial fertilizers are applied, but all available compost is worked into the soil.
Parent Material	Pliocene molasse, a silt loam with a few rounded stones derived from basic to intermediate lavas and tuffs.
Drainage	Class 2, imperfect.
Moisture Conditions in the Soil	Moist throughout.
Depth to Water Table	Not determined. Seasonal perched water table close to surface in winter.
Surface Stones	A little very smooth gravel.
Evidence of Erosion	None
Human Influence	Probably a long history of cultivation.

Profile Description

A deep, yellowish brown, sticky silty clay developed on an almost

stone-free silt loam to loam. Drainage is impeded in the upper horizons which exhibit fine rust mottles. There is no calcareous horizon but there is finely diffused carbonate throughout the profile and the exchange complex is base-saturated.

The C horizon shows a characteristic huge polyhedral, somewhat pyramidal structure, and the ped faces bear continuous thin manganese cutans.

Horizon	Depth(cm.)	
1. Ap	0-32	Dark yellowish brown (10YR 4/4). Silty clay loam; strong cultivated cloddy structure; consistence wet - sticky and slightly plastic, moist - firm but friable, dry - hard. A little rounded gravel. Non calcareous. Frequent earthworms concentrating particularly around fragments of blackened but only partially decomposed organic material incorporated in the soil by cultivation. Frequent, evenly-distributed potato roots. Abrupt, irregular boundary defined by mattock cultivation.
2. A_{12}	32-65	Dark yellowish brown (10YR 4/4) with a few ochreous mottles. Silty clay. Coarse prismatic structure, poorly-defined in the moist state; more compact than Ap, consistence wet - sticky and slightly plastic, moist - firm, dry hard to extremely hard (4-5). A little weathered rounded gravel. Slightly calcareous. Common earthworms. Fine roots less frequent than above, but a few medium and coarse roots from nearby fig tree. Gradual, smooth boundary.

3. B 65-120 Yellowish brown (10YR 5/4) with a few fine, evenly distributed, ochreous mottles. Silty, clay; strong, coarse polyhedral structure; consistence wet - sticky and slightly plastic, dry - compact and hard. Vertical faces have cutans of manganese oxides becoming more continuous at greater depth. Occasional weathered rounded gravel. Slightly calcareous.

Coarse and medium fig roots increasingly confined to ped faces.

4. C 120+ Light yellowish brown (10YR 6/4) moist; pale yellow (2·5Y 7/4) dry; frequent yellow streaks and diffuse coarse mottles. Loam; very coarse polyhedral, somewhat pyramidal structure, individual ped faces up to 40 cm.^{2} can be picked out; consistence wet - slightly sticky and slightly plastic, dry - compact and hard. Ped faces sharply defined by continuous fine cutans of manganese oxides,[1] dark reddish brown to black (5YR 3/1-3/0). Occasional rounded gravel and small stones of weathered basic lava. Calcareous.

Fig roots form a reticulum between ped faces and along horizontal shatter planes.

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[1] Subsequently confirmed by chemical tests.

Profile 10 ÇUKUÇAYIR V

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	% $CaCO_3$	Exchangeable Cations me./100g				C.E.C me./100g.	% Base Saturation	Phosphorus mg./100g	Acid Oxalate Extractable Sesquioxides mg/100g	
				C.S.	F.S.	Am.Si.	Int.Si.	Clay		%C	%N	C/N			H^+	Ca^{++} and Mg^{++}	K^+	Na^+				Fe_2O_3	Al_2O_3
1	Ap	10-20	3.70	3.9	28.0	47.0	30.1	38.0	6.3	0.70	0.29	2.4	7.2	0.98	nil	46.8	0.72	1.39	48.9	100	8.45	680	761
2	A 1.2	40-50	3.88	6.4	25.0	40.4	26.6	42.1	6.5	0.74	0.27	2.7	6.9	0.13	3.99	51.3	0.94	1.22	57.5	93.1	14.63	675	724
3	B	80-100	4.12	4.4	25.2	44.9	28.5	41.9	5.3	0.40	N.D.	N.D	6.9	1.32	3.12	49.1	0.79	1.30	54.3	93.6	14.76	608	517
4	C	130-140	4.23	0.9	45.9	43.4	31.8	21.6	5.2	N.D.	N.D.	N.D.	7.7	1.56	nil	44.7	0.75	1.48	47.0	100	13.53	536	495

PLAGGEN SOILS

Profile 11 BEŞTAŞ II

Classification	Vertic Plaggept (40b), strictly the plaggen horizon should be>50 cm. thick.
Date of Examination	22nd June, 1966.
Location	South of mule track leading from Kanliğa to the Çukuçayir ridge about 4 km. south of Trabzon Compass bearings to water tower on Boz Tepe N.19°E. to minaret at Beştaş N.279°E.
Elevation	c. 270m.
Land Form	Small basin cut into the Trabzon Platform. Residual sirtes to east and west, higher hills rising to the south.
Slope	Concave, 12°
Aspect	N.315°E.
Land Use	Intensive cultivation around farm house. Vegetable patch of cucumbers and beans; fields of maize with interplanted beans; hazel bahçe with fruit trees - plum, apple, pear, kara yemiş, fig and mulberry - close to the buildings. No artificial fertilizers are used, but compost is applied. Profile examined in hazel bahçe with lush ground vegetation of grasses, clover, nettles and Labiatae.
Parent Material	Marl, probably of Upper Miocene age.
Drainage	Class 4, well drained.
Moisture Conditions in the Soil	Moist throughout.
Depth to Ground Water	More than 150 cm.

profile 11 Beştas II

Surface Stones and Rock Outcrops: None.

Human Influence: Probably a long history of cultivation.

Profile Description

A dark brown clay loam developed on a fairly soft highly calcareous marl. Fragments of parent material are found throughout the upper horizons and there is a strongly developed horizon of secondary carbonate deposition, up to 20 cm. thick, overlying the parent material.

The soil has been intensively cultivated and the Ap is particularly enriched in organic matter which is well humufied and dark in colour.

Horizon	Depth (cm.)	
1. Ap	0-20	Very dark greyish brown (2·5Y 3/2). Clay; very coarse granular structure becoming very coarse subangular blocky below 6 cm.; the soil shrinks considerably on drying, leaving distinct peds separated by large cracks; consistence wet - very sticky and plastic, moist - firm and coherent, dry - very hard. Frequent angular gravel, some hard limestone, some marly and weathered. Strongly calcareous. Fragments of charcoal and old, well-decomposed roots throughout the horizon. Abundant fine live roots. Great faunal activity, slugs on surface, ants, beetles, earthworms. Abrupt, irregular boundary, defined by mattock cultivation.
2. A_{12}	20-45	Dark greyish brown (2·5Y 4/2). Clay loam; strong medium blocky structure; consistence wet - sticky (2-1), moist - friable and coherent, dry - hard. Frequent angular fragments as in Ap. Strongly calcareous.

			Potsherds, fragments of charcoal and well-decomposed old roots throughout the horizon. Most fine roots penetrate to about 35 cm. some reach 45 cm., large hazel roots are concentrated in this horizon. Earthworms present. Abrupt irregular boundary.
3.	(B)ca	45-55	Olive (5Y 5/2·5). Clay loam; weak small blocky structure; consistence moist - friable, dry - hard. Few stones. Frequent small soft carbonate nodules. Common medium and coarse roots. Horizon of variable depth -1 to 10 cm. Abrupt tongueing boundary with the underlying horizon.
4.	Cca	46/55-62	White $CaCO_3$ in large, soft concretions, mostly fused but with vertically aligned flocks and patches of dense clay loam, honeycombed by dendritic pores; passages left by the decay of large roots are filled with dark brown (5YR 3/2) powdery soil and abundant fine live roots. Bulk consistence wet - non-sticky and non-plastic, moist - friable, firm in lumps, dry - very hard. Abrupt irregular boundary.
5.	C2	62-85	Reddish yellow 7·5YR 6/8 with many prominent sharply defined fine mottles of white, green and blue. Sandy loam; massive structure; with veins of $CaCO_3$ in all directions, mostly 2-3mm. thick, occasionally up to 1 cm. Hazel roots penetrate to 85 cm.
6.	C3	85-100+	Massive marl as above.

Profile 11 BEŞTAŞ II

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	% $CaCO_3$	Exchangeable Cations, m.equiv. per 100g				C.E.C. m.e. / 100g	% Base Saturation	Phosphorus mg/100g
				C.S.	F.S.	Am. Si.	Int. Si.	Clay		%C	%N	C/N			H^+	Ca^{++} and Mg^{++}	K^+	Na^+			
1	Ap	5 15	4.26	22.4	19.0	17.7	10.4	48.1	16.9	3.11	0.38	8.0	7.2	9.31	nil	51.3	0.35	0.53	52.2	100	18.41
2	A12	25 35	3.31	18.2	16.2	33.9	26.2	36.8	15.6	0.79	0.10	7.9	7.9	12.10	nil	43.4	2.21	0.50	46.1	100	10.78
4	Cca	50 60	2.26	15.5	20.1	38.5	30.1	33.8	13.6	N.D.	N.D.	N.D.	8.1	27.08	nil	30.0	0.90	0.53	31.4	100	3.53
5	C2	70 80	2.25	15.9	25.5	19.0	10.4	12.3	13.8	N.D.	N.D.	N.D.	8.3	22.40	nil	29.4	0.52	0.35	30.3	100	2.60

Profile 12 SOĞUKSU

Classification	Plaggept (40b)
Date of Examination	20th June, 1966.
Location	On the left side of the mule track leading due south from the well at Soğuksu, about a km. S. of the Ataturk Köşke.
Elevation	342m.
Land Form	Convex slope at shoulder of ridge.
Slope	Moderately steep, 22^{o}, some 50-100m. to crest of sirte.
Aspect	N.90^{o}E.
Land Use	Maize, cultivated with mattock and hoe. All available organic refuse is applied to the soil but artificial fertilizers are not used.
Parent Material	Extremely weathered coarse Pliocene molasse including rounded stones of Upper Cretaceous and Eocene basic and intermediate lavas and tuffs.
Drainage	Class 2-3 imperfectly drained.
Moisture Conditions in the Soil	Dry to 5 cm., moist below.
Depth to Water Table	Permanent water table not encountered in profile, seasonal perched water table fluctuates up to about 50 cm.
Surface Stones and Rock Outcrops	Nil.
Present Soil Erosion	Moderate sheet erosion on unprotected land.
Human Influence	Cultivated, probably over a long period.

Profile Description

Red-brown clay with strong structure overlying, with sharp discontinuity, massive, highly weathered bedrock ("saprolite") at 70 cm.

"Ghosts" of large boulders in situ in the sedimentary rock. Paler colours and spotty manganese deposition indicate seasonal waterlogging, below about 50 cm. Cultivated topsoil shows a drastic loss of organic matter and structure compared with adjacent uncultivated soil.

Horizon	Depth (cm.)	
1. Ap	0-25	Dark red brown (7·5YR 3/4). Clay; coarse cultivated cloddy structure; moist - friable consistence, slightly sticky and slightly plastic when wet. Few small rounded stones and gravel, mostly strongly weathered. Earthworms present, casts deposited underground; frequent fine fibrous roots. Abrupt irregular boundary. Sample also taken from uncultivated land under scrub and grass 15 m. away (sample 8-18 cm.b).
2. A_{12}	25-38	Reddish brown (5YR 4/4). Clay; strong very coarse blocky structure, consistence - wet; slightly sticky and plastic, moist - firm, weakly cemented. Stone free. Earthworms present; frequent fine roots with some concentration at ped faces. Clear wavy boundary.
3. A_{13}	38-52	Reddish brown (5YR 4/4) with purple tinge. Clay; strong coarse prismatic structure; consistence wet - slightly sticky and plastic, moist - very firm. Few small rounded stones, highly weathered, colour 7·5YR 4/6 speckled with white and orange. Frequent fine roots, evenly distributed. Clear, smooth boundary.
4. B(g)	52-70	Yellowish red (5YR 4/6). Clay, moderate coarse blocky structure, consistence wet - slightly sticky and plastic, moist - firm. Few angular gravel fragments, frequent rounded stones and boulders, highly weathered. Few fine black

manganese nodules giving a spotty appearance; some old root channels outlined in black. Abrupt, broken boundary; the horizon sometimes occurs in fissures in the underlying saprolite down to 150 cm.

5. IIC(g) 70-150+ Yellowish brown (10YR 5/4), speckled white and rust. Massive, highly weathered molasse breaking down to a gritty silty clay loam; consistence wet - slightly sticky and non-plastic, moist - firm. The matrix contains "ghosts" of rounded and sub-rounded stones up to 50 cm. diameter. Few small, firm manganese nodules. Roots rare.

Profile 12 Soğuksu

Analytical Data

Horizon		Sample Depth (cm.)	% Water	Mechanical Analysis, % separates					% Loss on Ignition	Organic Fraction			pH water	Exchangeable Cations m.equiv. per 100g					C.E.C. m.e./100g	Base Saturation		Phosphorus, c.g/100g	
				C.S.	F.S.	Am.Si	Int.Si	Clay		%C	%N	C/N		H^+	Ca^{++}	Mg^{++}	K^+	Na^+		(a)	(b)	Total	Acetic Soluble
1b	A_1	8-18b	1.24	8.4	27.9	28.8	17.0	46.7	13.4	2.41	0.68	3.5	4.8	11.76	20.13	9.07	3.91	0.52	57.6	79.7	58.3	60.49	0.025
1	Ap	8-18	2.85	10.0	25.1	29.8	17.8	47.2	14.3	0.93	0.23	4.0	4.5	12.69	23.48	10.84	1.85	0.67	63.6	79.8	57.8	69.98	0.20
2	$A_{1.2}$	26-36	3.56	8.4	20.6	25.5	16.8	54.2	16.1	1.65	0.18	8.9	5.5	6.74	18.37	9.21	1.51	0.55	61.6	88.9	48.2	55.00	<.02
3	$A_{1.3}$	40-50	3.68	3.0	20.8	21.7	14.7	61.5	13.6	0.73	0.19	3.8	6.1	4.77	18.98	12.55	2.44	0.67	57.5	91.4	60.2	72.46	<.02
4	B(g)	60-70	4.22	3.4	21.4	18.0	9.6	65.6	13.8	0.37	0.30	1.2	4.9	7.68	13.78	9.67	1.85	0.69	58.9	87.5	44.2	79.49	<.02
5	IIC(g)	120-140	4.92	1.0	45.6	34.4	21.5	31.9	13.9	<.05	0.24	<1	4.9	10.17	11.04	5.17	0.33	1.60	51.7	80.4	35.1	31.36	<.02

Mineralogical Analysis of the Coarse Sand Fraction, sample 120-140 cm.

Light Fraction 92.79 per cent, entirely quartz

Heavy Fraction 7.21 per cent., mostly black opaque material - a mixture of hæmatite and mangatite
a fraction of one per cent. zircon, epidote and biotite

Profile 13 LITHOSOL

Classification	Lithic Udorthent
Date of Examination	23rd June, 1966.
Location	Above track leading south from the west of the old citadel of Trabzon towards Kireçhane. Profile taken on the west face of gorge, about a km. south of the city.
Elevation	175m.
Land Form	Gorge cutting through the volcanic basement of the Trabzon Platform. The surrounding country is steeply dissected although the smooth ridge tops retain a sedimentary cover.
Slope	Steep, 27·5° at the profile site with much steeper slopes above and below.
Aspect	N.120°E.
Vegetation	Mosses and lichens on rock outcrops, a xerophytic sward about 10 per cent of the soil surface exposed and patches of scrub where pockets of deeper soil have accumulated.

Blackstonia perfoliata (L.) Huds
Campanula aff. hemishinica C. Koch
Centaurium tenuiflorum Fritsch
C. erythraea Rafn.
Ceterach officinarum D.C.
Convulvulus cantabrica L.
Cynanchum nigrum C.A. Meyer
Echium italicum L.
Lophochloa phleoides (Vill.) Reichb.
Pallenis spinosa (L.) Cass.
Paliurus spina-cristi
Pimpinella sp.
Prunella aff. orientalis Bornm.
Rubus tomentosus Borckh.
Scabiosa sp.
Sedum hispanicum L.
Serapias vomeracea (Burm.) Briq.
Stachys iberica Bieb.
Thymus sp.

The flora as a whole has strong Mediterranean affinities. The vegetation is lightly browsed where accessible to sheep and cattle.

Parent Material	Basalt
Drainage	Excessive, Class 6.
Moisture Conditions in the Soil	Dry to 5 cm., moist below.
Rock Outcrops	Extremely rocky.
Evidence of Erosion	Frequent rock falls, sheet erosion on bare surfaces
Human Influence	Limited to indirect action of grazing animals.

Profile Description

Shallow stony brown sandy loam occurring in pockets on a steep rocky slope.

Horizon	Depth (cm.)	
O	0•5-0	Moss and dry litter. Lizards, ants and small insects of many kinds.
A_1	0-5	10YR 4/2 (dry). Gritty sandy loam; weak medium crumb structure, consistence dry - slightly hard, moist - friable. Frequent angular rock fragments, weathered, mostly of gravel size, and frequent black coarse sand grains. Abundant white mycelia within soil crumbs. Abundant fine fibrous roots of grasses and herbs, occasional tap roots of Compositae. Merging boundary. pH 7•2 (colourimetric field test).
AC	5-20	10YR 4/2 (dry). Properties as above but angular fragments of parent rock, mostly between 1 and 5 cm. long axis, comprise 50 per cent of the volume of the horizon. Weak blocky structure determined by stones. Abundant fine roots. Abrupt, irregular boundary with the underlying horizon.

R 20+ Hard, jointed basalt.