A Quantitative Vision of Biometry in Developing Countries [1]

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Introduction

During the 11th International Biometric Conference, which was held in Toulouse (France) in 1982, we presented a paper concerning the situation of biometry in Third World countries [Dagnelie, 1982]. This presentation was based on the analysis of the lists of members of the International Biometric Society, from 1949 to 1975. The present paper constitutes, after a lapse of fifteen years, an updated version of the first document. Other references pertaining to the same issue are Dagnelie [1983, 1984] and Riley [1992].

Method and results

The International Biometric Society published lists of members (*Directories*) at intervals of three to seven years (1949, 1953, 1957, 1962, 1965, 1968, 1971, 1975, 1982, 1986, 1990, and 1996). The members listed have been counted for the following six groups of countries:
America 1 ('Am.1'): Canada and the United States of America;
Europe ('Eur.'), including the European part of (ex-) U.S.S.R.;
Asia-Oceania 1 ('A.O.1'): Australia, Japan and New Zealand;
America 2 ('Am.2'): other countries of America;
Africa ('Afr.');
Asia-Oceania 2 ('A.O.2'): other countries of Asia and Oceania.
The first three groups are considered here as constituting the 'developed countries' as a whole, and the three last ones as making up the 'developing countries'.

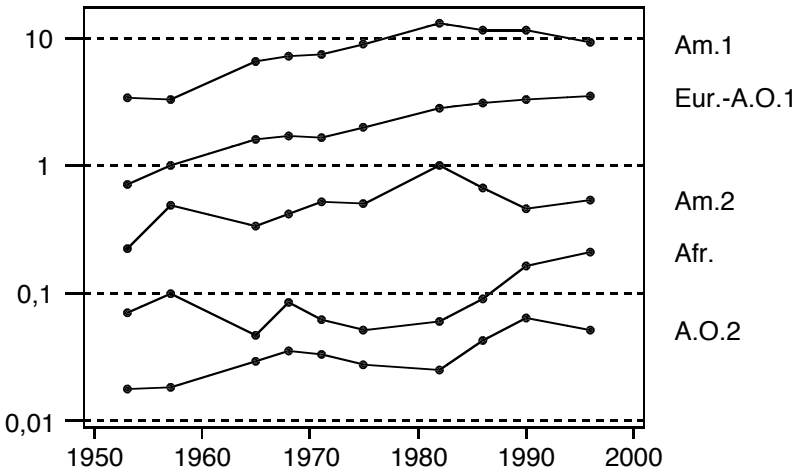
We have not been able to find a copy of the list of members for 1962. Moreover, we have not taken into account the observations concerning 1949, since the Biometric Society, founded in 1947 in Washington, was essentially American at that time. Our analysis thus concerns ten series of observations, two series per decade, since 1950.

The population numbers within the same groups of countries, at the various dates in question, were reviewed by consulting the *United Nations Statistical Yearbooks*. And we have calculated the ratios 'numbers of members / populations', by expressing them in numbers of members per million inhabitants. These data are presented in Table and Figure 1, the y-axis of the figure being a logarithmic scale. The values relative to groups 'Eur.' and 'A.O.1' being very similar, these two groups are represented in the figure by a single line, in order to avoid confusion.

[1] *Biometric Bulletin* **15** (1), 6-9, 1998.

Table and Figure 1. Numbers of members of the International Biometric Society by million inhabitants.

Years	Am.1	Eur.	A.O.1	Am.2	Afr.	A.O.2	World
1953	3.4	0.69	0.84	0.22	0.071	0.018	0.43
1957	3.3	0.95	1.2	0.48	0.098	0.018	0.51
1965	6.6	1.6	1.5	0.33	0.046	0.029	0.82
1968	7.2	1.7	1.6	0.41	0.083	0.035	0.86
1971	7.4	1.7	1.5	0.52	0.062	0.033	0.86
1975	8.9	2.0	1.9	0.50	0.051	0.027	0.97
1982	13	2.7	3.4	0.99	0.059	0.025	1.33
1986	12	3.1	3.1	0.67	0.088	0.043	1.25
1990	12	3.3	2.9	0.45	0.16	0.064	1.23
1996	9.1	3.6	3.0	0.53	0.21	0.052	1.09



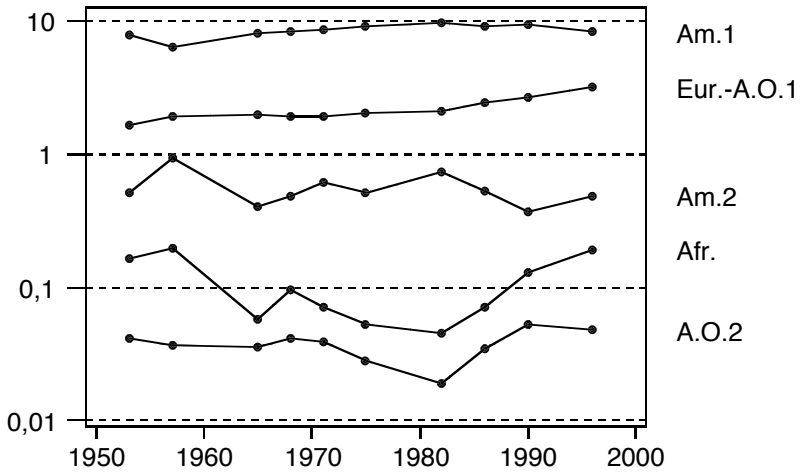
The number of members of the International Biometric Society are also expressed per million inhabitants in proportion to world means, defining in this way quotients comparable to *odd-ratios*. These ratios are presented in Table and Figure 2, the last three columns of the table giving the inverse of values lower than 1. As above, the y-axis of the figure is logarithmic, and groups 'Eur.' and 'A.O.1' are represented by a single line.

Observations and comments

Of course, the results obtained in this way are succinct and are not free of distortions, some even relatively important. For instance, values calculated for the whole European continent are obviously averages, relative to situations which can differ greatly from one country to the next, especially from west to east, from the British Isles to the Ural. Similarly, China which is still largely impermeable to what can be considered as coming from America, exerts a marked influence on data concerning the 'Asia-Oceania 2' group. Finer analyses could be undertaken, but global figures already give rise to a certain number of interesting observations and comments.

Table and Figure 2. Numbers of members of the International Biometric Society by million inhabitants as proportions of the world means.

Years	Am.1	Eur.	A.O.1	Am.2	Afr.	A.O.2	Inverse proportions Am.2	Afr.	A.O.2
1953	7.9	1.6	1.9	0.51	0.16	0.041	1.9	6.1	24
1957	6.5	1.9	2.4	0.95	0.19	0.036	1.1	5.2	28
1965	8.0	2.0	1.8	0.41	0.057	0.035	2.4	18	28
1968	8.3	2.0	1.8	0.48	0.097	0.041	2.1	10	25
1971	8.6	2.0	1.8	0.61	0.071	0.038	1.6	14	26
1975	9.2	2.0	1.9	0.51	0.052	0.028	2.0	19	36
1982	9.7	2.0	2.6	0.74	0.045	0.019	1.3	22	53
1986	9.3	2.5	2.5	0.53	0.070	0.034	1.9	14	29
1990	9.3	2.7	2.4	0.37	0.13	0.052	2.7	7.7	19
1996	8.3	3.3	2.8	0.49	0.19	0.047	2.1	5.3	21



In 1982, 1983 and 1984, we concluded our work by stating that '*the Third World has been excluded from the development of biometry in recent years*', and that the gap between developed and developing countries '*far from narrowing, is widely widening*'. What is the trend today ?

The number of members and the population figures, which are not explicitly presented in this paper, indicate that the part occupied by developing countries within the International Biometric Society has increased somewhat over the past years, albeit remaining less than 10 %, whereas the population of these countries represents approximately 80 % of the world population. In addition, important irregular fluctuations appear in the number of members of the 'America 2' group. These fluctuations are to a large extent the outcome of abnormal variations of the number of Brazilian members, which can no doubt be ascribed to the methods of counting the latter. This has resulted in Brazil not being taken into account in some of the following comparisons.

Regarding the number of members per million inhabitants (Table 1), if attention is focused on the years 1982 to 1996, there is a slight recovery. Indeed, for this period, there was a reduction in the number of members per million inhabitants in groups

'America 1' and 'Asia-Oceania 1' (in the order of 2 % and 1 % per year respectively), and a slight or marked increase in the four other groups of countries, excluding Brazil from the 'America 2' group (approximately 2 % per year for Europe and the 'America 2' group, 5 % per year for the 'Asia-Oceania 2' group, and 10 % per year for Africa).

Considerable disparities again exist (Table and Figure 2). In 1996, the mean concerning Canada and the United States of America ('Am.1') is still eight times higher than the world mean; the European mean and that of the group Australia-Japan-New Zealand ('A.0.1') is three times higher than the world mean; the mean of the group 'America 2' is twice lower than the world mean; the African mean is five times lower than the world mean; and the mean of the group 'Asia-Oceania 2' is roughly twenty times inferior to the world mean. But the recovery of Africa, and to a lesser extent of the 'Asia-Oceania 2' group, is clearly apparent. A similar recovery is noted for the 'America 2' group if one disregards Brazil.

It would seem that this pattern can be attributed to two factors. The first is the increased number of scientific staff in developing countries over the last fifteen to twenty years; the second is the policy adopted by the International Biometric Society, of developing regional networks, first of all in Asia (1987), and then in Africa (1990), and in Latin America (1992). If the first of these networks has become somewhat lethargic, the other two are still very active and constitute important centres of development.

Outlook for the future ?

A balanced situation is still a long way off. Efforts made up till now must be renewed and even reinforced. This calls for the participation of one and all: scientists (of developed and developing countries), senior academic staff (faculty deans, heads of departments, laboratory directors, etc.), and international societies and organisations (such as the International Biometric Society).

Particular emphasis should be placed on the role of senior academic staff, for it is they who are responsible, either directly or indirectly, for bestowing grants, recognizing merits and promoting younger members of staff, for the contents of reviews, the research axes adopted by scientific organisations, programmes of meetings, congresses and conferences, etc. In developed countries, it is up to these 'senior members of staff' to make younger members (students, scientists and young teachers) aware of the problems encountered by developing countries, and to guide their work accordingly.

Bibliography

Dagnelie P. [1982]. La biométrie dans les pays du Tiers Monde. *In: Actes de la 11ème Conférence internationale de Biométrie.* Versailles, Institut national de la Recherche agronomique, 177-182.

Dagnelie P. [1983]. Biometry in the Third World. *Tropicultura* **1** (4), 122-127.

Dagnelie P. [1984]. La situation de la biométrie dans les pays du Tiers Monde. *Biom. Praxim.* **24** (1), 3-21.

Riley J. [1992]. Biometrical perspectives under global change. *In: Proceedings of invited papers.* Hamilton, XVIth International Biometric Conference, 111-122.

Summary

This note presents the results of an analysis of the directories of the International Biometric Society. It reveals some improvement of the situation since 1982, but it also stresses the magnitude of the still existing gap between developed and developing countries.

Résumé

Cette note présente les résultats d'une analyse des listes de membres de la Société internationale de Biométrie. Elle met en évidence une amélioration de la situation depuis 1982, et souligne l'importance du fossé qui subsiste entre les pays développés et les pays en voie de développement.