Comparability of L_1 Data

by

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The l_1 data submitted to the 'Methods' meeting in Hamburg have been further analysed and in addition the data supplied by Sweden has been incorporated. In this analysis the Danish data have been omitted as there was a difference in the method of calculation of the l_1.

In the analysis at Hamburg which is reported in the draft report it appeared that the English values tended to be somewhat lower than those of Norway, Denmark, Scotland and Germany and that the Netherlands values were slightly higher than those of the same group of countries. In arriving at these differences, no account was taken between scale variance of l_1, nor were differences in interpretation considered. This indeed was scarcely possible in the time available.

One of us (A. C. Burd) did report, however, on a previous l_1 comparison made on a series of loo scales by both Dutch and English workers. Two scales from each fish were available for l_1 determination, in the case of the English (W.G.Parnell) both scales were used and the between scale variance was calculated. Two Dutch workers (M. and G.) read unnamed scales. It was found that in some few cases, nine differences greater than 1 cm in l_1 were found. These were disregarded in the final analysis as being due to differences in interpretation. Very similar l_1 values by the Dutch and English workers were observed in the remaining 91. Any differences between the English value and that of the Dutch was of the order of the between scale variance. In the light of this experiment the 'results' of the recent comparison were surprising.

One basic piece of information required before any comparison of these data is possible, is some estimate of the between scale variance of l_1 on an individual fish. W.G.P. therefore repeated Lea's classic experiment of taking all the scales from spoors parallel to the lateral line from gill cover to tail. Three rows on each side were treated in this manner and the l_1's were calculated. Of the 178 scales taken, only 98 were projectable. These gave a between scale variance of 0.1242 cm^2 with 95% confidence limits on the mean of $\pm$ 3 mm. These values are very similar to the ones obtained in the previous Anglo-Dutch experiment.

Of the 3oo pairs of scales available for growth determination Holland and Sweden rejected very few, while Germany gave no estimates for l_1 of rather more than half. The numbers projected by each country are given below:-

Table 1.

	No.
Sweden	263
Germany	142
England	197
Holland	282
Scotland	2o7

The following test was used for estimating similarity of l_1's. The grand mean was calculated and the individual observations were compared with this. Differences greater than $\pm$ 3 mm were regarded as unacceptable. If one or more value lay outside these limits then the individuals were reexamined and those within $\pm$ 3 mm of each other were regarded as giving the best estimate of l_1.

The data were first divided into three groups:-

(a) Scales which all five countries had read.

(b) Scales which any four countries had read.

(c) Scales which any three countries had read.

Taking the group of five estimates the score of agreements is given below.

Table 2.

	G	E	N	Sc	Sw
Total no. of observations	1o3	1o3	1o3	1o3	1o3
All agree Score	44	44	44	44	44
4 agree	24	32	26	35	35
3 agree	14	1o	8	11	12
2 and 2 agree	1	1	1	o	1
	83	87	79	9o	92

The disagreeing values were then compared with the mean and are summarised below as being larger or smaller than the mean:-

Table 3

Differences	Greater	Less
Germany	13	6
England	o	15
Netherlands	22	1
Scotland	9	3
Sweden	1	9

In the same manner scores of agreements and differences were accumulated for the other two cases.

The total/of agreements for each of the other two groups have been calculated in the same manner and the totals for the whole data are given below.

Table 4

Country	No. of observations	Total agreements
Germany	142	1o5
England	197	166
Netherlands	282	168
Scotland	2o7	169
Sweden	263	197

The total differences from the means are given below.

<div align="center">Table 5</div>

Country	Greater	Less
Germany	2o	7
England	4	19
Netherlands	47	9
Scotland	21	7
Sweden	4	18

There remained a number of observations for each country in which total disagreement took place. These were:-

Germany	lo
England	8
Netherlands	58
Scotland	lo
Sweden	44

Discussion

In trying to summarise these data a major difficulty is in the varying numbers of scales considered projectable by the different workers. 3oo scales were available, Holland proportioned 94% of these while Germany only 47%. If this is an estimate of relative difficulty of the scales then one might expect loo% correct for Germany and a low percentage of success for Holland. This was not the case for Germany had proportionally fewer successes than Holland.

Table 6 gives the percentages read by each country and the percentage of these which were successful.

<div align="center">Table 6</div>

	% read	% success
Germany	47	74
England	66	84
Netherlands	94	6o
Scotland	69	82
Sweden	88	75

England and Scotland projected approximately the same number of fish and scored the highest successes.

In the cases where a country differed from the mean in its l_1 determination, it is seen in Table 5 that overestimates were made by Germany, Netherlands and Scotland, while England and Sweden gave lower values in general.

The conclusion to be drawn from the experiment is again the one arrived at in the Anglo-Dutch experiment - only scales where there is little doubt of the position of the l_1 should be projected.