

Presidential Address: XXII International Biometric Conference, Cairns, Australia, July 2004 Biometry, Biometrics, Biostatistics, Bioinformatics,..., Bio-X

Author(s): Geert Molenberghs

Source: *Biometrics*, Mar., 2005, Vol. 61, No. 1 (Mar., 2005), pp. 1-9

Published by: International Biometric Society

Stable URL: <https://www.jstor.org/stable/3695641>

REFERENCES

Linked references are available on JSTOR for this article:

https://www.jstor.org/stable/3695641?seq=1&cid=pdf-reference#references_tab_contents

You may need to log in to JSTOR to access the linked references.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



International Biometric Society is collaborating with JSTOR to digitize, preserve and extend access to *Biometrics*

JSTOR

**PRESIDENTIAL ADDRESS: XXII International Biometric Conference,
Cairns, Australia, July 2004**

Biometry, Biometrics, Biostatistics, Bioinformatics, . . . , Bio-X

Geert Molenberghs

Center for Statistics, Limburgs Universitair Centrum, Universitaire Campus,
B-3590 Diepenbeek, Belgium
email: geert.molenberghs@luc.ac.be

SUMMARY. Recent scientific evolutions force us to rethink our profession's position on the scientific map, in relation to our neighboring professions, the ones with which we traditionally have strong collaborative links as well as the newly emerging fields, but also within our own, diverse professional group. We will show that great inspiration can be drawn from our own history, in fact from the early days of the Society. A recent inspiring example has been set by the late Rob Kempton, who died suddenly just months before he was to become President of the *International Biometric Society*.

KEY WORDS: Biometrical Clinic; Blue Plaque; Education; International Biometric Conference; Leo Corsten; Rob Kempton; Strategic plan.

1. Introduction

Our discipline is known under the names statistics, biometry, biostatistics, etc. We view all of these names as directed at the same general enterprise of the use and development of statistical theory and methods to address design, analysis, and interpretation of information in the biological sciences. Whatever it is called, our profession clearly is at a critical juncture. Our work has always been and continues to be of great importance in the conduct of scientific investigations in agriculture, life sciences in general, ecology, forestry, medicine, public health, and host of other endeavors. However, with perhaps a few exceptions, our field overall has not enjoyed the recognition it richly deserves as a fundamental cog in the wheel of scientific inquiry, neither among subject-matter scientists nor government officials nor the general public. This has never been more pressing than in current times, with advances in technology that have allowed amazing amounts of information to be collected and stored and with an increasingly complex health care and public health landscape associated with dizzying arrays of new pharmaceutical products and medical procedures and growing interest among the public in assessing their risks and benefits.

Personal experiences of many of us, collaborating with scientists in agriculture and life sciences and with physicians, and observing the role of our discipline in public life, have often been very rewarding but have sometimes been disheartening. Although some investigators have greatly appreciated our contributions, others tend to view statisticians as, at best, “staff” who know how to run software, “secretaries that are able to count.” Our profession tends to attract a number of in-

dividuals with an attitude that is, with the best of intentions, too service oriented. Some of us have been told that “it is not our policy to have statisticians as co-authors,” by horticulturists, entomologists, and crop scientists (after designing the study, analyzing the data, and writing the statistical section of the journal article); and have argued with physician colleagues about issues such as adjusting for postrandomization covariates, using longitudinal data methods to analyze longitudinal data (rather than comparing means at each time point separately: “we could never get that kind of analysis published”), and so on. In many of these situations, our expertise has been all but ignored as irrelevant. In the media, it is rare to see a statistician interviewed to explain what are essentially statistical issues; the media would rather solicit opinions from “the real scientists,” resulting in pronouncements from, for example, physicians on popular news shows that are inaccurate or downright misleading. The impressions of many nonstatistician acquaintances about the role of statistics in public policy and scientific inquiry range from woefully naive to complete ignorance. This scenario is not one of success and certainly not one that will lead to continuity.

One very important way for a statistician to counteract this attitude is by becoming an expert, or at least quite knowledgeable, in the subject-matter area within which he or she is working. By combining statistical reasoning with knowledge of the real scientific problems, statisticians can and have made high-profile contributions both to the science and to the policy. Important contemporary examples are Fred Mosteller, John Tukey, Sir David Cox, Lincoln Moses (incidentally the first four winners of the Marvin Zelen Leadership Award),

Table 1
Regions and Groups of the International Biometric Society

Regions		Groups	
Single-country	Multicountry		
Argentina (70)	Australasian (180)	Baltic	Morocco
Belgium (110)	Austro-Swiss (220)	Botswana	Namibia
Brazil (110)	British (300)	Cameroon	Nigeria
France (200)	C.A. & Caribbean (60)	Chile	Poland
Germany (880)	East Mediterranean (70)	China	Romania
India (70)	ENAR (1860)	Ethiopia	South Africa
Italy (110)	Nordic (120)	Hungary	Uganda
Japan (250)	WNAR (270)	Indonesia	Uruguay
Korea (40)		Kenya	Zimbabwe
The Netherlands (110)		Mexico	
Spain (150)			

Note: C.A. & Caribbean: Central America & Caribbean Region; ENAR: Eastern North American Region; WNAR: Western North American Region.

Nick Day, Richard Peto, Klaus Dietz, and Martin Gardner. Further, we have to teach our colleagues from substantive areas what our contributions are to the big picture. This needs to be done every time we start working with a new colleague. It should never be taken for granted. Applied statistics is, at best, an acquired taste to those we work with. Those to whom it is love at first sight are likely to be found in the profession already. Related to this, we need to become better, as a profession, at explaining the statistical methods we use in less technical language.

The *International Biometric Society (IBS)* being the learned Society dedicated to our field, we believe we are in a unique position to address the challenge of enhancing understanding of and appreciation for our contributions and expertise among scientists and the public alike and have a greater role in public discourse where interpretation of information is a key aspect. Never has this been more important than with the explosion of data collection in areas like genomics, medical imaging, environmental sciences, and bioterrorism surveillance; with the increasing reliance on sophisticated mathematical modeling to explain biological phenomena; and with the increasing public focus on displaying “statistics” at every turn and disseminating results of studies such as those on mammography and hormone replacement therapy. Computer scientists, applied mathematicians, physicists, and others are claiming these areas, in many cases “reinventing the wheel” or, worse, using inappropriate approaches. It is our belief that we have a fundamental responsibility as a Society to undertake this challenge. We believe that all statistically oriented societies, not just IBS, have tended in the past to look inward rather than outward, and we have neglected to capitalize sufficiently on the potential role we could have in educating domain scientists and the public on the importance of our discipline in all aspects of modern life. At the same time, we are convinced that issues affecting the future of the workings of the Society and the future of the profession are inextricably linked.

We will indicate ways by which these ambitious goals can be reached, but first take a closer look at the International Biometric Society IBS, a lady of a respectable age, readying

herself for a sixtieth anniversary in 2007 but still a compelling example through her rich history.

2. The International Biometric Society

The membership of the International Biometric Society, parent society of this very journal as well as of the biennial *International Biometric Conference*, amounts to 6000 professionals across all continents, organized into 19 Regions and 19 Groups. Table 1 lists the Regions and Groups, with an indication of Regional membership. Of these, the Baltic, Cameroon, and Hungarian Groups have been recently formed, while others celebrate their fiftieth anniversary. In addition, members in sub-Saharan Africa are further organized into a network, SUSAN. The Region and Group structure testifies to the Society’s confederate structure, with a large autonomy for its constituents. Our Society, while united in our professional goals, exhibits rich diversity in language and culture. About 3400 members are native English speaking, with 900 having German, 400 Spanish, and 350 French as their native language. Around 1000 members speak yet another language.

While our professional goals all point in the same direction, wherever we are located, one may wonder whether this is reflected in, say, the submission rate to *Biometrics*. Table 2 displays the number of 2003 submissions to the journal as well

Table 2
2003 Submissions to Biometrics and membership per United Nations Region

United Nations Region	Submissions		Membership		Comp.
	<i>n</i>	%	<i>n</i>	%	
Africa	4	0.8	220	3.3	—
Asia	59	11.9	560	8.5	+
Europe	94	19.0	2480	37.6	—
Latin America & Caribbean	13	2.6	420	6.4	—
North America	317	64.0	2740	41.6	+
Oceania	8	1.6	170	2.6	—

as the membership size, in absolute numbers and in terms of percentage, broken out by United Nations Region. The column labeled "Comp." indicates whether there is a "surplus" (+) or a "deficit" (-). A surplus is found in Asia and North America, while deficits are encountered in Africa, Europe, and Latin America & the Caribbean. The top 10 of submissions is: (1) United States (290); (2) United Kingdom (31); (3) Canada (27); (4) People's Republic of China (16); (5) France (14); (6) Germany, Singapore, Taiwan (9); (9) Japan, Spain (8). The discrepancies observed are intriguing and formulating hypotheses about their explanation is instructive. Is there a relationship with the relative age of a Region, Group, or country within the Society, or is there rather an Anglo-Saxon factor, with English being the predominant language of publication in *Biometrics*? Is there a relationship with whether or not a Region or Group has an economically developing status, or is it rather the prevalent type of biometry (e.g., medical versus nonmedical) within a geographical entity that explains the differences? Do we have to take into account the proportion of submissions by non-IBS members? Do we have to account for the status of graduate training in biometry, at the MSc and PhD levels? Are trends like this generally observed or are there specifics related to the nature of our profession? We will find inspiration by going back in time a little over 50 years.

3. A Forgotten Publication...

In 1948, in the early days of the International Biometric Society (formed in 1947), Chester Bliss edited a proceedings volume entitled *Biometrical Clinic on Entomological Problems*, the title page of which is reproduced in Figure 1. This publication came to the attention of Timothy G. Gregoire, past President of ENAR and based at Yale, as it was part of the inheritance of Lewis R. Grosenbaugh, Yale School of Forestry and Environmental Studies graduate, who spent virtually his entire career with the U.S. Forest Service. Grosenbaugh passed away in April 2003 and the text is now on display at Yale.

While over 50 years old, the message is remarkably fresh and relevant, as we can read from the foreword:

The advances in biometry have developed through the close cooperation of biologists confronted with problems and of statisticians who develop methods for solving them. Both have gained from this collaboration. One medium for maintaining contact is the "biometrical clinic," in which questions are asked by the biologist and answered informally by the statistician. The meeting recorded here followed this pattern. Even when the answers can be found in the textbooks or in scientific journals, the method which is most relevant to a specific problem may not be apparent to the

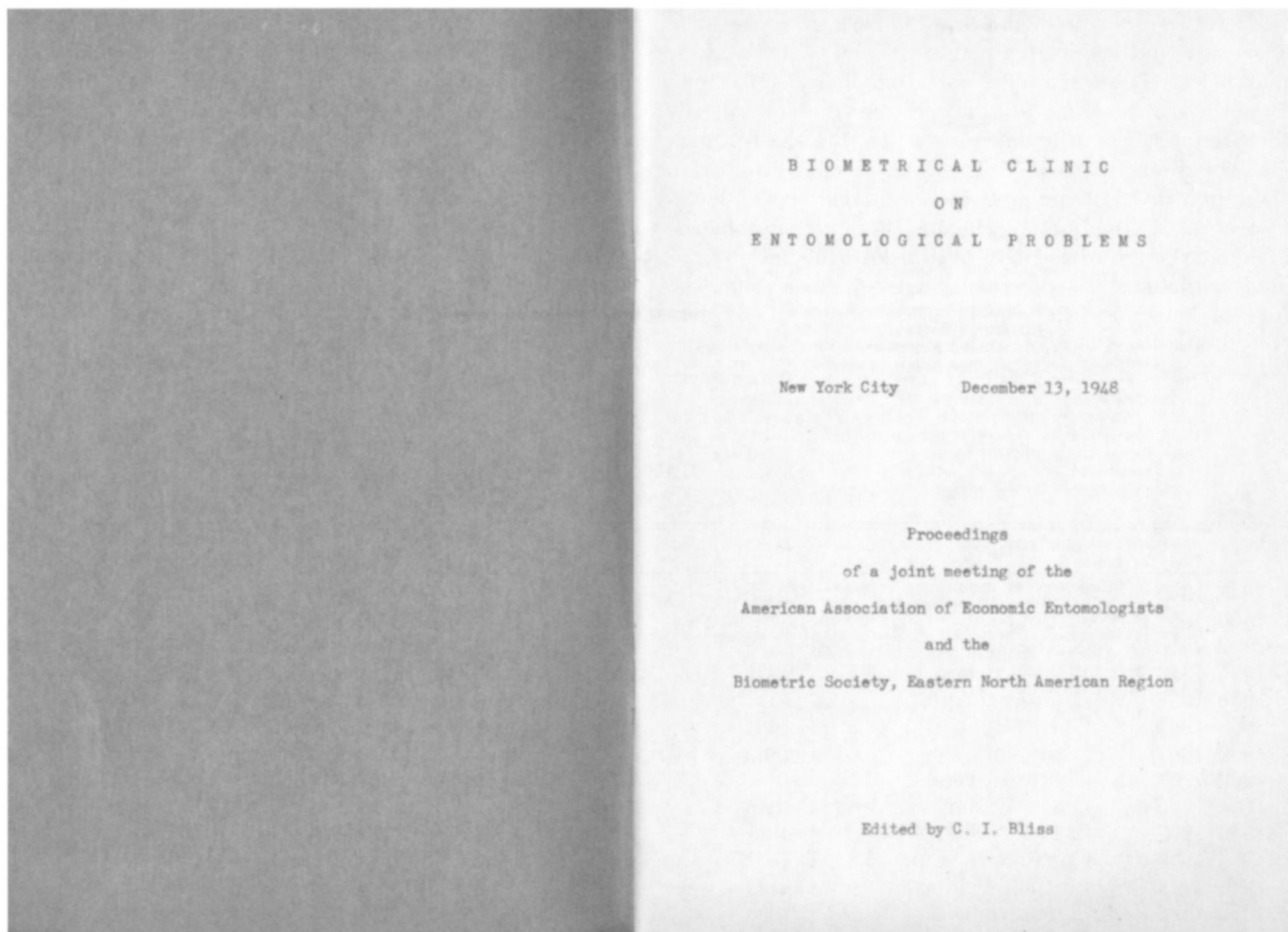


Figure 1. Title page of "Biometrical Clinic on Entomological Problems" proceedings.

uninitiated. If a question cannot be answered, its asking may guide the statistician into a new and interesting field of study. Hence the session is of interest to both the biologist and the statistician.

This text provides food for reflection, especially at times when we are confronted, in addition to our traditional collaborators in agricultural, environmental, medical, biological, and epidemiological sciences, with colleagues from various new fields including molecular biology, bioinformatics, genomics, proteomics, even from security biometrics.

Unfortunately, we are so busy trying to get our work published and to keep our CVs up to date, that we are in danger of losing the habit of scientific discussion, among ourselves and with collaborators in the various substantive fields. Nevertheless, half a century ago, our colleagues realized this type of exchange was vital, leading them to allocate time to answering such questions as, quoting from p. 5 of the same publication: "What is the value of replication and randomization if later the data are not analyzed statistically?"

The meeting, which is recounted in the proceedings volume, was privileged enough to welcome a fine slate of top representatives of our profession, a testimony to the importance given to this type of encounter. The panel included Frank Wilcoxon, Chester I. Bliss, and John W. Tukey. They were convinced that initiatives like this one were beneficial at both the substantive and the biometric end. They knew research, development, and publication had to be done *after* the clinic and not before. The lesson to be learned, perhaps, is that publishing on a real problem, after taking the trouble to deeply familiarize oneself with it before even starting the research, is the correct way. This way of working is more fruitful, in the long run, than coming up with yet another epsilon increment over an existing method, hoping that one day someone will be kind enough to use it. While, luckily, the finest of our contemporaries still practice this art, the "publish or perish" culture tends to get in the way.

The Bliss proceedings volume teaches us how useful it is to understand our own history, especially in the light of the issues

we currently face, as sketched in Section 1. Having returned to our early days, let us explore this period in somewhat more detail.

4. Some IBS History

In its Volume 106, No. 2757, published October 31, 1947, *Science* reported: "International Biometric Society Formed at Woods Hole Conference." The mission statement of the Society, then still termed "The Biometric Society," read:

An International Society Devoted to the Mathematical and Statistical Aspects of Biology,

expanded into its longer version:

The Biometric Society is an international society for the advancement of quantitative biological science through the development of quantitative theories and the application, development and dissemination of effective mathematical and statistical techniques. To this end, the society welcomes to membership biologists, mathematicians, statisticians and others interested in applying similar techniques.

The first slate of international officers included a number of now famous colleagues. Sir Ronald A. Fisher was the first President, and P. C. Mahalanobis was Vice-President. Chester I. Bliss served as the first Secretary. Officers were from North America, India, and the United Kingdom. At its formation, the Society comprised nine Regions: Australian (now Australasian), Benelux (now split into Dutch and Belgian Regions), British, ENAR, French, Indian, Russian (abolished), Scandinavian (now Nordic), and WNAR. Obviously, the initial Society reflected the political situation of the world, so soon after the Second World War. As stated earlier, we now enjoy 38 Regions and Groups.

The Presidents following on Sir Ronald Fisher reflected both the geographical diversity of the Society, a variety of applied interests, as well as a great prestige and therefore the weight the profession as a whole has always given to the IBS. An overview is given in Table 3. Note that Chester Bliss, whose name came up already twice, shows up in the Presidential record for the 1962–1963 slot.

Table 3
Past Presidents of the International Biometric Society

Year	Name	R/G	Year	Name	R/G
1947–1949	R. A. Fisher	British	1976–1977	Henry L. Le Roy	Austro-Swiss
1950–1951	A. Linder	At Large	1978–1979	John A. Nelder	British
1952–1953	G. Darrois	French	1980–1981	Richard M. Cormack	British
1954–1955	W. G. Cochran	ENAR	1982–1983	Herbert A. David	ENAR
1956–1957	E. A. Cornish	Australian	1984–1985	Pierre A. Dagnelie	Belgian
1958–1959	C. H. Goulden	ENAR	1986–1987	Geoffrey H. Freeman	British
1960–1961	L. Martin	Belgian	1988–1989	Jonas H. Ellenberg	ENAR
1962–1963	Chester I. Bliss	ENAR	1990–1991	Richard Tomassone	French
1964–1965	David J. Finney	British	1992–1993	Niels Keiding	Nordic
1966–1967	L. L. Cavalli-Sforza	Italian	1994–1995	Lynne Billard	ENAR
1968–1969	Gertrude M. Cox	ENAR	1996–1997	Byron J. T. Morgan	British
1970–1971	Berthold Schneider	German	1998–1999	Susan Wilson	Australasian
1972–1973	Peter Armitage	British	2000–2001	Nanny Wermuth	German
1974–1975	C. R. Rao	ENAR	2002–2003	Norman E. Breslow	WNAR

Note: R/G: Region or Group.

4.1 Blue Plaques

Several names in Table 3 are well known, even to our youngest colleagues, through their reputation, their work, and through results and scientific publications they have authored. It is no wonder, therefore, that some of our colleagues have received recognition and honors of various kinds. In this spirit, both Karl Pearson and Sir Ronald Fisher have a so-called *Blue Plaque* in London. Blue Plaques were established in 1867 by the *Royal Society of Arts* who installed 36 copies, to be followed in 1901 by the *London City Council* who established a further 249 plaques. In 1965, the *Greater London Council* inherited the initiative and inaugurated 262 plaques. The plaques are to be found at houses of famous people who lived in London, most often at the front of the very house where they originally lived, but occasionally also at the location where the dwelling once stood. In the meantime, the initiative spread all over Great Britain and is since 1985 in *English Heritage* hands.

The citations for Karl Pearson and Sir Ronald Fisher read:

Pearson, Karl (1857–1936). Pioneer Statistician, lived here. 7 Well Road, Hampstead, NW3 (Camden, 1983).

Fisher, Sir Ronald Aylmer (1890–1962). Statistician and Geneticist, lived here, 1896–1904 Inverforth House, North End Way, NW3 (Camden 2002).

Karl Pearson worked and died well before the formation of the IBS, but he did interact with Sir Ronald Fisher, in the days when statisticians understood the art to thoroughly disagree with one another, on principle. Therefore, it is better to have the plaques in each other's vicinity than the people they are commemorating.

4.2 Honorary Life Members

While we are grateful for the tribute paid to our members by external bodies, we have established our own token of honor: *Honorary Life Membership*. Fourteen members have received the honor over a 40-year period: Chester I. Bliss, Gertrude M. Cox, Gustavo Barbensi, George W. Snedecor, Frank Yates, Arthur Linder, William G. Cochran, Erna Weber, David J. Finney, C. R. Rao, Peter Armitage, Pierre Dagnelie, David Cox, and Leo C. A. Corsten. Once again, we find Chester Bliss among the list of people who are deserving of the Society's high honor. Most recently, Professor Leo C. A. Corsten, emeritus professor of Wageningen University in the Netherlands, received Honorary Life Membership. Professor Corsten founded the *Biometrics* research group at his home institution. He was highly dedicated to good statistical practice in research, education, and consultancy and as such he practiced the spirit of the 1948 *Biometrical Clinic*, thus formulating a personal answer to the challenges facing us. The scientific contributions of Professor Corsten are diverse and are to be found in experimental design, the use of vector notation in statistics, and a sound statistical foundation for geostatistical methods. Professor Corsten received an honorary doctorate from Poznan University in Poland. He took an active interest in promoting biometry in economically developing countries. This dedication he shared with another fine member of our Society, Rob Kempton.

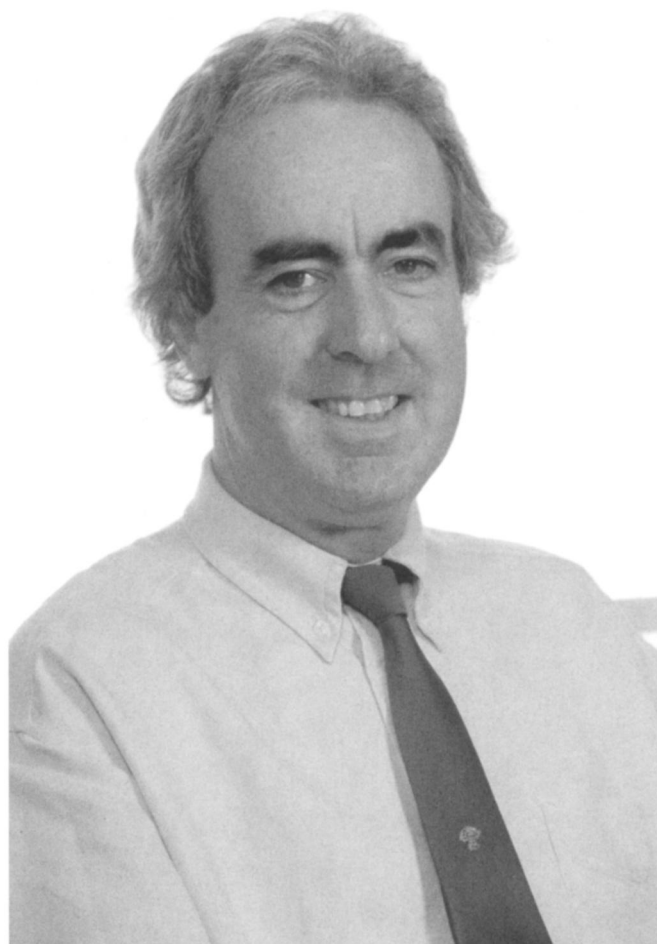


Figure 2. Rob Kempton.

5. Rob Kempton

The list of Presidents in Table 3 should have continued with the entry: "2004–2005, Rob Kempton, British Region" (see Figure 2), were it not for his untimely death on Sunday, May 11, 2003. This would have been entirely appropriate, given Rob's great talents and his devotion to the IBS. A member since 1970, he served on the British Region Committee, acted as British Region Secretary, and served as Regional President in 1995–1996. His presidential address was entitled "Life in a Competitive Environment." Rob considered the IBS his home organization, as clearly evidenced by his high involvement in the 1984, 1986, 1990, 1992, 1994, 1996, 1998, 2000, and 2002 International Biometric Conferences. For example, Rob served on the Program Committee on the IBC1996 in Amsterdam. Moreover, he was elected twice to the IBS Council (1984–1987, 1990–1993). He was Associate Editor for both *Biometrics* and *Journal of Agricultural, Biological, and Environmental Statistics* (JABES) and was Chair of the Awards Fund Committee (1996–1997). The latter underscores his dedication to biometry in economically developing countries, in particular in Africa. He actively participated in the *African Regional Biometric Conference*, in Nairobi (1990), Harare (1991), Kampala (1993, 1997), Cape Town (1995), and Pietermaritzburg (2003).

Rob became IBS Vice-President on January 1, 2003 and joined the Executive Committee. He participated in the face-to-face Executive Committee Meeting in Tampa, Florida in March 2003, and was making plans for his presidency in May 2003 when he suddenly and unexpectedly died. Biomathematics and Statistics Scotland (BioSS) reported:

BioSS Director, Rob Kempton, died of a heart attack while on a cycling holiday in the North York Moors on Sunday May 11th. Rob had been Director of BioSS since its inception in 1987 and was responsible for developing BioSS into the internationally renowned organization it is today. He was Vice-President (and President-elect for 2004) of the International Biometrics Society and Fellow of the Royal Society of Edinburgh. Rob is survived by his wife, Annelise and their 3 grown-up children, Emily, William and Benjamin.

Rob was posthumously honored with *Honorary Memorial Membership* in the IBS and the award was given to his family, the British Region, and BioSS, at an Ordinary Meeting of the British Region held in his honor on April 16, 2004, in Edinburgh.

Rob did not have a chance to directly lead the IBS, but he set a strong example in the leadership he provided to his home institution, Biomathematics and Statistics Scotland, an organization devoted

... to support the *Scottish Executive Environment and Rural Affairs Department* research programme through specialist advice and training, and to provide research in statistics and biomathematics.

... to be a leading international centre for mathematics, statistics and computational science applied to agriculture, the environment, food and health.

BioSS received Visiting Groups in 1996 and 2003. In 1996, the Visiting Group stated:

... a unique organisation that has made a substantial contribution to Scottish Biological research.

The 2003 Visiting Group stated:

The range, scientific quality and productivity of the work at BioSS... are impressive and... excellent value for money.

People are very positive and spoke enthusiastically about working for BioSS... there is a strong sense of loyalty and commitment throughout the organisation.

The Visiting Group felt strongly that its assessment of BioSS' performance reflected the very considerable leadership skills and scientific contribution of Rob Kempton. He was the driving inspiration behind the successful development and evolution of BioSS and his legacy is to have placed BioSS in a very strong position for the future.

The strongly positive views of the Visiting Groups were a direct consequence of Rob's views on the profession and on how to lead an organization. Rob's vision on statistics and the role of statisticians can be another strong source of inspiration for the IBS. He saw an increased role for the statistician as a scientific innovator rather than a technical specialist and put emphasis on training for scientists in routine statistical methods. Rob felt statistics had to be broadened to include methodologies such as mathematical modeling, image analysis, and bioinformatics. Rob believed our discipline must be

conceived as a genuine science, in a sufficiently encompassing way. Rob saw the 21st century as the century of biology, with mathematical, statistical, and computational sciences central to this development. He also felt that statistics as a scientific discipline had to be clearly separated from computing services: we need "departments of biostatistical science" rather than "biostatistical services," in line with the view expressed in Section 1.

To reach these goals, Rob felt it important to develop a long-term vision for the organization, in full awareness of local and international scientific trends. This vision needed to be laid out in a coherent Society plan. Translating Rob's views on BioSS to the IBS, we have developed a *strategic plan*, to consolidate our longer-term views for the Society, and a *business plan*, to lay out achievable goals over the period of, say, a calendar year.

6. The Strategic Plan

The development of a Strategic Plan started under Norm Breslow's Presidency and was further inspired by Rob Kempton. The Strategic Plan Committee was initially chaired by Marie Davidian and Geert Molenberghs, with now Andrew Mead replacing Geert Molenberghs. At this time, the document containing the broad outlines of the plan was approved and implementation is now in progress. A synthesis of the problems facing us, as sketched in Section 1, can be brought back, once again, to the variance that exists between current practices in our profession, with difficulty in getting our rightful place within the academic hierarchy, and the spirit of the Biometrical Clinic as described in Bliss (1948). At best, we will get the position we aim for, certainly not more than that, and only on the condition that we are prepared to fight for it, in a united way. It is remarkable how little effort we have spent in securing visibility at all levels of scientific and public life. The Strategic Plan therefore envisages the establishment of public relations and outreach initiatives. We are happy to mention that, due to a fine collaboration between the sponsoring societies of the Joint Statistical Meetings (JSM; in particular the *American Statistical Association* and our North American Regions ENAR and WNAR), *Biometrics* sessions now feature at the JSM, increasing visibility of our journal. Similar initiatives will be actively sought in other parts of the world. An experimental slate of awards will be established for the International Biometric Conference 2006 in Québec which, if successful, will be turned into a more permanent initiative. One of these will be named after Rob Kempton.

6.1 An Interdisciplinary Science

Two decades ago, "pure science" was considered "better science." The best students went on to pure mathematics, with the applied branches left to the others. Important breakthroughs in the last decade, primarily in the field of molecular biology, have made it increasingly clear that the future is bright for interdisciplinary and multidisciplinary efforts and that academic institutions should prepare themselves for this trend. A nice example is the *Bio-X* initiative at Stanford, a new entity in a flashy building, encompassing molecular biology, life sciences, biosciences, or whatever we want to call them.

It would be natural to think that, by the very nature of our profession, we have a competitive advantage. Not only do we contribute significantly in a scientific way, as evidenced by the large number of journal articles and books in statistical genetics, bioinformatics, and computational biology (Halloran and Geisser, 1999; Balding, Bishop, and Cannings, 2001; McLachlan, Do, and Ambroise, 2004; Ting Lee, 2004), but we also have a long tradition of collaboration across disciplines, with *Biometrika* being century old (and yes, originally it *was* an applied journal), and our own *Biometrics* having half a century of tradition as well. However, while Stanford's Bio-X banner rightly puts biology in the center, surrounded by partner sciences, biometry or biostatistics is completely absent. The argument is that we are embraced by the term "information sciences," but other sciences, such as medicine, are not put under an umbrella term.

We have to remain more vigilant than ever, and appropriately fight for our position, not for the sake of merely perpetuating our profession. If we do not serve a purpose, let us disappear! However, we are deeply convinced that we can have a profound beneficial impact on the biosciences. But we will have to live with the quadrature of the circle: we want to be united with our scientific partners in agriculture, biology, and medicine on the one hand, while on the other to maintain links with our colleagues from other statistical branches, whether theoretical or applied. Insulation is lethal, examples abound. A benign effect of insulation is that we use the same name for different things, depending on our area of application. Think, for example, about such terms as "conditional" and "mixed." Another mild effect is that different names are used for the same thing, such as, for example, variance components (Searle, Casella, and McCulloch, 1992), mixed models (Brown and Prescott, 1999), repeated measures (Vonesh and Chinchilli, 1997), longitudinal data (Verbeke and Molenberghs, 2000; Diggle et al., 2002), hierarchical models, multilevel models (Goldstein, 1995), growth curves (Kshirsagar and Smith, 1995), random coefficients (Longford, 1993), etc. Naively looking at the titles of these volumes, it looks as though they all deal with different topics but, in spite of such differences, there is a strong common denominator. More worrisome is the relative insulation within which developments take place. In this sense, declaring a specific technique within statistics to be a separate profession is dangerous. This holds, for example, for classification, sensitivity analysis, and statistical modeling. In principle, there is nothing against scientific meetings or societies with a narrowly defined remit, but the communication lines with the professional groups at large have to remain open.

The current trend points in the reverse direction. Rather than splitting the profession ever further into subgroups, lines between existing subgroups start to blur. In some instances, the lines between biometricians and biologists fade out, or between biostatisticians and clinical trialists. Working in such an environment is challenging but, if we are ready to look in various directions at the same time, it can be very rewarding. While individual professionals and academic institutions (e.g., the Bio-X initiative) are readying themselves for the future, scientific societies will also have to formulate appropriate plans. Younger colleagues identify themselves less

and less with a single society, let alone show career-long loyalty. Journals become available online and pay-per-view might conceivably make subscribing to societies and journals something from the past. To begin formulating answers to these challenges, societies start to venture beyond their traditional borders, exploring collaboration with other societies. Joint (reduced) membership fees belong to the realm of possibilities. Currently, the IBS and the *International Statistical Institute* (ISI) are exploring the possibilities of a strategic partnership. The ISI does not have a life sciences section, and looks to us to fulfill this role, thereby respecting our autonomy. Such a partnership could be beneficial to the membership in important ways. For interaction with other branches of statistics ISI is a natural home. The *American Statistical Association* (ASA), being the largest national statistical society, is developing outreach programs to render access to its journal attractive and cheap for statisticians in a wide range of economically developing countries.

6.2 The Other Biometrics

Recent global events have catalyzed the advent of "the other biometrics" or "security biometrics." While we ourselves are still unsure as to whether to call our field "biometry," "biometrics," "biostatistics," "medical statistics," or...our retina scanning and fingerprinting colleagues have their public relations act together. In no time, such societies as the *Biometrics Institute* and the *International Behavioral & Medical Biometrics Society* have formed. On Friday, June 18, 2004, the British newspaper the *Guardian* wrote: "Biometrics—great hope for world security or triumph for Big Brother?" We can take different attitudes to such evolutions like questioning the scientific basis of such initiatives, regretting their choice of terminology or just ignoring it. Or, alternatively, we can try to build bridges and explore ways in which we can collaborate, provide scientific input, and, perhaps, avoid having them reinvent the wheel, as we could have done in statistical genetics and bioinformatics, or even prevent calamities from happening by offering access to our expertise in a collaborative effort. In this spirit, the IBS will form a committee to establish a dialogue with our "other biometrics" colleagues.

6.3 Our Publications

Biometrics and *JABES* are our scientific publications. Together with the IBCs, the journals are among the most tangible forms of our scientific activity, indeed of our existence. Past efforts have ensured a smooth transition to Blackwell Publishing for the paper publication and the electronic version of the journals is now well established. In the meantime, the three-editor system has been reviewed and suggestions have been made for further fine tuning. In the near future, the journals will be reviewed further, as requested by the Strategic Plan. Important areas include widening the scope of articles published—while maintaining the highest scientific standards and referee criteria—to include tutorial, expository, and overview articles, as well as introductory articles on new, hot areas such as bioinformatics, data mining, image processing, statistics in bioterrorism surveillance, and so on. In addition, authors of invited papers at IBCs could be invited to submit to the journals. The possibility of establishing

fast-track publication will be explored, with strong efforts to keep overall review times under control. *Biometrics* does very well in this respect, certainly within the group of statistical journals. However, if we take our interdisciplinary efforts seriously, we have to be competitive within a wider circle of journals. The IBS will undertake such a journal review in collaboration with the *JABES* Management Committee, as this journal is a joint venture with the ASA.

6.4 Education

Arguably, the most important area of activity for the future is education. This was already hinted upon in Section 1 and featured high on Rob Kempton's agenda as well. We need to invest in facilitating adequate training, both of candidate statisticians and of colleagues in fields with which we collaborate. Educational needs are different in different parts of the world. While ample master- and PhD-level education is available in a number of Anglo-Saxon countries, and some programs exist in some other countries, including in Western Europe, still great needs exist in various parts of the world. Thus, the IBS ought to be instrumental in providing education at a wide variety of levels, including: short courses and satellite workshops at IBCs, at Regional conferences, and at other scientific events in which we are or can become a partner; Summer or Winter Schools; templates for partial or full graduate programs, facilitating exchange of instructors, etc. One might consider drawing up a template program, based on successful experiences from various locations around the globe. Such a template could consist of a minimal core together with a large number of suggestions for other mandatory and optional courses. In addition to this, successful instructors could be asked to make their course notes available, for use and/or adaptation by local instructors. Such a template could be accompanied by full syllabi for courses, course notes, exercises, standard tests, etc. An important component of this and other educational initiatives is the use of Distance Learning methods (online courses, access to free educational materials, software). Such methods could either replace or supplement onsite teaching.

The IBS should explore ways of providing professional development services to its members. Currently, the IBS is almost entirely absent from this segment of professional organizations. Exceptions are some of its larger Regions (ENAR, the German Region). Large national societies, such as the Royal Statistical Society and the American Statistical Association, take such initiatives very seriously. Intersociety working parties may be set up to provide professional development services to our members. Appropriate initiatives will be taken to ensure IBS has structure in place to successfully undertake these tasks.

7. Final Comment

We are facing important challenges for the future but we believe our Society is in a unique position to cope with them. Our long history of collaborative research is a gold mine of knowledge and experience, provided we are willing to make efficient use of it, and provided we are willing to take an inclusive view of the profession and are prepared to work together with our existing scientific partners in biology, agriculture, forestry, medicine, etc., as well as with new partners in bioin-

formatics, genomics, the other biometrics, etc., but importantly also within our profession. When taking this attitude, we will truly be able to fulfill our renewed mission statement:

An International Society Devoted to Development and Application of Statistical and Mathematical Theory and Methods in the Biosciences.

ACKNOWLEDGEMENTS

I am grateful to Gavin Gibson, Chris Glasbey, and Andrew Mead for their assistance when preparing the section on Rob Kempton. I am indebted to Marie Davidian and Andrew Mead, Strategic Plan Committee Chairs, and their committee members, for material regarding the Strategic Plan. Further, I would like to express gratitude to all chairs and members of IBS standing and ad-hoc committees, to the journal and newsletter editors, and to the editorial boards. A special word of thanks goes to the Council members for their important legislative activities. I am grateful to Norman Breslow and Xihong Lin for their valuable comments on an earlier version of this article.

RÉSUMÉ

Les récentes évolutions scientifiques nous imposent de repenser notre position professionnelle au sein de la communauté scientifique, en relation avec nos voisins professionnels, ceux avec qui traditionnellement nous avons des liens de collaboration étroites comme avec les domaines nouvellement émergés, mais aussi avec notre propre groupe professionnel diversifié. Nous allons montrer que notre propre histoire, en fait les premiers temps de notre Société, peut être source importante d'inspiration dans ce cadre. Un exemple récent qui nous a inspiré nous vient de Rob Kempton, brutalement disparu quelques mois avant de devenir Président de la *Société Internationale de Biométrie*.

REFERENCES

- Balding, D. J., Bishop, M., and Cannings, C. (2001). *Handbook of Statistical Genetics*. Chichester: John Wiley & Sons.
- Bliss, C. I. (1948). Biometrical clinic of entomological problems. In *Proceedings of a Joint Meeting of the American Association of Economic Entomologists and the Biometric Society*. Eastern North American Region.
- Brown, H. and Prescott, R. (1999). *Applied Mixed Models in Medicine*. New York: John Wiley & Sons.
- Diggle, P. J., Heagerty, P. J., Liang, K. Y., and Zeger, S. L. (2002). *Analysis of Longitudinal Data*, 2nd edition. Oxford: Oxford University Press.
- Goldstein, H. (1995). *Multilevel Statistical Models*. London: Edward Arnold.
- Halloran, M. E. and Geisser, S. (1999). *Statistics in Genetics*. New York: Springer-Verlag.
- Kshirsagar, A. M. and Smith, W. B. (1995). *Growth Curves*. New York: Marcel Dekker.
- Longford, N. T. (1993). *Random Coefficient Models*. Oxford: Oxford University Press.
- McLachlan, G. J., Do, K.-A., and Ambrose, C. (2004). *Analyzing Microarray Gene Expression Data*. New York: John Wiley & Sons.

- Searle, S. R., Casella, G., and McCulloch, C. E. (1992). *Variance Components*. New York: John Wiley & Sons.
- Ting Lee, M.-L. (2004). *Analysis of Microarray Gene Expression Data*. Boston: Kluwer.
- Verbeke, G. and Molenberghs, G. (2000). *Linear Mixed Models for Longitudinal Data*. Springer Series in Statistics. New York: Springer-Verlag.
- Vonesh, E. F. and Chinchilli, V. M. (1997). *Linear and Non-linear Models for the Analysis of Repeated Measurements*. Basel: Marcel Dekker.
- Received August 2004. Revised August 2004.*
Accepted August 2004.