

Report on the intercomparison run Soil-5 for the determination
of trace elements in soil

by

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Report on the Intercomparison for the Determination of Selected Trace
and Major Elements in IAEA Soil-5 Material

1. Introduction

The knowledge of the elemental composition of soil, and especially its trace element content is of interest to many investigators active in various fields of research. Among these concerned are not only agricultural chemists and soil scientists, but also biochemists, environmentalists, nutritionists and others. The increased recognition of the essentiality on one hand and toxicity on the other, of certain trace elements towards animals and Man ¹⁻³⁾, has led to intensified studies of the pathways of trace elements in nature, particularly in the environmental research. Not only atmosphere, hydrosphere and biological tissues, but also soil is examined.

Essential and toxic trace elements may pass from soil to plants (by which they are sometimes effectively concentrated ⁴⁾) and further through food chains to Man. The interest in the analysis of soil for the content of many trace and also some major elements is therefore rapidly increasing. Hence, there seems to be an obvious need for a reference material with established "recommended values" of as many elements as possible which could be used for checking the quality of analytical work of the laboratories engaged in soil analyses. At the same time well-characterized soil, containing high levels of minerals can be also of interest for geochemists as a complement to already existing geochemical reference samples ^{5,6)}.

The intercomparison which forms substance of this report was organized by the IAEA in 1976 with a double aim in mind:

First it was intended to provide the participating laboratories in the Member States with the opportunity of checking their general performance.

Secondly, it was hoped that the soil would become sufficiently well characterized in this intercomparison to be subsequently useful as a reference material with "recommended values" for many elements.

Due to encouragingly impressive response of the interested laboratories, 60 of which participated in this exercise, setting up a record in the history of our intercomparisons, both aims could be successfully realized.

Because of the considerable number of elements to be determined in Soil-5 the deadline originally set turned out to have been too short, and results were still flowing in over a period of months after it. On the other hand, the abundance of data forced us to change completely the procedures for the evaluation of results. These are the main reasons which delayed the preparation of this Report.

2. Description of the Material

The soil collected at the Agricultural Experimental Station La Molina, Lima, Peru (20 cm topsoil depth) was made available by the Agricultural Section of the Agency's Laboratory in already ground and presieved form. In order to ensure good homogeneity and to prevent any sampling errors and errors due to segregation of particles during storage, the material was sieved again and the fraction that passed a 0.16 mm sieve was collected. This fraction (ca. 50 kg) was then mixed in a rotating plastic drum for 48 hours, and approximately 25 or 50 g portions were distributed into plastic bottles.

The homogeneity was tested by determining the content of some elements (Cs, Co and Fe) by neutron activation analysis in several samples taken from one bottle and comparing the results with analogous data obtained by analyzing several samples taken from various bottles chosen at random.

By applying F and t tests it was found that the results did not differ significantly and the material could be considered homogeneous, at least for sample weights ≥ 100 mg. The content of hygroscopic moisture in Soil-5, as determined by drying at 105°C to a constant weight, was rather small ($\approx 1.7\%$), but it may vary with a change in ambient humidity.

It was recommended to participating laboratories that the moisture in Soil-5 be always determined in a separate sub-sample (not that taken for analysis), by drying at 105°C for 20 - 24 hours, and all results reported on a dry-weight basis.

3. The Scope of the Intercomparison

For practical reasons, the number of elements requested to be determined by the participants in Soil-5 was originally limited to the following 20: As, Ba, Br, Co, Cr, Cs, Cu, Fe, Hf, La, Mn, Rb, Sb, Se, Ta, Tb, Th, U, Yb, Zn. However, in the information sheet accompanying the intercomparison sample, the

Agency expressed its interest in receiving results for any other element which participating laboratories would be willing to determine.

The number of these "additionally determined" elements turned out to be quite impressive (37, not including those for which only the approximate upper limits were reported). For 23 elements from among them 5 or more laboratory means were received which, in several cases, made it possible for us to establish "recommended values".

4. Results

The data sent in by the laboratories were edited, punched on cards, and processed by a computer programme especially written for this purpose. The concentrations are expressed either as parts per million (denoted in computer printout as PP10EXP6) or weight percent (WT.%).

4.1. Tables

The results returned by individual laboratories for all the elements for which at least 2 laboratory means were available are presented in Tables 1 - 55. The meaning of the terms used in these tables is as follows:

Laboratory Code No.: Each laboratory is represented by an appropriate code number which remains unchanged throughout the respective tables. These numbers, however, do not correspond to the sequence of laboratories in the list of participants given at the end of this report, so that anonymity is secured.

Method Code No.: Main features of the analytical methods used by individual laboratories are shown in the form of code numbers, the key to which is given in Tables 56 and 57, respectively. The code numbers appearing before the point refer to pretreatment of the sample and separation, and/or preconcentration methods used, those after the point to the method used for the quantitative determination, respectively. For technical reasons only two digits were available to describe the sample pretreatment and separation or preconcentration methods. In certain cases, where actually three digits should have been used, the one omitted was normally that referring to the dissolution step.

Estimated Laboratory Error: The participant's own estimate expressed in percent. The figure before the point refers to random error due to counting statistics only (for radiometric methods) that after the point is an estimate of the systematic error due to uncertainty of the standards used. For technical reasons the errors smaller than 1% were entered as "1" and those exceeding 100% as "99".

Number of determinations: The number of individual results for a given element (with the exception of those given in the form "lower than ...") supplied by the laboratory. Results described as "doubtful" by the laboratory itself were not considered. The computer programme in the present form accepts a maximum of up to 6 individual results for a given element from one laboratory. If the number of individual results reported by the laboratory was bigger, it was reduced down to 6 with the aid of Tables of random numbers ⁷⁾. If the number of individual results exceeded 6 but there were some differences in the procedure (e.g. if two different methods were used for the calculation of the peak area in instrumental neutron activation analysis), the results were split accordingly and entered as two separate sets.

Laboratory Mean: The arithmetic mean computed from all individual results supplied by a given laboratory. An asterisk next to a laboratory mean denotes that this mean was qualified as an outlier and was not taken into account when computing the overall mean.

The procedure adopted here for the identification of outlying results was the same as described in a recent paper ⁸⁾. Four criteria, i.e. Dixon's test (D) ^{9,10)}, Grubbs' test (G) ^{11,12)}, coefficient of skewness test (S) ^{13,14)} and coefficient of kurtosis test (K) ^{13,14)} were used concurrently at a significance level of $\alpha = 0.05$. If the laboratory average was declared as an outlier by any criterion, it was rejected, and the whole procedure repeated until no more outliers could be identified.

Laboratory standard deviation: Was calculated in the usual way only if at least three results were reported by a laboratory.

The results of the intercomparison are summarized in Table 58. The meaning of terms used in the summarizing table except for those which are self-explanatory is as follows:

Overall mean ($\bar{X}$): is the non-weighted mean of all "accepted" laboratory averages, i.e. those left after elimination of outliers. Correspondingly, the same set of data was used for the calculation of the:

Standard deviation of overall mean (S.D.): and

Standard error (S.E.):

$$S.E. = \frac{S.D.}{\sqrt{N}}$$

where:

N = number of "accepted" laboratory averages.

Confidence limits for the mean of the population of all laboratory means:
were calculated from the relation:

$$\bar{X} - t_{0.05} \cdot (S.E) < \mu < \bar{X} + t_{0.05} \cdot (S.E)$$

where:

$t_{0.05}$ = Student's factor for a significance level of 0.05.

5. Discussion

5.1. General Comments

Table 56 shows that a purely instrumental approach without any chemical pretreatment of the sample and without any separations was predominantly used for the majority of elements determined in this intercomparison. In this table the sum of numbers designated as "% of use in the run" may exceed "100" for those elements for which various separation methods have been used. As the operations coded "0 - 9" in Table 56 and in Tables 1 - 55 are not quite independent from each other (e.g. extraction or ion exchange cannot be executed in the case of solid samples without prior dissolution), the "% of use" was calculated here taking as a "100% basis" the number of participating laboratories rather than the total sum of operations included.

Simple sample pretreatment such as digestion, fusion and/or dissolution was used quite often, usually as a necessary step before measurement by Atomic Absorption Spectrometry (AAS). Precipitation and extraction were the most popular separation methods, ion exchange and volatilization were also sometimes used.

From among the methods used for quantitative determinations (see Table 57) the leading roles of neutron activation analysis (NAA) and AAS are indisputable. X-ray fluorescence (XRF) occupies the third place followed by Emission spectroscopy (ES), Colorimetry or Spectrophotometry (C & S) and Mass Spectrometry (MS). Other methods listed in Table 57 were used in isolated cases only.

The relative frequency of the use of various analytical methods as revealed by Table 56 and 57 seems to be rather typical for that kind of sample, i.e. solid with high mineral content and trace element concentrations exceeding 1 ppm in most cases (see Table 58). Well known merits of nondestructive multielement methods of analysis, such as NAA could be fully exploited here.

From among 57 elements finally covered in this intercomparison, only two (Cd and P) were not determined at all by purely instrumental approach.

The apparent ease with which elements like hafnium and rare earths can be determined by NAA, compared to the difficulties encountered when other analytical techniques are tried for this purpose, resulted in the almost exclusive use of NAA for these elements.

5.2. Problem of rejection of outlying results

Outliers, i.e. results deviating markedly from the population of other observations are quite frequently observed in intercalibration tests, and may be considered as being due to some gross errors in the analytical procedure, instrument calibration, standards used, calculations etc. In trace analysis it occurs not infrequently that laboratories report results differing among themselves even by orders of magnitude. Therefore, if reliable values of trace element concentrations and their confidence limits are to be arrived at on the basis of intercomparison runs, an appropriately sensitive and effective procedure for the detection and rejection of outliers is indispensable.

It was demonstrated in previous work ⁸⁾ that because of masking effects which occur when two or more outliers are present in a given set of results, the concurrent use of several criteria is more effective than the use of any single one of them (at the same significance level).

Examples of complementary action of the four criteria used in this work are shown in Table 59.

Judging from the observations on the previous use of this approach for processing of data from other intercomparisons in which the "true value" was known, the procedure applied above seems to assure good selectivity of rejection of outliers while not leading, at the same time, to excessive rejections. (The latter may sometimes result in significant deviations of the overall mean from the "true value" and an unrealistic estimation of the standard deviation).

A survey through Tables 1 - 55 reveals that altogether 116 results (laboratory averages) contributed by 37 laboratories have been qualified as outliers. A closer examination shows that 55% of all outlying results have been produced by 9 laboratories (Code Numbers: 5, 14, 16, 25, 31, 36, 43, 53 and 58) which constitute only 15% of all participating laboratories or 24% of those laboratories which have had their share in providing outlying results. So the probability of occurrence of outlying results in some laboratories is

much greater than in the others, which should be a warning signal to those concerned. On the other hand one should note that it would be unjust to appraise all the 9 laboratories mentioned above in exactly the same manner. For instance while for laboratories 5 and 25 the outliers constitute 17 and 14% of all results supplied by them, the analogous percentages for laboratories 14 and 43 amount to 79 and 83%, respectively.

5.3. Comparison of analytical methods

Comparison of results obtained by various analytical techniques⁺ for several elements is shown in Table 60. Only those elements were taken into account for which available data resulted from at least two methods each with not less than two "accepted" laboratory averages. The results are presented in the form: mean $\pm$ S.E (number of accepted laboratory averages).

In general one can say that there is a fairly good agreement between the methods. Some exceptions, however, should be noted. The results by AAS for Ba and Ca seem to be too high and those for Sr too low. Similarly the results obtained by XRF for Ni or by MS for Pb seem to be distinctly lower than those obtained by other methods.

However, if we set as a provisional criterion for significant difference between the methods that calculated confidence limits of the means (at significance level of $\alpha = 0.05$) do not overlap, none of the cases mentioned above do qualify as "significantly different". The reason for that is first of all too small a number of results for certain methods in which case Student's $t_{0.05}$ factors are high, making confidence limits excessively large, and secondly not too good agreement of results within a method.

In one case, however, owing to the big number of results returned, it was possible to establish that significant difference between the methods exists. For Mn, the results by NAA are unambiguously higher than those obtained by AAS or ES (see Table 60).

5.4. Soil-5 as a reference material

One of the main purposes of this intercomparison was the establishment of "best" or "recommended" values for concentrations of several constituents.

The degree of certainty with which the true content of an element can be assessed in the course of an interlaboratory comparison depends upon many factors

and usually varies from element to element. The data for the first category of elements, i.e. for those for which "recommended" values could be established with a relatively high degree of confidence, are listed in Table 61. To qualify into this class, five criteria formulated below had to be fulfilled:

1. Relative uncertainty of the overall mean (at a significance level of $\alpha = 0.05$), lower than 20% (trace elements) or 10% (major and minor elements).
2. Relative standard deviation of the overall mean lower than 25% (trace elements) or 15% (major and minor elements).
3. Data from at least two different analytical methods were available for the calculation of the overall mean.
4. At least 5 laboratory averages have been used for the calculation of the overall mean.
5. No significant difference between the groups of results obtained by various analytical methods could be detected.

A second category was established for elements the "recommended" values of which, while failing to fulfill all the five criteria simultaneously, at least fulfilled either criterion 1 or 2. These are listed in Table 62.

A third category includes elements for which criteria No.1 and No.2 were not fulfilled. The accuracy with which concentrations of these elements were assessed is not considered satisfactory and they are given for information only (Table 63).

5.5. Conclusions

The present intercomparison has demonstrated once again that constant analytical quality control is indispensable in trace analysis irrespective of the type of material being analysed. Although concentrations of elements in Soil-5 were in most cases in the ppm range, i.e. not excessively low, sometimes an incomprehensibly high spread of results ranging, e.g. for Ag, Co, Cu, Hg etc. up to three orders of magnitude, was observed. A survey through outlying results seems to indicate that a relatively small number of laboratories are mainly responsible for producing erroneous results, and not the analytical technique or the kind of element being determined. Certain systematic differences between

the methods, however, seem to exist in isolated cases and this problem deserves further investigation. A big amount of data received from the laboratories in this intercomparison run, together with appropriately sensitive and reliable procedures for the rejection of outliers applied in this study made possible the establishment of meaningful "recommended" values for many of the elements. It is hoped that Soil-5 reference material will be of help for analytical chemists working in many different fields of research.

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TABLE NO. 1 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR AG IN SOIL-5,1976

UNIT: PPI0EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	5A	9.4	.	6	1.107		.182	16.4	
2	19A	1.2	.	4	0.900		.258	28.6	
3	36A	1.2	.	1	0.080				
4	48	9.1	15.05	2	2.300				
5	53B	9.4	.10	1	5.000				
6	58	1.2	.	1	40.000*		.		

TABLE NO. 2 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR AL IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	2.05	6	8.102		.403	4.9	
2	58	1.6	.	1	8.520				
3	8	9.1	3.15	6	7.937		.963	12.1	
4	18	9.1	3.05	4	8.527		.096	1.1	
5	57A	9.1	1.01	6	7.195*		.159	2.2	
6	57B	9.1	1.01	6	8.117		.204	2.5	
7	58	1.2	.	1	7.950				

TABLE NO. 3 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR AS IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	2.06	6	110.000		6.260	5.6	
2	2C	9.6	1.06	6	100.000		1.673	1.6	
3	4	9.6	10.02	6	78.317		5.321	6.7	
4	5D	9.1	.	6	106.000		5.549	5.2	
5	6	9.1	1.	5	84.800		1.673	1.9	
6	7	9.6	.10	6	80.167		7.250*	9.0	
7	8	9.1	7.15	6	113.600		15.173	13.3	
8	9	16.5	.03	6	104.500		2.258	2.1	
9	10	9.6	6.	1	110.000				
10	14	9.1	44.11	1	212.000*				
11	15	9.6	6.25	3	87.333		5.773	6.6	
12	16	9.7	.30	3	65.000		31.224	48.0	
13	18	9.1	5.05	5	113.000		4.690	4.1	
14	19B	9.6	1.05	4	78.250		1.707	2.1	
15	21	9.1	2.10	3	93.967		.208	.2	
16	25	9.1	3.	2	5.900*				
17	26	9.6	.20	2	71.000				
18	30	9.1	2.02	6	101.050		2.189	2.1	
19	35	9.1	.	6	118.932		4.039	3.3	
20	39	9.1	5.10	5	73.000		2.236	3.0	
21	40	13.5	.08	6	112.000		9.736	8.6	
22	41A	9.1	.	5	157.000*		3.000	1.9	
23	46	9.1	9.03	6	104.667		5.276	5.0	
24	48	9.1	4.10	3	116.000		4.358	3.7	
25	49	9.1	6.	1	58.000				
26	53A	9.6	10.10	4	57.250		7.804	13.6	
27	53B	9.4	.10	1	10.000*				
28	54A	12.1	.	6	97.017		6.050	6.2	
29	55A	9.6	.	4	110.500		1.290	1.1	
30	57A	9.1	3.01	6	96.467		6.504	6.7	

TABLE NO. 4 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR BA IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.07	6	530.333		36.120	6.8	
2	2A	9.1	5.06	6	531.667		26.394	4.9	
3	2B	12.1	1.05	1	500.000				
4	5D	9.1	.	5	549.600		56.752	8.7	
5	6	9.1	18.	5	452.000		34.205	7.5	
6	8	9.1	29.15	6	521.167		74.665	14.3	
7	12	9.6	3.10	4	767.750		28.371	3.6	
8	14	9.1	10.11	1	392.000				
9	16	9.7	.30	3	311.667		82.815	26.5	
10	18	9.1	11.05	5	590.000		101.840	17.2	
11	19D	9.6	1.05	4	432.750		2.217	.5	
12	21	9.1	5.10	3	537.000		12.124	2.2	
13	22	9.1	30.	4	665.500		190.650	28.6	
14	25	9.1	40.	2	610.000				
15	26	9.6	.20	1	450.000				
16	31	1.2	.	4	1145.000*		95.742	8.3	
17	35	9.1	.	6	596.925		66.358	11.1	
18	36A	1.2	.	4	2800.000*		600.000	28.5	
19	36B	1.2	.	4	1072.500*		63.206	5.8	
20	38A	9.1	.10	4	649.750		26.411	4.0	
21	39	9.1	6.10	5	578.000		17.888	3.0	
22	40	1.2	.15	6	616.167		97.659	15.6	
23	45	9.1	20.05	3	366.000		18.248	4.9	
24	46	9.1	14.03	6	480.000		60.332	12.5	
25	47	1.2	.10	6	879.167		19.487	2.2	
26	48	9.1	12.10	3	652.667		34.501	5.2	
27	49	9.1	8.	1	630.000				
28	55A	9.6	.	4	567.000		49.125	8.6	
29	57A	9.1	1.01	6	418.333		26.348	6.2	
30	57B	9.1	2.01	4	430.000		25.703	5.9	
31	60	9.4	.	3	720.333		22.810	3.1	

TABLE NO. 5 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR BE IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	5A	9.4	.	6	1.792		.039	2.2	
2	36A	13.2	.	4	1.750		.957	54.7	

TABLE NO. 6 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR BI IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	36A	1.2	.	4	1.750		.500	28.5	
2	55A	9.6	.	4	4.500		1.290	28.6	
3	55B	1.2	.	2	30.000				

TABLE NO. 11 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR CO IN SOIL-5, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.10	6	10.133		1.046	10.3	
2	2A	9.1	1.05	6	14.167		.314	2.2	
3	5A	9.4	.	6	12.667		1.505	11.8	
4	5D	9.1	.	6	14.800		2.683	18.1	
5	6	9.1	1.	5	15.520		.327	2.1	
6	8	9.1	1.10	6	15.817		.306	1.9	
7	11	2.1	.	6	14.157		1.541	10.8	
8	14	9.1	1.11	1	48.000*				
9	16	9.7	.30	3	17.667		6.350	35.9	
10	18	9.1	2.05	5	15.620		.408	2.6	
11	15B	9.6	2.05	4	11.750		.957	8.1	
12	21	9.1	2.10	3	15.167		.208	1.3	
13	22	9.1	6.	3	16.000		1.000	6.2	
14	24	1.2	.10	6	33.000*		.632	1.9	
15	25	9.1	4.	2	14.000				
16	26	14.2	.15	2	16.850				
17	28	1.2	.	6	37.000*		4.472	12.0	
18	29	1.2	.	6	15.397		.245	1.5	
19	31	9.1	2.	3	15.900		.519	3.2	
20	32	1.2	.05	6	23.500*		1.870	7.9	
21	32B	9.1	2.	4	17.750		1.500	8.4	
22	34	14.2	.15	2	14.050				
23	35	9.1	.	5	15.678		.658	4.1	
24	36A	1.2	.	4	13.750		3.500	25.4	
25	36B	1.2	.	4	26.000*		4.546	17.4	
26	37	14.5	.15	3	16.000		5.000	33.3	
27	38A	9.1	.05	5	14.000		1.000	7.1	
28	39	9.1	5.10	5	17.020		.402	2.3	
29	40	1.2	.04	4	20.000		2.943	14.7	
30	41A	9.1	1.	5	12.260		.568	4.6	
31	41B	1.2	.	5	17.620		.376	2.1	
32	42	9.1	.	5	13.260		.167	1.2	
33	43	1.2	.15	3	0.317*		.075	24.1	
34	44	1.2	.13	6	5.628*		.777	13.8	
35	45	9.1	10.05	4	12.350		2.056	16.6	
36	46	9.1	2.03	6	15.250		.432	2.8	
37	47	1.2	.10	3	53.433*		1.167	2.1	
38	48	9.1	3.05	3	13.933		.152	1.0	
39	49	9.1	4.	1	16.800				
40	50	9.1	5.03	4	16.400		1.080	6.5	
41	53B	9.4	.10	1	50.000*				
42	55A	9.6	.	4	26.750*		1.258	4.7	
43	55B	1.2	.	2	10.000				
44	57A	9.1	1.01	6	12.317		.292	2.3	
45	57B	9.1	1.01	4	11.642		.416	3.5	
46	58	1.2	.	1	800.000*				
47	55	9.1	.10	6	15.117		.893	5.9	
48	60	9.4	.	3	19.000				

TABLE NO. 12 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR CR IN SOIL-5, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.08	6	28.500		2.144	7.5	
2	2A	9.1	5.06	6	37.667		1.861	4.9	
3	2C	9.6	20.06	6	32.833		9.020	27.4	
4	3	1.2	.01	3	25.900		.435	1.6	
5	5A	9.4	.	6	26.333		2.422	9.1	
6	5D	9.1	.	5	29.400		3.781	12.8	
7	6	9.1	4.	5	25.600		1.516	5.9	
8	8	9.1	11.15	6	17.263		2.947	17.0	
9	10	9.6	6.	1	400.000*				
10	11	2.1	.	6	77.070*		11.567	15.0	
11	14	9.1	9.11	1	44.000				
12	16	9.7	.30	3	25.500		1.500	5.8	
13	18	9.1	6.05	5	31.240		2.809	8.9	
14	19A	1.2	.	4	29.500		3.872	13.1	
15	19B	9.6	1.05	4	40.250		1.892	4.7	
16	20	1.2	.50	6	10.000				
17	21	9.1	6.10	3	34.333		2.579	7.5	
18	22	9.1	30.	4	34.500		9.614	28.4	
19	24	1.2	.15	6	34.000				
20	25	9.1	20.	2	37.000				
21	26	1.2	.15	2	18.400				
22	28	1.2	.	6	27.006		14.240	52.7	
23	29	1.2	.	6	17.148		.487	2.8	
24	31	1.2	.	3	36.333		1.154	3.1	
25	34	1.2	.50	2	17.800				
26	35	9.1	.	5	30.968		2.948	9.5	
27	36A	13.2	.	4	31.250		5.652	18.7	
28	36B	1.2	.	4	13.750		2.500	18.1	
29	37	1.5	.15	3	50.000				
30	38A	9.1	.10	4	19.500		2.081	10.6	
31	38B	1.2	.	2	22.500				
32	39	9.1	20.10	5	35.800		3.114	8.6	
33	40	1.2	.08	4	41.750		3.500	8.3	
34	41A	9.1	2.	4	15.500		1.290	8.3	
35	41B	1.2	.	5	35.000		1.000	2.8	
36	42	9.1	.	5	20.740		.890	4.2	
37	44	1.2	.15	6	36.250		5.526	15.2	
38	45	9.1	20.05	3	26.067		1.890	7.2	
39	46	9.1	6.03	6	29.500		2.073	7.0	
40	48	9.1	10.06	3	28.133		1.795	6.3	
41	49	9.1	4.	1	25.000				
42	50	9.1	10.03	1	15.000				
43	52A	9.6	30.10	2	705.000*				
44	55A	9.6	.	2	50.500				
45	57A	9.1	1.01	6	24.600		1.597	6.4	
46	57B	9.1	2.01	4	23.825		1.573	6.6	
47	60	9.4	.	3	36.000		3.605	10.0	

TABLE NO. 13 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR CS IN SOIL-5, 1976

UNIT: PP10EXP5

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF CETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	2.05	6	43.050		1.564	2.4	
2	SD	9.1	.	5	84.200*		8.438	10.0	
3	6	9.1	1.	5	49.800		.836	1.6	
4	8	9.1	1.15	6	57.067		4.384	7.6	
5	11	2.1	.	6	50.575		3.466	6.8	
6	14	9.1	1.11	1	151.000*		.	.	
7	16	9.7	.30	3	9.000*		1.500	16.6	
8	18	9.1	2.05	5	62.140		1.880	3.0	
9	21	9.1	1.10	3	62.833		.321	.5	
10	22	9.1	5.	4	70.250		3.095	4.4	
11	25	9.1	25.	2	64.500				
12	31	9.1	3.	3	27.533*		.611	2.2	
13	35	9.1	.	5	56.820		1.369	2.4	
14	38A	9.1	.10	5	59.600		6.985	11.7	
15	39	9.1	3.10	5	45.600		1.095	2.3	
16	41A	9.1	1.	5	49.400		2.190	4.4	
17	42	9.1	.	5	50.000		2.345	4.6	
18	46	9.1	1.03	6	69.833		1.834	2.6	
19	48	9.1	3.06	3	61.867		.838	1.3	
20	49	9.1	4.	1	51.000				
21	55A	9.6	.	4	96.750*		4.112	4.2	
22	57A	9.1	1.01	4	55.550		1.782	3.2	
23	57B	9.1	1.01	4	51.575		1.687	3.2	
24	59	9.1	.10	6	56.250		3.453	6.1	

TABLE NO. 14 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR CU IN SOIL-S.1976

UNIT: PP10EXF6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.05	6	56.833		2.786	4.9	
2	2C	9.6	2.06	6	80.167		2.926	3.6	
3	3	1.2	.01	3	77.100		.655	.8	
4	4	9.6	25.02	6	50.100		16.159	32.2	
5	5A	9.4	.	6	48.333		5.391	11.1	
6	7	9.6	.10	6	64.333		5.316	8.2	
7	8	9.1	6.15	6	357.333*		16.848	4.7	
8	10	9.6	10.	1	80.000				
9	12	9.6	1.05	4	92.250		2.986	3.2	
10	15	9.6	6.15	3	76.333		5.859	7.6	
11	16	9.7	.30	3	133.333*		41.633	31.2	
12	19A	1.2	.	4	84.500		3.872	4.5	
13	19B	9.6	1.05	4	77.250		1.500	1.9	
14	2C	1.2	.3	6	73.000		2.097	2.8	
15	24	1.2	.10	6	81.333		.516	.6	
16	25	9.1	2.	2	16.000*				
17	26	14.2	.15	4	7.425*		.550	7.4	
18	27	1.2	.	6	81.167		2.562	3.1	
19	28	1.2	.	6	67.167		4.915	7.3	
20	29	1.2	.	6	64.582		1.368	2.1	
21	31	1.2	.	4	65.750		.500	.7	
22	32	1.2	.03	6	83.333		2.160	2.5	
23	34	14.2	.06	2	93.000				
24	36A	1.2	.	4	56.250		12.264	21.8	
25	36B	1.2	.	4	68.000		3.162	4.6	
26	37	1.5	.15	3	65.000		5.000	7.6	
27	38A	1.2	.	3	96.000		13.892	14.4	
28	40	1.2	.04	4	85.750		2.986	3.4	
29	41A	14.1	1.	5	79.200		5.805	7.3	
30	41B	1.2	.	5	75.000		1.870	2.4	
31	43	1.2	.10	4	0.285*		.023	8.3	
32	44	1.2	.09	6	133.500*		11.777	8.8	
33	46	14.1	1.03	6	72.333		1.861	2.5	
34	47	1.2	.10	6	80.800		1.378	1.7	
35	52	14.1	2.04	3	77.667		1.320	1.7	
36	53A	9.6	10.10	3	161.333*		68.009	42.1	
37	53B	6.4	.10	1	100.000				
38	54A	12.6	.	5	96.920		6.523	6.7	
39	54B	12.1	.	2	103.250				
40	55A	9.6	.	4	91.750		2.362	2.5	
41	55B	1.2	.	2	70.000				
42	58	1.2	.	1	700.000*				
43	60	9.4	.	3	85.333		3.214	3.7	

TABLE NO. 15 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR DY IN SOIL-S.1976

UNIT: PP10EXF6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	10.10	6	3.950		.308	7.8	
2	50	9.1	.	4	4.425		1.090	24.6	
3	25	9.1	20.	2	3.600				

TABLE NO. 16 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR EU IN SOIL-5,1975

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	5	1.180		.072	6.1	
2	2B	13.1	1.05	1	1.200				
3	5D	9.1	*	6	1.850*		.266	14.4	
4	6	9.1	2.	5	1.242		.023	1.9	
5	16	9.7	0.30	1	0.300*				
6	18	9.1	6.65	5	1.052		.070	6.6	
7	25	9.1	10.	2	1.300				
8	41A	15.1	1.	5	0.880		.031	3.5	
9	42	9.1	*	5	1.290		.103	8.0	
10	45	9.1	15.05	4	1.372		.125	9.1	
11	46	34.1	3.10	6	1.232		.028	2.3	
12	48	9.1	5.10	3	1.047		.090	8.6	
13	49	9.1	20.	1	1.100				
14	57A	9.1	1.01	6	1.283		.040	3.1	
15	57B	9.1	1.01	4	1.142		.048	4.2	

TABLE NO. 17 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR FE IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	6	4.850		.083	1.7	
2	2C	9.6	1.05	6	4.705		.037	.7	
3	3	1.2	.04	3	3.503		.185	5.2	
4	4	9.6	1.02	6	2.614		.039	1.5	
5	5B	1.6	.	1	4.740		.		
6	5D	9.1	.	5	4.560		.378	8.2	
7	6	9.1	1.	5	4.640		.054	1.1	
8	7	9.6	.10	6	2.963		.135	4.5	
9	8	9.1	1.15	6	5.463		.172	3.1	
10	10	9.6	1.33	1	3.900				
11	12	9.6	1.05	4	5.967		.045	.7	
12	14	9.1	1.11	1	0.905*				
13	15	9.6	1.15	3	4.867		.115	2.3	
14	16	9.7	.30	1	4.300				
15	18	9.1	1.05	5	4.562		.102	2.2	
16	19A	1.2	.	4	4.425		.340	7.6	
17	19B	9.6	1.05	4	4.500		.081	1.8	
18	20	1.2	.2	6	3.042		.049	1.6	
19	21	9.1	1.10	3	4.353		.015	.3	
20	22	9.1	4.	4	4.950		.191	3.8	
21	24	1.2	.10	6	4.450		.044	1.0	
22	25	9.1	2.	2	4.850				
23	26	14.2	.10	3	4.167		.152	3.6	
24	27	1.2	.	6	3.300		.089	2.7	
25	28	1.2	.	6	4.479		.107	2.3	
26	29	1.2	.	6	4.024		.137	3.4	
27	31	1.9	.	4	4.740		.061	1.3	
28	32	1.2	.02	6	4.623		.049	1.0	
29	33A	1.2	.04	6	4.462		.070	1.5	
30	33B	9.1	1.	4	4.742		.088	1.8	
31	35	9.1	.	6	4.852		.182	3.7	
32	36A	13.2	.	4	3.250		.129	3.9	
33	36B	1.2	.	4	2.716		.169	6.2	
34	38A	9.1	.05	3	4.533		.057	1.2	
35	38B	1.2	.	3	5.300				
36	39	9.1	3.10	5	5.036		.211	4.1	
37	40	1.2	.03	4	4.395		.044	1.0	
38	41A	9.1	1.	5	4.360		.151	3.4	
39	41B	1.2	.	5	4.644		.035	.7	
40	42	9.1	.	5	4.678		.047	1.0	
41	43	1.2	.10	4	0.018*			4.5	
42	44	1.2	.02	6	3.557		.075	2.1	
43	45	9.1	4.05	4	4.397		.225	5.1	
44	46	9.1	1.04	6	5.023		.040	.8	
45	47	1.2	.10	6	4.619		.027	.6	
46	48	9.1	2.06	3	4.373		.064	1.4	
47	49	9.1	4.	1	4.400				
48	50	9.1	5.03	3	4.033		.115	2.8	
49	53A	9.6	1.01	4	4.842		.301	6.2	
50	54A	12.5	.	6	4.362		.056	1.3	
51	54B	12.5	.	6	4.553		.046	1.0	
52	55A	9.6	.	4	5.341		.042	.7	
53	55B	1.2	.	2	4.545				
54	57A	9.1	1.01	6	4.975		.225	4.5	
55	57B	9.1	1.01	4	4.637		.090	1.9	
56	58	1.2	.	1	5.920				
57	59	9.1	.30	6	4.873		.278	5.7	

TABLE NO. 18 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR GA IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2C	9.6	7.07	6	12.600*		1.586	12.5	
2	5D	9.1	.	6	18.000		4.242	23.5	
3	7	9.6	.10	6	16.333		1.211	7.4	
4	15	9.6	.	3	19.333		2.516	13.0	
5	19B	9.6	1.05	4	18.250		.500	2.7	
6	25	9.1	15.	2	21.500				
7	44	9.1	12.	1	17.000				
8	53A	9.6	40.10	2	31.500*				
9	60	9.4	.	3	18.333		1.154	6.2	

TABLE NO. 19 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR G0 IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2B	13.1	4.05	1	5.000				
2	18	9.1	26.05	5	64.780		9.546	14.7	

TABLE NO. 20 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR HF IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	6	6.017		.231	3.8	
2	6	9.1	8.	5	6.520		.396	6.0	
3	8	9.1	1.15	6	10.735*		1.801	16.7	
4	11	2.1	.	6	6.397		.761	12.2	
5	14	9.1	3.11	1	14.400*				
6	18	9.1	4.05	5	6.662		.374	5.6	
7	21	9.1	2.10	3	6.757		.557	8.2	
8	22	9.1	30.	4	3.650*		1.247	34.1	
9	25	9.1	10.	2	5.450				
10	31	9.1	5.	3	5.403		.350	6.4	
11	36	9.1	.	5	6.716		.288	4.2	
12	38A	9.1	.05	5	6.260		.421	6.0	
13	39	9.1	7.10	5	6.840		.811	11.8	
14	42	9.1	.	5	5.840		.313	5.3	
15	45	9.1	10.05	4	6.132		1.133	18.4	
16	46	9.1	4.03	6	6.050		.776	12.8	
17	48	9.1	5.10	3	6.733		.152	2.2	
18	49	9.1	7.	1	6.600				
19	50	9.1	5.03	4	3.175*		.499	15.7	
20	57A	9.1	1.01	6	7.450		.564	7.5	
21	57B	9.1	1.01	4	6.252		.634	10.1	

TABLE NO. 21 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR HG IN SOIL-5,1976

UNIT: PP10EXF6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	13	1.2	.	1	0.540				
2	19A	1.2	+	4	1.107		.146	13.2	
3	25	9.1	20.	2	0.013*				
4	26	14.2	.15	3	0.910		.051	5.7	
5	27	1.2	.	6	0.940		.046	4.9	
6	54A	12.1	.	6	1.012		.078	7.7	
7	54B	12.1	.	6	0.993		.046	4.6	
8	55A	9.6	.	4	18.750*		5.315	28.3	
9	56A	1.2	.	6	0.555		.065	11.7	
10	56B	1.2	.	6	0.522		.040	7.8	
11	56B*	15.4	.	3	0.543		.090	16.5	

TABLE NO. 22 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR HG IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	28	13.1	1.05	1	0.750				
2	57B	9.1	2.01	4	0.880		.084	9.5	

TABLE NO. 23 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR K IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	5.05	6	1.912		.104	5.4	
2	2C	9.6	1.06	6	1.997		.016	.8	
3	5B	1.6	.	1	1.840				
4	5D	9.1	.	6	1.688		.126	7.4	
5	7	9.6	.15	6	0.708*		.026	3.7	
6	15	9.6	.	3	1.297		.061	4.7	
7	18	9.1	6.05	5	1.948		.043	2.2	
8	25	9.1	4.	2	1.775				
9	31	1.2	+	4	1.977		.045	2.2	
10	46	9.1	8.04	6	1.817		.147	8.1	
11	49	9.1	5.	1	1.800				
12	53A	9.6	6.02	4	2.375		.267	12.0	
13	57A	9.1	1.01	6	1.572		.118	7.5	
14	58	1.2	.	1	2.130				

TABLE NO. 24 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR LA IN SOIL-5,1976

UNIT: PPI0EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	6	27.300		1.048	3.8	
2	2B	13.1	1.05	1	26.700				
3	50	9.1	.	6	34.167		2.136	6.2	
4	6	9.1	1.	5	24.850		.658	2.6	
5	6	9.1	15.15	6	33.400		5.499	16.4	
6	11	2.1	.	6	27.988		1.508	5.3	
7	16	9.7	.30	3	10.000*		6.000	59.9	
8	18	9.1	5.05	5	31.600		1.662	5.2	
9	21	9.1	1.10	3	30.633		1.601	5.2	
10	22	9.1	10.	4	40.750*		4.031	9.8	
11	25	9.1	2.	4	28.500		2.380	8.3	
12	31	9.1	2.	3	5.533*		.202	3.6	
13	35	9.1	.	6	31.425		2.142	6.8	
14	38A	9.1	.05	4	27.750		.793	2.8	
15	39	9.1	5.10	5	26.600		1.949	7.3	
16	41A	15.1	1.	5	22.200		1.923	8.6	
17	42	9.1	.	5	25.800		1.193	4.6	
18	45	9.1	4.05	4	24.075		2.542	10.5	
19	46	9.1	2.03	6	28.167		2.786	9.8	
20	48	9.1	2.10	3	25.433		1.184	4.6	
21	49	9.1	4.	1	25.000				
22	55A	9.6	.	2	32.000				
23	57A	9.1	1.01	6	26.100		.959	3.6	
24	57B	9.1	1.01	4	30.400		3.728	12.2	

TABLE NO. 25 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR LI IN SOIL-5,1976

UNIT: PPI0EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	36A	1.2	.	4	49.500		22.472	45.3	
2	60	9.4	.	3	54.667		8.082	14.7	

TABLE NO. 26 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR LU IN SOIL-5,1976

UNIT: PPI0EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	3.06	6	0.360		.022	6.3	
2	2B	13.1	1.05	1	0.340				
3	50	9.1	.	4	0.637*		.094	14.7	
4	6	9.1	3.	4	0.942*		.027	2.9	
5	25	9.1	10.	2	0.390				
6	42	9.1	.	5	0.402		.032	8.1	
7	45	9.1	20.05	3	0.313		.011	3.6	
8	46	34.1	5.10	6	0.248		.014	5.9	
9	57A	9.1	1.01	6	0.315		.020	6.5	
10	57B	9.1	2.01	4	0.322		.035	11.1	

TABLE NO. 27 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR HG IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	15.20	4	1.200		.282	23.5	
2	5B	1.6	.	1	0.609				
3	31	1.2	.	4	1.257		.004	.3	
4	57A	9.1	1.01	6	2.870		.075	2.6	
5	58	1.2	.	1	1.730				

TABLE NO. 28

SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR MN IN SOIL-5, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.03	6	701.667		22.286	3.1	
2	2A	9.1	1.05	6	903.333		46.332	5.1	
3	2C	9.6	1.06	6	919.833		17.600	1.9	
4	3	1.2	.03	3	767.333		24.172	3.1	
5	5A	9.4	.	6	719.167		145.779	20.2	
6	5B	1.6	.	1	1000.000		.		
7	5D	9.1	.	4	1030.000		42.879	4.1	
8	7	9.6	.15	6	585.167		23.710	4.0	
9	8	9.1	1.15	6	890.500		51.897	5.8	
10	10	9.6	4.25	1	1300.000*				
11	12	9.6	1.05	4	899.250		9.912	1.1	
12	14	9.1	14.11	1	1560.000*				
13	15	9.6	3.15	3	992.333		67.574	6.8	
14	16	9.7	.30	3	610.000		103.319	16.9	
15	18	9.1	6.05	4	917.250		112.470	12.2	
16	19A	1.2	.	4	922.500		115.866	12.5	
17	19B	9.6	1.05	4	772.250		13.720	1.7	
18	20	1.2	.1	6	6883.332*		75.277	1.0	
19	21	9.1	1.10	3	967.667		14.571	1.5	
20	22	9.1	4.	3	986.667		37.859	3.8	
21	24	1.2	.10	6	898.333		4.082	.4	
22	25	9.1	1.	4	850.000		35.590	4.1	
23	26	14.2	.15	2	837.500				
24	27	1.2	.	6	715.000		24.289	3.3	
25	28	1.2	.	6	805.000		39.954	4.9	
26	29	1.2	.	6	699.768		14.145	2.0	
27	31	1.2	.	4	852.500		27.440	3.2	
28	32	1.2	.02	6	950.833		9.174	.9	
29	33A	1.2	.05	6	848.833		18.345	2.1	
30	33B	9.1	1.	6	995.500		52.294	5.2	
31	34	1.2	.08	2	782.000				
32	35	9.1	.	6	935.644		13.547	1.4	
33	36A	1.2	.	4	765.500		52.290	6.8	
34	36B	1.2	.	4	615.000		50.872	8.2	
35	37	1.5	.15	3	600.000				
36	38A	9.1	.	3	924.000		19.924	2.1	
37	38B	1.2	.	3	856.000		77.672	9.0	
38	39	9.1	9.10	4	925.000		19.148	2.0	
39	40	1.2	.03	4	835.000		13.711	1.6	
40	41A	9.1	1.	5	844.000		41.593	4.9	
41	41B	1.2	.	5	844.000		26.786	3.1	
42	43	1.2	.10	3	163.147*		274.402	68.1	
43	44	1.2	.02	6	699.833		14.105	2.0	
44	46	9.1	3.04	6	1013.333		33.862	3.3	
45	47	1.2	.10	6	942.333		8.801	.9	
46	49	9.1	12.	1	800.000				
47	50	9.1	2.03	3	1033.333		11.547	1.1	
48	53A	9.6	20.10	4	1715.000*		206.210	28.6	
49	53B	9.4	.10	1	800.000				
50	54A	12.1	.	6	941.167		6.493	.6	
51	55A	9.6	.	4	1047.000		8.445	.8	
52	55B	1.2	.	2	495.000				
53	57A	9.1	1.01	6	979.167		23.163	2.3	
54	57B	9.1	1.01	6	895.167		21.507	2.4	
55	58	1.2	.	1	1000.000				

TABLE NO. 29 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR M0 IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	5A	9.4	.	6	5.767*		1.028	17.8	
2	36A	1.2	.	1	2.000				
3	53A	9.6	50.15	1	2.500				
4	53B	9.4	.10	1	1.000				
5	55A	9.6	.	2	1.250				
6	58	1.2	.	1	400.000*		.		

TABLE NO. 30 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR NA IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.06	6	1.757		.027	1.6	
2	58	1.6	.	1	1.710				
3	50	9.1	.	6	1.850		.137	7.4	
4	8	9.1	1.15	6	2.472*		.097	3.9	
5	18	9.1	5.05	5	1.910		.097	5.1	
6	25	9.1	2.	4	1.927		.038	2.0	
7	31	1.2	.	4	2.047		.071	3.4	
8	46	9.1	1.04	6	1.940		.012	.6	
9	48	9.1	4.10	3	1.893		.020	1.0	
10	49	9.1	12.	1	1.700				
11	50	9.1	5.03	3	2.100		.045	2.1	
12	57A	9.1	1.01	6	2.040		.162	7.9	
13	57B	9.1	1.01	6	1.804		.032	1.8	
14	58	1.2	.	1	2.310				

TABLE NO. 31 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR NB IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2C	9.6	10.07	6	10.833		1.169	10.7	
2	53A	9.6	40.15	4	6.000		3.265	54.4	
3	55A	9.6	.	2	10.050				

TABLE NO. 32 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR NO IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	10.10	6	31.833		2.857	8.9	
2	2B	13.1	2.05	1	28.000				
3	6	9.1	15.	5	31.400		3.781	12.0	
4	16	9.7	0.30	1	9.000*				
5	25	9.1	20.	2	77.500*				
6	46	24.1	10.10	6	30.167		2.228	7.3	
7	57A	9.1	1.01	6	29.883		1.909	6.3	
8	57B	9.1	2.01	4	28.275		3.725	13.1	

TABLE NO. 33 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR NI IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.05	6	14.250		.689	4.8	
2	3	14.2	.02	3	9.727		.245	2.5	
3	5A	9.4	.	6	8.350		2.630	31.5	
4	19A	1.2	.	4	7.225		.638	11.6	
5	19B	9.6	2.05	4	4.000		.816	20.4	
6	24	1.2	.10	6	26.333		.516	1.9	
7	29	1.2	.	6	16.077		.492	3.0	
8	34	14.2	.14	2	6.350				
9	36A	1.2	.	4	21.250		5.057	23.8	
10	37	14.5	.18	3	20.000				
11	44	1.2	.13	6	78.800*		10.532	13.3	
12	55A	9.6	.	4	7.750		1.707	22.0	
13	55B	1.2	.	2	15.000				
14	58	1.2	.	1	400.000*				
15	60	9.4	.	3	13.333		1.527	11.4	

TABLE NO. 34 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR P IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	5B	1.6	.	1	0.104				
2	37	1.6	.15	3	0.095		.004	5.2	
3	55A	9.6	.	4	0.141		.001	.7	

TABLE NO. 35 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR PR IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.03	6	170.667		5.163	3.0	
2	2C	9.6	2.07	6	150.167		4.070	2.7	
3	3	14.2	.02	3	144.000		2.645	1.8	
4	4	9.6	6.02	4	74.350		5.152	6.9	
5	5A	9.4	.	6	119.667		27.933	23.3	
6	7	9.6	.10	6	117.833		9.020	7.6	
7	10	9.6	5.99	1	220.000				
8	16	9.7	0.30	1	10.000				
9	19A	1.2	.	4	144.000		19.595	13.6	
10	19B	9.6	1.10	4	134.000		11.518	8.5	
11	26	14.2	.15	3	206.667		15.275	7.3	
12	29	1.2	.	6	172.598		4.915	2.8	
13	31	1.2	.	4	137.250		2.500	1.8	
14	34	14.2	.06	2	33.350				
15	36A	1.2	.	4	65.000		56.124	86.3	
16	37	1.5	.15	3	125.000		5.000	3.9	
17	41B	1.2	.	5	7.980		.549	6.8	
18	44	1.2	.03	6	173.333		4.412	2.5	
19	51	45.7	.	1	147.000				
20	53A	9.6	3.01	4	181.750		33.049	18.1	
21	53B	9.4	.10	1	150.000				
22	55B	1.2	.	2	160.000				
23	58	1.2	.	1	700.000*				

TABLE NO. 36 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR PR IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	26	13.1	4.05	1	6.900				
2	25	9.1	.	1	3.000				

TABLE NO. 37

SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR R8 IN SOIL-5, 1976

UNIT: PP10EXF6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	4.06	6	120.000		8.366	6.9	
2	2C	9.6	1.06	6	129.667		1.966	1.5	
3	4	9.6	4.02	6	65.817*		5.207	7.9	
4	5D	9.1	.	5	152.200		10.802	7.0	
5	6	9.1	4.	5	115.000		2.121	1.8	
6	7	9.6	.10	6	121.667		4.844	3.9	
7	10	9.6	14.	1	220.000*				
8	11	2.1	.	6	117.780		8.378	7.1	
9	12	9.6	1.02	4	130.000		1.414	1.0	
10	15	9.6	3.15	3	151.333		1.527	1.0	
11	16	9.7	.30	2	29.000*				
12	18	9.1	6.05	5	128.200		10.709	8.3	
13	21	9.1	4.10	3	154.000		1.000	.6	
14	22	9.1	8.	4	175.000		12.909	7.3	
15	25	9.1	20.	2	125.000				
16	26	9.6	.40	2	175.000				
17	31	1.2	.	4	105.250		13.301	12.6	
18	35	9.1	.	5	143.270		7.329	5.1	
19	36A	1.2	.	4	170.750		32.697	19.2	
20	36B	1.2	.	4	151.750		21.792	14.3	
21	38A	9.1	.10	5	127.800		13.103	10.2	
22	39	9.1	5.10	5	141.200		4.086	2.8	
23	40	9.6	1.03	2	121.000				
24	42	9.1	.	5	121.000		3.391	2.8	
25	46	9.1	7.03	6	151.667		7.229	4.7	
26	47	1.2	.10	6	126.333		2.422	1.9	
27	48	9.1	6.07	3	138.000		3.464	2.5	
28	49	9.1	28.	1	140.000				
29	50	9.1	6.03	3	32.733*		3.901	11.9	
30	53A	9.6	5.10	4	152.750		19.448	12.7	
31	55A	9.6	.	4	152.000		1.414	.9	

TABLE NO. 38 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SB IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	2.05	6	14.800		.797	5.3	
2	5D	9.1	.	6	21.667		5.988	27.6	
3	6	9.1	2.	5	10.300		.316	3.0	
4	8	9.1	5.15	6	15.083		.842	5.5	
5	14	9.1	12.11	1	83.000*		.		
6	16	9.7	.30	2	8.250				
7	18	9.1	3.05	5	17.660		.795	4.5	
8	21	9.1	3.10	3	15.933		.611	3.8	
9	22	9.1	20.	4	9.250		1.707	18.4	
10	25	9.1	10.	2	15.000				
11	30	9.1	3.03	6	12.940		.320	2.4	
12	35	9.1	.	5	15.894		.630	3.9	
13	36A	1.2	.	4	18.000		5.715	31.7	
14	36B	1.2	.	4	132.500*		13.178	9.9	
15	37	14.5	.15	3	12.667		.577	4.5	
16	38A	9.1	.05	3	14.600		.199	1.3	
17	39	9.1	3.10	5	17.280		.414	2.4	
18	40	13.2	.10	6	36.000*		3.741	10.3	
19	41A	9.1	.	5	31.000*		3.464	11.1	
20	42	9.1	.	5	6.460		.415	6.4	
21	43	1.2	.10	3	8.033		.321	4.0	
22	45	9.1	25.05	3	7.133		.513	7.1	
23	46	9.1	4.03	6	16.883		.549	3.2	
24	48	9.1	4.06	3	15.267		.152	1.0	
25	49	9.1	17.	1	12.000				
26	50	9.1	5.03	4	13.200		2.639	19.9	
27	53B	9.4	.10	1	25.000				
28	54A	12.1	.	6	7.223		.400	5.5	
29	55A	9.6	.	4	27.000		4.690	17.3	

TABLE NO. 39 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SC IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	6	15.467		.280	1.8	
2	5D	9.1	.	5	18.800*		1.303	6.9	
3	6	9.1	1.	5	15.220		.258	1.7	
4	8	9.1	1.15	6	19.517*		.624	3.1	
5	15	9.6	.	3	211.000*		15.874	7.5	
6	18	9.1	1.05	5	15.280		.491	3.2	
7	25	9.1	1.	2	15.500				
8	31	9.1	1.	3	7.293*		.280	3.8	
9	42	9.1	.	5	14.200		.187	1.3	
10	45	9.1	3.05	4	13.600		1.232	9.0	
11	46	9.1	1.03	6	15.283		.343	2.2	
12	48	9.1	1.10	3	14.133		.057	.4	
13	49	9.1	26.	1	15.100				
14	57A	9.1	1.01	6	16.433		.332	2.0	
15	57B	9.1	1.01	4	13.075		.221	1.6	

TABLE NO. 40 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SE IN SOIL-S, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	15.15	5	2.020		.192	9.5	
2	2C	9.6	15.07	6	2.683		.331	12.3	
3	5F	12.1	.	5	6.448*		13.724	12.8	
4	25	9.1	40.	2	2.800				
5	31	14.5	.	3	1.200		.173	14.4	
6	35	9.1	.	5	0.894		.192*	21.5	
7	44	1.3	.12	4	0.160		.021	13.5	
8	46	16.1	6.10	6	0.358		.032	9.0	
9	53A	9.6	30.	1	11.000*				
10	55A	9.6	.	3	0.933		.450	48.3	

TABLE NO. 41 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SI IN SOIL-S, 1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2C	9.6	3.06	6	26.967		.475	1.7	
2	5B	1.6	.	1	27.600				
3	53A	9.6	6.10	1	38.600				
4	53B	9.4	.10	1	39.500				

TABLE NO. 42 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SM IN SOIL-S, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	1.05	6	5.567		.163	2.9	
2	2B	13.1	1.05	1	5.300				
3	5D	9.1	.	6	6.000		.282	4.7	
4	6	9.1	2.	5	3.590*		.110	3.0	
5	18	9.1	6.05	5	9.694*		.611	6.3	
6	25	9.1	1.	4	5.400		.216	4.0	
7	31	9.1	2.	3	5.380		.141	2.6	
8	41A	9.1	1.	4	13.400*		.535	3.9	
9	42	9.1	.	5	4.852		.338	6.9	

TABLE NO. 43 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR SR IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	5.06	6	338.333		21.369	6.3	
2	2B	12.1	2.05	1	300.000				
3	2C	9.6	1.06	6	367.667		5.240	1.4	
4	4	9.6	2.02	6	201.517		6.822	3.3	
5	5D	9.1	.	6	324.333		58.929	18.1	
6	6	9.1	10.	5	353.200		42.204	11.9	
7	7	9.6	.10	6	327.833		17.634	5.3	
8	10	9.6	7.30	1	660.000				
9	12	9.6	1.03	4	382.000		3.559	.9	
10	15	9.6	.	3	436.000		11.357	2.6	
11	16	9.7	0.30	1	30.000				
12	19B	9.6	1.10	4	341.000		31.874	9.3	
13	25	9.1	30.	2	965.000*				
14	29	1.2	.	6	22.423		1.276	5.6	
15	36A	1.2	.	4	176.250		22.867	12.9	
16	48	9.1	17.10	2	359.500				
17	53A	9.6	1.01	4	357.500		18.929	5.2	
18	55A	9.6	.	4	402.750		5.315	1.3	
19	60	9.4	.	3	564.333		44.657	7.9	

TABLE NO. 44 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR TA IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	5.06	6	0.813		.015	1.8	
2	5D	9.1	.	5	0.938		.078	8.4	
3	6	9.1	9.	5	0.532		.055	10.4	
4	8	9.1	13.15	6	0.812		.148	16.2	
5	11	2.1	.	6	3.648*		.332	9.1	
6	14	9.1	8.11	1	45.000*				
7	18	9.1	13.05	5	0.861		.116	13.7	
8	21	9.1	10.10	3	0.687		.008	1.3	
9	22	9.1	30.	4	0.720		.200	27.6	
10	25	9.1	30.	2	0.845				
11	31	9.1	6.	3	0.840		.026	3.1	
12	35	9.1	.	5	0.768		.068	8.8	
13	36A	1.5	.	1	2050.000*				
14	38A	9.1	.10	3	0.720		.019	2.7	
15	39	9.1	6.10	5	1.382*		.060	4.3	
16	41A	15.1	2.	5	0.760		.089	11.7	
17	42	9.1	.	5	0.722		.082	11.4	
18	46	9.1	25.03	6	0.683		.132	19.4	
19	48	9.1	9.10	3	1.300*				
20	49	9.1	20.	1	0.500*				
21	55A	9.6	.	2	2.500*				

TABLE NO. 45 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR TB IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	7.10	6	0.700		.028	4.0	
2	2B	13.1	2.05	1	0.710				
3	50	9.1	.	5	1.640*		.320	19.5	
4	6	9.1	13.	5	0.482		.056	11.6	
5	14	9.1	2.11	1	1.130*				
6	18	9.1	14.05	5	0.812		.055	6.8	
7	21	9.1	8.10	3	0.650		.012	1.9	
8	22	9.1	50.	3	0.657		.310	47.3	
9	25	9.1	10.	2	0.740				
10	31	9.1	5.	3	1.737*		.276	15.9	
11	35	9.1	.	5	0.546		.098	17.9	
12	36A	9.1	.10	4	0.460		.082	18.0	
13	39	9.1	10.10	5	0.590		.009	1.6	
14	46	34.1	4.10	6	0.583		.025	4.2	
15	48	9.1	20.10	3	0.680		.180	26.5	
16	49	9.1	17.	1	0.850				
17	57B	9.1	1.01	4	0.845		.107	12.7	

TABLE NO. 46 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR TH IN SOIL-5.1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	2.05	6	11.017		.515	4.6	
2	50	9.1	.	5	17.200*		2.588	15.0	
3	6	9.1	1.	5	11.292		1.312	11.6	
4	6	9.1	2.15	6	12.750		1.172	9.1	
5	11	2.1	.	6	12.190		1.106	9.0	
6	18	9.1	3.05	5	11.180		.889	7.9	
7	21	9.1	2.10	3	11.100		.624	5.6	
8	22	9.1	5.	4	10.375		.478	4.6	
9	25	9.1	4.	2	12.500				
10	35	9.1	.	6	12.465		1.416	11.3	
11	36A	13.5	.	3	5330.000*		934.170	73.8	
12	36A	9.1	.05	6	11.317		.630	5.5	
13	39	9.1	3.10	5	11.920		.936	7.8	
14	40	9.6	2.05	2	13.000				
15	41A	9.1	1.	4	13.400		1.009	7.5	
16	42	9.1	.	5	8.920		.164	1.8	
17	45	9.1	12.05	4	9.247		.405	4.3	
18	46	9.1	2.03	6	11.500		.334	2.9	
19	48	9.1	6.10	3	16.433*		3.435	20.9	
20	49	9.1	5.	1	12.800				
21	50	9.1	5.03	4	7.875		.499	6.3	
22	55A	9.6	.	4	9.750		2.217	22.7	

TABLE NO. 47 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR TI IN SOIL-5,1976

UNIT: WT. %

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	7.10	6	0.518		.031	6.0	
2	2C	9.6	1.05	6	0.520		.006	1.2	
3	56	1.6	.	1	0.520				
4	7	9.6	.10	6	0.270		.012	4.4	
5	15	9.6	.	3	0.320		.025	7.8	
6	16	9.7	0.30	1	0.250				
7	18	9.1	25.05	4	0.591		.086	14.6	
8	19B	9.6	1.10	4	0.351		.004	1.3	
9	31	1.2	.	4	0.762		.015	1.9	
10	52A	9.6	6.15	4	0.490		.108	22.2	
11	55A	9.6	.	4	0.522		.007	1.4	
12	57A	9.1	1.01	6	0.564		.029	5.2	

TABLE NO. 48 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR TM IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2B	13.1	3.05	1	0.340				
2	25	9.1	15.	2	0.495				

TABLE NO. 49 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR U IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2B	12.1	2.05	1	2.800				
2	5D	9.1	.	6	4.217		.416	9.8	
3	14	9.0	46.04	2	2335.000*				
4	18	9.1	19.05	5	3.112		.535	17.2	
5	21	9.1	6.10	3	2.900		.144	4.9	
6	22	9.1	7.	6	2.833		.163	5.7	
7	23	15.3	10.15	6	1.432		.127	8.9	
8	25	9.1	40.	2	2.150				
9	31	9.1	5.	3	3.487		.057	1.6	
10	35	9.1	.	3	5.200		.396	7.6	
11	36A	1.5	.	3	591.333*		558.628	94.4	
12	36A	9.1	.10	6	3.042		.293	9.6	
13	39	9.1	10.10	5	3.160		.230	7.2	
14	40	9.6	2.05	2	2.000				
15	41A	9.1	2.	5	2.860		.219	7.6	
16	45	9.1	10.05	3	2.390		.285	11.9	
17	46	9.1	14.05	6	4.583		.466	10.1	
18	47	1.3	.10	6	4.167		.408	9.7	
19	49	9.1	25.	1	3.800				
20	54A	12.1	.	6	0.907		.042	4.7	
21	55A	9.6	.	4	2.750		1.500	54.5	

TABLE NO. 50 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR V IN SOIL S, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	0.04	6	196.833		7.494	3.8	
2	2A	9.1	6.08	6	130.000		8.944	6.8	
3	2C	9.6	18.06	6	110.333		16.329	14.8	
4	5A	9.4	.	6	136.333		14.038	10.2	
5	7	9.5	0.15	6	144.167		11.338	7.8	
6	8	9.4	5.15	6	170.500		26.463	15.5	
7	15	9.3	.	3	184.333		8.504	4.6	
8	16	9	0.30	1	275.000				
9	62B	9	0.10	1	50.000				
10	54A	12.	.	5	106.700		2.423	2.2	
11	55A	9.	.	4	213.250		3.947	1.8	
12	57A	9.	1.01	6	130.500		3.271	2.5	
13	57B	9	2.01	6	125.333		11.977	9.5	
14	60	9.	.	3	145.667		3.785	2.5	

TABLE NO. 51 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR W IN SOIL S, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	50	9.1	.	5	4.100		.418	10.2	
2	18	9.1	11.05	5	6.370		.705	13.1	
3	25	9.1	65.	2	0.350				
4	55A	9.6	.	4	10.750		2.061	19.1	

TABLE NO. 52 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR Y IN SOIL S, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO.OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2C	9.6	5.07	6	23.333		1.861	7.9	
2	16	9.7	0.30	1	10.000				
3	53A	9.6	20.10	4	30.250		12.658	41.8	
4	55A	9.6	.	2	23.000				
5	60	9.4	.	3	18.667		.577	3.0	

TABLE NO. 53 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR YB IN SOIL-5,1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL. %	
1	2A	9.1	4.06	6	2.403		.108	4.5	
2	28	13.1	1.05	1	2.300				
3	50	9.1	.	6	2.833		.377	13.3	
4	6	9.1	10.	5	2.870		.228	7.9	
5	11	2.1	.	6	1.760		.192	10.9	
6	14	9.1	4.11	1	1.330		.		
7	18	9.1	6.05	5	2.238		.241	10.7	
8	21	9.1	4.10	3	2.213		.023	1.0	
9	22	9.1	20.	3	2.367		.152	6.4	
10	26	9.1	10.	2	2.550				
11	35	9.1	.	6	2.612		.194	7.4	
12	38A	9.1	.10	5	2.020		.130	6.4	
13	39	9.1	10.10	5	2.340		.089	3.8	
14	42	9.1	.	5	1.770		.103	5.8	
15	45	9.1	15.05	3	2.470		.298	12.0	
16	46	34.1	3.10	6	1.625		.048	2.9	
17	49	9.1	4.	1	2.300				
18	50	9.1	5.03	4	0.620*		.077	12.5	
19	57A	9.1	1.01	6	2.233		.136	6.1	
20	57B	9.1	2.01	4	2.230		.143	6.4	

TABLE NO. 54

SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR ZN IN SOIL-5, 1976

UNIT: PF10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	1	9.4	.07	6	335.833		24.169	7.1	
2	2A	9.1	4.06	6	350.000		17.888	5.1	
3	2C	9.6	1.05	6	369.667		6.282	1.6	
4	3	1.2	.04	3	364.000		16.093	4.4	
5	4	9.6	5.02	6	212.583*		28.717	13.5	
6	5A	9.4	.	6	351.000		33.615	9.5	
7	5D	9.1	.	5	385.000		69.513	18.0	
8	6	9.1	1.	5	581.200*		13.103	2.2	
9	7	9.6	.10	6	305.167		9.304	3.0	
10	8	9.1	6.15	6	620.833*		21.122	3.4	
11	10	9.6	.	1	390.000				
12	12	9.6	1.05	4	394.500		5.744	1.4	
13	14	9.1	1.11	1	1190.000*				
14	15	9.6	2.15	3	365.667		10.785	2.9	
15	16	9.7	.30	3	248.333*		47.521	19.1	
16	17	1.2	.05	6	607.500*		97.915	16.1	
17	1E	9.1	7.05	5	357.000		9.823	2.7	
18	19A	1.2	.	4	367.500		9.574	2.6	
19	19B	9.6	1.05	4	346.500		15.802	4.4	
20	20	1.2	.2	6	348.333		7.527	2.1	
21	21	9.1	5.10	3	392.667		12.013	3.0	
22	24	1.2	.10	6	379.167		5.492	1.4	
23	25	9.1	15.	2	380.000				
24	26	14.2	.15	2	401.500				
25	27	1.2	.	6	346.667		19.663	5.6	
26	28	1.2	.	6	354.833		14.469	4.0	
27	29	1.2	.	6	304.695		9.746	3.1	
28	31	1.2	.	4	366.000				
29	32	1.2	.03	6	371.500		9.460	2.5	
30	33A	1.2	.05	5	362.400		15.517	4.2	
31	34	1.2	.03	2	391.500				
32	36A	1.2	.	4	305.750		13.375	4.3	
33	36B	1.2	.	4	283.250*		40.697	15.4	
34	37	14.5	.15	3	176.667*		5.773	3.2	
35	38A	1.2	.	3	395.667		18.610	4.7	
36	39	9.1	6.10	5	476.000*		20.736	4.3	
37	40	1.2	.03	4	388.500		7.325	1.8	
38	41A	15.1	1.	5	390.000		55.226	14.1	
39	41B	1.2	.	5	370.400		2.190	.5	
40	43	1.2	.10	3	2.800*		.264	9.4	
41	44	1.2	.03	6	383.833		11.391	2.9	
42	46	13.1	2.05	6	388.833		12.624	3.2	
43	47	1.2	.10	6	356.833		3.600	1.0	
44	48	9.1	3.06	3	377.000		7.937	2.1	
45	49	9.1	5.	1	360.000				
46	53A	9.6	4.02	4	410.000		24.494	5.9	
47	53B	9.4	.10	1	400.000				
48	54A	12.1	.	6	363.833		25.771	7.0	
49	55A	9.6	.	2	398.000				
50	55B	1.2	.	2	355.000				
51	58	1.2	.	1	3460.000*				

TABLE NO. 55 SIGNIFICANCE LEVEL 0.05

RESULTS OF INTERCOMPARISON FOR ZR IN SOIL-5, 1976

UNIT: PP10EXP6

NO.	LAB. CODE NO.	METHOD CODE NO.	ESTIM. LAB. ERROR%	NO. OF DETERM.	LAB. MEAN	DEVIATION FROM TRUE VALUE	LAB. STANDARD DEV		R
							ABS	REL %	
1	2A	9.1	8.10	4	220.000		18.257	8.2	
2	2C	9.6	1.07	6	247.667		15.603	6.3	
3	4	9.6	2.02	6	126.433		6.663	4.4	
4	5A	9.4	.	6	186.500		24.263	13.0	
5	6	9.1	20.	5	337.400		56.332	16.6	
6	10	9.6	10.20	1	390.000				
7	16	9.7	0.30	1	70.000				
8	53A	9.6	2.10	4	208.500		12.922	6.1	
9	55A	9.6	.	2	251.000				
10	60	9.4	.	3	176.333		39.501	22.4	

TABLE 56

Review of the sample pretreatment and separation and/or preconcentration methods used in Soil-5 intercomparisons

Pretreatment, separation and/or preconcentration	% of use in the run												
	Ag	Al	As	B	Ba	Be	Bi	Br	Ca	Cd	Ce	Co	Cr
0 - not communicated													
1 - fusion, digestion, ashing, dissolution, evaporation	50	29.6	10		19.4	50	66.7	5.9	25	100	14.2	33.3	34.0
2 - chemical separation (general statement without details)			3.3		6.7					14.3			2.1
3 - precipitation, coprecipitation			3.3			50					14.2	2.1	2.1
4 - extraction, extraction chromatography										28.6	7.1	6.3	
5 - ion exchange, adsorption													
6 - distillation, volatilization			3.3					5.9					
7 - electrochemical methods													
8 - other methods													
9 - no chemical pretreatment and separation or preconcentration used	50	7.4	90	100	80.6	50	33.3	94.1	75		85.7	64.6	63.8

TABLE 56 (cont'd)

Review of the sample pretreatment and separation and/or preconcentration methods used in Soil-5 intercomparisons

Pretreatment, separation and/or preconcentration	% of use in the run												
	Cs	Cu	Dy	Bu	P	Fe	Ga	Cd	Hf	Hg	Ho	K	La
0 - not communicated													
1 - fusion, digestion, ashing, dissolution, evaporation		62.8		20	100	42.1		50		81.8	50	21.4	8.3
2 - chemical separation (general statement without details)	4.2	4.7				3.5			4.8	18.2			4.2
3 - precipitation, coprecipitation				13.3		1.8		50			50		4.2
4 - extraction, extraction chromatography		11.7		6.7		1.8				9.1			
5 - ion exchange, adsorption				6.7						9.1			4.2
6 - distillation, volatilization													
7 - electrochemical methods													
8 - other methods													
9 - no chemical pretreatment and separation or preconcentration used	95.8	37.2	100	80		57.9	100	50	95.2	18.2	50	78.6	87.5

TABLE 56 (cont'd)

Review of the sample pretreatment and separation and/or preconcentration methods used in Soil-5 intercomparisons

Pretreatment, separation and/or preconcentration	% of use in the run												
	Li	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pr	Rb
0 - not communicated													
1 - fusion, digestion, ashing, dissolution, evaporation	50	20	60	45.5	33.3	21.4		25	66.7	66.7	56.6	50	12.9
2 - chemical separation (general statement without details)				1.5									
3 - precipitation, coprecipitation		20						25	20			50	
4 - extraction, extraction chromatography		10		1.5				12.5			17.4		
5 - ion exchange, adsorption											4.3		
6 - distillation, volatilization													
7 - electrochemical methods													
8 - other methods													
9 - no chemical pretreatment and separation or preconcentration used	50	80	40	54.5	66.7	78.6	100	75	33.3	33.3	43.5	50	87.1

TABLE 56 (cont'd)

Review of the sample pretreatment and separation and/or preconcentration methods used in Soil-5 intercomparisons

Pretreatment, separation and/or preconcentration	% of use in the run											
	Sb	Sc	Se	Si	Sm	Sr	Ta	Tb	Th	Ti	Tm	U
0 - not communicated												
1 - fusion, digestion, ashing, dissolution, evaporation	20.7		40	25	11.1	15.8	9.5	11.8	4.5	16.7	50	23.8
2 - chemical separation (general statement without details)	3.4		10			5.3	4.8		4.5			9.5
3 - precipitation, coprecipitation	3.4				11.1			11.8	4.5		50	
4 - extraction, extraction chromatography	3.4		10					5.9				
5 - ion exchange, adsorption												4.8
6 - distillation, volatilization			10									
7 - electrochemical methods												
8 - other methods												
9 - no chemical pretreatment and separation or preconcentration used	79.3	100	60	75	88.9	84.2	85.7	88.2	81	83.3	50	76.2

TABLE 56 (cont'd)

Review of the sample pretreatment and separation and/or preconcentration methods used in Soil-5 intercomparisons

Pretreatment, separation and/or preconcentration	% of use in the run					
	V	W	Y	Yb	Zn	Zr
0 - not communicated						
1 - fusion, digestion, ashing, dissolution, evaporation	7.1			10	52.9	
2 - chemical separation (general statement without details)	7.1					
3 - precipitation, coprecipitation				10		
4 - extraction, extraction chromatography				5		
5 - ion exchange, adsorption						
6 - distillation, volatilization						
7 - electrochemical methods						
8 - other methods						
9 - no chemical pretreatment and separation or preconcentration used	92.9	100	100	90	47.1	100

Review of the methods used for quantitative determination of elements used in Soil-5 intercomparison

[illegible]

Review of the methods used for quantitative determination of elements used in Soil-5 intercomparison

[illegible]

TABLE 51

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5, 1976

ELEMENT DETERMINED		AG	AL	AS	BA	BE
UNIT		PP10EXP6	WT. %	PP10EXP6	PP10EXP6	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	6	7	30	31	2
	INDIVIDUAL DETERMINATIONS	18	30	130	126	10
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	5	6	26	28	2
	INDIVIDUAL DETERMINATIONS	14	24	121	113	10
TOTAL RANGE OF LABORATORY AVERAGES		0.080 - 40.000	7.195 - 8.527	8.900 - 212.000	311.667 - 2600.000	1.750 - 1.792
RANGE OF ACCEPTED LABORATORY AVERAGES		0.080 - 5.000	7.937 - 8.527	97.250 - 118.932	311.667 - 879.167	1.750 - 1.792
PERCENTAGE OF OUTLYING LABORATORIES		17	14	13	10	0
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		1.877	8.194	93.870	561.634	1.771
STANDARD DEVIATION (S.D.)	+ABS	1.918	0.266	18.658	36.873	0.029
	+RELX	102.1	3.2	19.9	24.4	1.7
STANDARD ERROR (S.E.)	+ABS	0.858	0.108	3.659	25.867	0.021
	+RELX	48.7	1.3	3.9	4.6	1.2
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		-0.50 - 4.26	7.91 - 8.47	86.33 - 101.41	508.56 - 614.71	1.51 - 2.04

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5.1976

ELEMENT DETERMINED		BI	BR	CA	CD	CE
UNIT		PP10EXP6	PP10EXP6.	WT. %	PP10EXP6	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	3	17	12	9	14
	INDIVIDUAL DETERMINATIONS	10	68	47	41	50
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	3	16	12	8	12
	INDIVIDUAL DETERMINATIONS	10	66	47	36	46
TOTAL RANGE OF LABORATORY AVERAGES		1.750 - 30.000	1.583 - 12.000	0.248 - 3.600	0.182 - 6.406	20.000 - 75.333
RANGE OF ACCEPTED LABORATORY AVERAGES		1.750 - 30.000	1.583 - 7.867	0.248 - 3.600	0.182 - 2.917	52.167 - 59.980
PERCENTAGE OF OUTLYING LABORATORIES		0	6	0	11	14
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		12.003	5.357	2.200	1.456	59.659
STANDARD DEVIATION (S.D.)	+ABS	15.577	1.907	0.981	0.858	4.741
	+RELX	128.9	35.6	44.6	58.9	7.9
STANDARD ERROR (S.E.)	+ABS	8.993	0.477	0.283	0.303	1.369
	+RELX	74.4	8.9	12.9	20.8	2.3
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		-26.62 - 50.78	4.34 - 6.37	1.58 - 2.82	0.74 - 2.17	56.65 - 62.67

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-6, 1976

ELEMENT DETERMINED		CO	CR	C5	CU	DY
UNIT		PP10EXP6	PP10EXP6	PP10EXP6	PP10EXP6	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	48	47	24	43	3
	INDIVIDUAL DETERMINATIONS	198	189	102	180	12
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	37	44	19	35	3
	INDIVIDUAL DETERMINATIONS	157	180	86	151	12
TOTAL RANGE OF LABORATORY AVERAGES		0.317 - 800.000	10.000 - 705.000	9.000 - 151.000	0.285 - 700.000	3.600 - 4.425
RANGE OF ACCEPTED LABORATORY AVERAGES		10.000 - 20.000	10.000 - 60.500	45.800 - 70.250	48.333 - 103.250	3.600 - 4.425
PERCENTAGE OF CUTLYING LABORATORIES		23	6	21	19	0
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		14.833	28.912	56.732	77.137	3.992
STANDARD DEVIATION (S.D.)	+ABS	2.272	9.291	6.937	13.542	0.414
	+RELX	15.3	32.1	12.2	17.6	10.4
STANDARD ERROR (S.E.)	+ABS	0.374	1.401	1.591	2.289	0.239
	+RELX	2.5	4.8	2.8	3.0	6.0
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		14.07 - 15.59	26.09 - 31.74	53.39 - 60.08	72.48 - 81.79	2.96 - 5.02

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5, 1976

ELEMENT DETERMINED		EU		FE		GA		GD		HF	
UNIT		PP10EXP6		WT. %		PP10EXP6		PP10EXP6		PP10EXP6	
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	18		57		9		2		21	
	INDIVIDUAL DETERMINATIONS	60		246		33		6		89	
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	13		58		7		2		17	
	INDIVIDUAL DETERMINATIONS	53		240		25		6		74	
TOTAL RANGE OF LABORATORY AVERAGES		0.300 - 1.850		0.018 - 5.967		12.600 - 31.500		5.000 - 64.780		3.175 - 14.400	
RANGE OF ACCEPTED LABORATORY AVERAGES		0.880 - 1.372		2.614 - 5.967		16.333 - 21.500		5.000 - 64.780		5.260 - 7.450	
PERCENTAGE OF OUTLYING LABORATORIES		13		4		22		0		19	
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		1.179		4.454		18.393		34.690		6.299	
STANDARD DEVIATION (S.D.)	+ABS	0.133		0.689		1.678		42.271		0.984	
	+REL%	11.3		15.5		9.1		121.2		9.3	
STANDARD ERROR (S.E.)	+ABS	0.037		0.093		0.634		29.890		0.142	
	+REL%	3.1		2.1		3.4		85.7		2.2	
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		1.10 - 1.26		4.27 - 4.64		16.84 - 19.95		-344.89 - 414.67		6.00 - 6.60	

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-6, 1976

ELEMENT DETERMINED		HG	HQ	K	LA	LI
UNIT		PP10EXP6	PP10EXP6	WT. %	PP10EXP6	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	11	2	14	24	2
	INDIVIDUAL DETERMINATIONS	47	5	57	103	7
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	9	2	13	21	2
	INDIVIDUAL DETERMINATIONS	41	5	51	93	7
TOTAL RANGE OF LABORATORY AVERAGES		0.013 - 18.750	0.750 - 0.880	0.708 - 2.375	5.533 - 40.750	49.500 - 54.667
RANGE OF ACCEPTED LABORATORY AVERAGES		0.222 - 1.107	0.750 - 0.880	1.297 - 2.375	22.200 - 34.167	49.500 - 54.667
PERCENTAGE OF CUTLYING LABORATORIES		10	0	7	13	0
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		0.791	0.815	1.856	28.100	52.083
STANDARD DEVIATION (S.D.)	+ABS	0.245	0.092	0.262	3.223	3.653
	+RELX	30.9	11.3	14.1	11.5	7.0
STANDARD ERROR (S.E.)	+ABS	0.082	0.065	0.073	0.703	2.583
	+RELX	10.3	8.0	3.9	2.5	5.0
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .65		0.60 - 0.98	-0.01 - 1.64	1.70 - 2.01	26.63 - 29.57	19.26 - 54.91

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5, 1974

ELEMENT DETERMINED		LU	MG	MN	MO	NA
UNIT		PP10EXP6	WT. %	PP10EXP6	PP10EXP6	WT. %
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	10	5	55	6	14
	INDIVIDUAL DETERMINATIONS	41	16	230	12	58
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	5	5	50	4	11
	INDIVIDUAL DETERMINATIONS	33	16	215	5	52
TOTAL RANGE OF LABORATORY AVERAGES		0.248 - 0.942	0.609 - 2.870	163.147 - 6883.332	1.000 - 400.000	1.700 - 2.472
RANGE OF ACCEPTED LABORATORY AVERAGES		0.248 - 0.402	0.609 - 2.870	495.000 - 1047.000	1.000 - 2.500	1.700 - 2.310
PERCENTAGE OF OUTLYING LABORATORIES		20	0	9	33	7
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		0.336	1.633	852.212	1.688	1.922
STANDARD DEVIATION (S.D.)	+-ABS	0.049	0.847	31.272	0.688	0.172
	+-RELX	14.5	55.2	15.4	40.8	8.9
STANDARD ERROR (S.E.)	+-ABS	0.017	0.379	18.565	0.344	0.048
	+-RELX	5.1	24.7	2.2	20.4	2.5
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		0.30 - 0.38	0.48 - 2.58	814.87 - 889.56	0.59 - 2.78	1.82 - 2.03

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5,1976

ELEMENT DETERMINED		NS	ND	NI	P	PS
UNIT		PP10EXP6	PP10EXP6	PP10EXP6	WT. %	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	3	8	15	3	23
	INDIVIDUAL DETERMINATIONS	12	31	60	8	83
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	3	6	13	3	22
	INDIVIDUAL DETERMINATIONS	12	28	53	8	82
TOTAL RANGE OF LABORATORY AVERAGES		6.000 - 10.833	9.000 - 77.500	4.000 - 400.000	0.095 - 0.141	7.980 - 700.000
RANGE OF ACCEPTED LABORATORY AVERAGES		6.000 - 10.833	28.000 - 31.833	4.000 - 26.333	0.095 - 0.141	7.980 - 220.000
PERCENTAGE OF CUTLYING LABORATORIES		0	25	13	0	4
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		8.961	29.926	13.050	0.113	129.300
STANDARD DEVIATION (S.D.)	+AES	2.594	1.569	6.636	0.025	58.014
	+RELX	28.9	6.2	50.9	21.7	44.9
STANDARD ERROR (S.E.)	+AES	1.498	0.640	1.840	0.014	12.369
	+RELX	16.7	2.1	14.1	12.5	9.6
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		2.52 - 15.41	28.28 - 31.57	9.04 - 17.06	0.05 - 0.17	103.67 - 155.03

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5.1976

ELEMENT DETERMINED		PR		RB		SB		SC		SE	
UNIT		PP10EXP6		PP10EXP6		PP10EXP6		PP10EXP6		PP10EXP6	
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	2		31		29		15		10	
	INDIVIDUAL DETERMINATIONS	2		127		117		54		40	
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	2		27		25		11		8	
	INDIVIDUAL DETERMINATIONS	2		115		101		47		34	
TOTAL RANGE OF LABORATORY AVERAGES		3.000 - 6.900		29.000 - 220.000		6.460 - 132.500		7.293 - 211.000		0.160 - 11.000	
RANGE OF ACCEPTED LABORATORY AVERAGES		3.000 - 6.900		105.250 - 175.000		6.460 - 27.000		13.075 - 16.433		0.160 - 2.800	
PERCENTAGE OF OUTLYING LABORATORIES		0		13		14		27		20	
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		4.950		138.430		14.301		14.845		1.381	
STANDARD DEVIATION (S.D.)	+ABS	2.758		18.698		5.282		0.976		1.009	
	+RELX	55.7		13.5		36.9		6.6		73.0	
STANDARD ERROR (S.E.)	+ABS	1.980		3.598		1.056		0.294		0.357	
	+RELX	39.4		2.6		7.4		2.0		25.8	
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .95		-19.83 - 29.73		131.03 - 145.83		12.12 - 16.48		14.19 - 15.50		0.54 - 2.22	

SUMMARY OF RESULTS OF THE INTERCOMPARISON SOIL-5,1976

ELEMENT DETERMINED		SI	SM	SR	TA	TB
UNIT		WT. %	PP10EXP6	PP10EXP6	PP10EXP6	PP10EXP6
NUMBER OF REPORTED RESULTS	LABORATORY AVERAGES	4	9	19	21	17
	INDIVIDUAL DETERMINATIONS	9	39	74	82	62
NUMBER OF ACCEPTED RESULTS	LABORATORY AVERAGES	4	6	18	14	14
	INDIVIDUAL DETERMINATIONS	9	26	72	63	53
TOTAL RANGE OF LABORATORY AVERAGES		26.967 - 39.500	3.590 - 13.400	22.423 - 965.000	0.500 - 2050.000	0.460 - 1.737
RANGE OF ACCEPTED LABORATORY AVERAGES		26.967 - 39.500	4.852 - 6.000	22.423 - 650.000	0.532 - 0.938	0.460 - 0.850
PERCENTAGE OF OUTLYING LABORATORIES		0	33	9	33	18
OVERALL MEAN OF ACCEPTED LABORATORY AVERAGES		33.167	6.416	330.258	0.764	0.665
STANDARD DEVIATION (S.D.)	+ABS	6.808	0.373	55.772	0.099	0.124
	+REL%	20.5	6.9	47.2	13.0	18.6
STANDARD ERROR (S.E.)	+ABS	3.404	0.152	36.716	0.027	0.033
	+REL%	10.3	2.8	11.1	3.5	5.0
CONFIDENCE LIMITS FOR THE MEAN OF POPULATION FOR PROBABILITY LEVEL .99		22.33 - 44.00	5.02 - 5.81	252.79 - 407.73	0.71 - 0.82	0.59 - 0.74

TABLE 59

Illustration of the performance of various criteria for the rejection of outliers

No.	Element	No. of laboratory averages	Overall mean $\bar{x}$	Standard deviation	Outliers	Detected by: ($\alpha = 0.05$)			
						$D^{*})$	G	S	K
1	As	30	94.2	37.8					
					212.0	+	+	-	+
		29	90.1	31.1					
					5.9	+	-	-	+
		28	93.1	27.0					
					10.0	+	+	-	+
		27	96.2	22.0					
					157.0	+	+	-	-
		26	<u>93.9</u>	<u>18.7</u>					
2	Cu	43	97.9	107.1					
					700.0	0	+	+	+
		42	83.5	52.0					
					357.3	0	+	+	+
		41	76.9	29.2					
					161.3	0	+	-	+
		40	74.8	26.2					
					0.285	0	-	-	+
		39	76.7	23.6					
					7.425	0	+	-	+
		38	78.5	20.9					
					16.0	0	+	-	+
3	Mn	37	80.2	18.4					
					133.5	0	+	+	+
		36	78.7	16.3					
					133.3	0	+	+	+
		35	<u>77.1</u>	<u>13.5</u>					
		55	987.9	141.9					
					6883.3	0	+	+	+
		54	878.7	133.1					
					1715.0	0	+	+	+
		53	862.9	104.1					
					1660.0	0	+	-	+
		52	847.6	72.6					
					163.1	0	+	-	+
		51	861.0	44.3					
					1300.0	0	+	-	-
		50	<u>852.2</u>	<u>31.3</u>					
4	Sb	29	22.1	25.6					
					132.5	+	+	+	+
		28	18.1	14.6					
					83.0	+	+	+	+
		27	15.7	7.25					
					36.0	-	+	+	+
		26	14.9	6.12					
					31.0	-	-	+	-
		25	<u>14.3</u>	<u>5.28</u>					

*) Tables of critical values for Dixon's criterion are available only up to $N = 30$.
 "0" appears in the Table when Dixon's criterion could not be used.

TABLE 59 (cont'd)

Illustration of the performance of various criteria for the rejection of outliers

No.	Element	No. of laboratory averages	Overall mean $\bar{x}$	Standard deviation	Outliers	Detected by: ($\alpha = 0.05$)			
						D ^{*)}	G	S	K
5	Zn	51	442.1	155.6		.			
					3460.0	0	+	+	+
		50	381.7	149.1	1190.0	0	+	+	+
		49	365.2	93.9	2.8	0	+	-	+
		48	372.7	78.4	620.8	0	+	-	+
		47	367.5	70.1	607.5	0	+	-	+
		46	362.3	61.0	581.2	0	+	-	+
		45	357.4	51.8	176.7	0	+	-	+
		44	361.5	44.4	212.6	0	+	-	+
		43	365.0	38.5	248.3	0	+	-	+
		42	367.7	34.3	476.0	0	+	-	+
		41	365.1	30.1	263.3	0	+	-	+
		40	<u>367.6</u>	<u>25.6</u>					

*) Tables of critical values for Dixon's criterion are available only up to $N = 30$.
 "0" appears in the Table when Dixon's criterion could not be used.

TABLE 61

Concentrations of elements in IAEA's Soil-5 which can be recommended with a relatively high degree of confidence *)

Major and Minor Constituents

<u>Element</u>	<u>Content</u> <u>Wt. %</u>	
Aluminium	8.19 $\pm$	0.28
Potassium	1.86 $\pm$	0.15
Sodium	1.92 $\pm$	0.11

Trace Constituents

<u>Element</u>	<u>Content</u> <u>$\mu\text{g/g}$</u>	
Arsenic	93.9 $\pm$	7.5
Barium	561 $\pm$	53
Cerium	59.7 $\pm$	3.0
Cobalt	14.8 $\pm$	0.76
Cesium	56.7 $\pm$	3.3
Copper	77.1 $\pm$	4.7
Gallium	18.4 $\pm$	1.6
Lanthanum	28.1 $\pm$	1.5
Rubidium	138 $\pm$	7.4
Scandium	14.8 $\pm$	0.66
Thorium	11.3 $\pm$	0.73
Zinc	368 $\pm$	8.2

*) The reported uncertainties are confidence limits of the mean for a significance level of $\alpha = 0.05$.

TABLE 62

Concentrations of elements in IAEA's Soil-5 which can be recommended with a reasonable degree of confidence *)

Major and Minor Constituents

<u>Element</u>	<u>Content</u> <u>Wt. %</u>
Iron	4.45 $\pm$ 0.19

Trace Constituents

<u>Element</u>	<u>Content</u> <u>$\mu\text{g/g}$</u>
Beryllium	1.77 $\pm$ 0.27
Bromine	5.4 $\pm$ 1.0
Chromium	28.9 $\pm$ 2.8
Dysprosium	4.0 $\pm$ 1.0
Europium	1.18 $\pm$ 0.08
Hafnium	6.30 $\pm$ 0.30
Holmium	0.82 $\pm$ 0.83
Lithium	52.1 $\pm$ 33
Lutetium	0.336 $\pm$ 0.044
Manganese	852 $\pm$ 37
Neodymium	29.9 $\pm$ 1.6
Lead	129 $\pm$ 26
Antimony	14.3 $\pm$ 2.2
Samarium	5.42 $\pm$ 0.39
Tantalum	0.764 $\pm$ 0.056
Terbium	0.665 $\pm$ 0.075
Uranium	3.04 $\pm$ 0.51
Ytterbium	2.24 $\pm$ 0.20

*) The reported uncertainties are confidence limits of the mean for a significance level of $\alpha = 0.05$.

TABLE 63

Non-certified values for concentrations of certain elements in IAEA's Soil-5
(Information values only)

Major and Minor Constituents

<u>Element</u>	<u>Content</u> <u>Wt. %</u>
Calcium	(2.2)
Magnesium	(1.5)
Phosphorus	(0.11)
Silicon	(33)
Titanium	(0.47)

Trace Constituents

<u>Element</u>	<u>Content</u> <u>ug/g</u>
Silver	(1.9)
Boron	(63)
Bismuth	(12)
Cadmium	(1.5)
Gadolinium	(35)
Fluorine	(628)
Mercury	(0.79)
Molybdenum	(1.7)
Niobium	(9)
Nickel	(13)
Praseodymium	(5.0)
Selenium	(1.4)
Strontium	(330)
Thulium	(0.42)
Vanadium	(151)
Tungsten	(5.1)
Yttrium	(21)
Zirconium	(221)