

A CENTURY OF ITM PUBLICATIONS (G. Roelants, D. Schoonbaert & V. Demedts)

(in: R. Baetens. Een brug tussen twee werelden. [Antwerpen], [ITG], [2006])

Introduction

Scientific publications have since long been considered as an indispensable testimony of research activity. They act as a primary means of public communication and appreciation, as a permanent archive, and increasingly also as a research assessment tool. Not just the number of publications, but also the status of the output channels – especially international peer reviewed journals - are being used as influential indicators - today probably more so than ever before. ITM has always acknowledged the prestige of scientific publications, e.g. by listing them in its annual reports. Starting in the late 1980's, the library staff (i.e. the current authors) created the *ITG Staff Publications* bibliographic database - which is freely accessible on the Internet since 1998 at <http://lib.itg.be/bs.htm> - registering the articles as they newly appear in print or in cyberspace and retrospectively picking them up, back to the early days. As a result ITM now disposes of a complete record of over 10,000 items written by its researchers, which makes it feasible to analyze their publication patterns of over seven decades. In this chapter we shall look at the types of publications, language distribution, favorite journals, prolific authors, major subjects, and notable trends regarding each of these categories. At the end we shall also take a look at the pre-1933 publications, and at recent bibliometric analyses.

Evolution of productivity

The *ITG Staff Publications* database contains the bibliographic references of 10,467 items published between 1933 and 2005. As a starting date 1933 is the logical choice as this is the year of the first annual report on ITM's activities in Antwerp. At the time of writing (January 2006) the large majority of 2005 items were captured in the database, but inevitably some of the late 2005 publications will be missed for this analysis.

Of the 10,467 publications thus identified, 2,377 items are conference abstracts, typically containing 10 to 20 lines of text. Part of them was published in journal supplements or special issues and can generally be retrieved in a good medical library. Others were published in separate conference proceedings volumes that are less widely distributed. For a third category it is not even certain that they were ever published at all (e.g. 'posters'). Conference abstracts are also notorious for not always being submitted to the ITM library for registration, so it seems best to exclude this category of 'publications' from this analysis. As a matter of fact, published abstracts are a rather recent phenomenon: about 90% of them were published during the last 20 years. A specific type of journal contributions that has also left out of the analysis on the basis of their less scientific character is that of the obituaries: 128 such items were identified in the database, almost 80% of them having appeared in the *Annales de la Société Belge de Médecine Tropicale (Annales)*. Finally, contributions to ITM alumni newsletters and a number of periodic guidelines updates have also been excluded, on account of their domestic nature or limited distribution. The remaining 7,970 publications inevitably will contain a small number of papers which upon closer inspection may hardly be considered as 'original' or 'scientific': commentaries, introductions and conclusions to meetings, restricted diffusion documents, educational material, and probably even some abstracts which we were unable to identify as such.

An analysis of the core of 'full-text' publications shows a steady rise in number from 30 to 40 annual publications in the 1930's to an average of well over 200 seventy years later. Deducing that scientists nowadays are that much more productive than their pioneering peers is however not evident, as university degree scientists attached to the institute in 1933 numbered only nine, while in 2005 ITM had twenty-four academic and about a hundred scientific staff - and obviously there are huge differences in individual output. Nevertheless, this illustrates a change in the publication culture, with increasing multiple authorship and international collaboration. This¹ and other trends (e.g. language distribution) are actually typical for biomedical literature in general, but it's interesting to see this corroborated by a substantial real-life data set.

On a more detailed scale, a few conspicuous rapids can be identified. The early sixties (and 1959) are characterized by an increase in number of publications due to the return to Belgium and employment by ITM of colonial doctors carrying much expertise and documentation with them. The eighties and nineties show a proliferation of writings, partly as a result of the advent of the AIDS epidemic, the first papers on this subject being published as soon as 1983.

Language distribution

Over these seven decades slightly over half of the publications (53.3%) are in English; 37.6% are in French, 7.2% in Dutch. [Table 1](#) presents the evolution of the language distribution, and clearly illustrates the historical trend towards increasing use of English. Up to 1960 the French language publications account for up to 90% of the total. English language publications were rather scarce during these first decades and only reached a substantial level during the 1960's, to overshadow the French language production in the second part of the 1970's. Today, papers in English account for over 80% of all ITM publications.

Table 1: evolution of productivity and language distribution

Decade	English	French	Dutch	Spanish	Other	Multiple	Total	Distrib.
1933-1939	5	258	19	0	2	1	283	3,6%
1940-1949	17	254	23	0	0	0	294	3,7%
1950-1959	34	385	17	0	0	0	436	5,5%
1960-1969	142	527	31	0	11	0	711	8,9%
1970-1979	490	496	57	58	10	3	1106	13,9%
1980-1989	913	490	138	17	7	4	1559	19,6%
1990-1999	1517	427	215	24	19	6	2195	27,5%
2000-2005	1130	156	71	20	13	3	1387	17,4%
Total	4248	2993	571	119	62	17	7970	100,0%
Distribution	53,3%	37,6%	7,2%	1,5%	0,8%	0,2%	100,5%	

The first and last group contain less than 10 years
 Because of multiple languages, some totals slightly exceed 100%

From the 1970's onwards a substantial number of papers was published in Spanish, generally resulting from institutional collaboration with Bolivia. Likewise, 20 years later a modest number of Vietnamese language papers appears, due to collaboration in the field of malaria and its vector control. 17 items are multilingual, mostly English/French, sometimes supplemented with Dutch.

Types of publications

As is clear from [table 2](#), 75.9% of the core publications are journal articles, i.e. the mainstream format of scientific communication since the 17th century. Other journal contribution types feature letters (3.6%), editorials (1%) and comments (0.5%) and 22 theme issues or journal supplements, including 10 in the earlier mentioned *Annales* and 6 in the journal *AIDS*. The value of letters is especially difficult to measure: short reactions to earlier papers or news items often contain limited new scientific information. Others, like e.g. *Letters to Nature* are genuine research papers of several pages length and in our analysis they have been classified as such. All journal contributions together constitute well over 80% of the ITM core publications. Next to these, ITM staff also wrote 111 PhD dissertations, 123 books and 1,083 book chapters. In recent years 5 CD-ROMs were produced. Finally there are 175 items of 'grey literature', i.e. restricted distribution documents, reports and report chapters.

Table 2: document types with language distribution

Document type	English	French	Dutch	Spanish	Other	Multiple	Total	Distrib .
Journal items	3449	2476	429	99	46	9	6485	81,4%
Articles	3083	2435	397	95	46	2	6052	75,9%
Letters	271	6	11	1	0	0	289	3,6%
Editorials	53	27	4	2	0	4	80	1,0%
News, comments	22	2	17	1	0	0	42	0,5%
Issues	20	6	0	0	0	4	22	0,3%
Books	52	54	16	4	0	3	123	1,5%
Book chapters	603	350	102	14	16	1	1083	13,6%
CDROMs	1	2	1	1	0	0	5	0,1%
Dissertations	68	36	6	0	0	0	111	1,4%
Documents	69	58	11	1	0	3	161	2,0%
Report chapters	2	11	1	0	0	0	14	0,2%
Total	4248	2993	571	119	62	17	7970	100,0%

During the 1990's most mainstream journals began offering their full-text contents also online from sophisticated websites, and from the year 2000 on a transition has started towards an exclusively digital format. So far only 14 ITM papers have been published in this category, 12 of which are journal contributions. Clearly this group is bound to expand quickly in the near future, especially now that young open access journals like those from *BioMed Central (BMC)* and the *Public Library of Science (PLOS)* are also being included in major international databases like *Medline / PubMed* and the *ISI Web of Knowledge*, the latter eventually giving access to the bibliometric grail of present-day scientific publishing, i.e. the journal impact factor. Thus in general this paradigm shift will probably not pose fundamental problems for assessment, but it should always be borne in mind that specific

types (e.g. electronic-only letters or comments) are not registered in these databases. As such a value assessment based on journal impact factors should not be used for this type of contributions. They have also been excluded from our analysis.

Favorite journals

Table 3 shows the ranking of journals in which ITM researchers have published 20 contributions or more. For those journals that had title changes the different forms have been combined. Not surprisingly this list is headed by the *Annales* with 891 items, or 14% of all journal items. The *Annales* were launched in 1920 by then director (i.e. of the Brussels School) *Alphonse Broden* and have practically speaking functioned as the de facto home publication of ITM and its predecessor for 75 years. In 1996 the *Annales* merged with 3 other European tropical medicine journals, i.e. *Journal of Tropical Medicine*, *Tropical and Geographical Medicine* and *Tropical Medicine and Parasitology* to form *Tropical Medicine and International Health (TM&IH)*, which almost from its very start has been one of the top 3 journals in the tropical medicine category as ranked by impact factor by the *Institute of Scientific Information (ISI)* in Philadelphia². With 151 ITM items in its first 10 years one can safely conclude that *TM&IH* has successfully taken over from the *Annales* as (partial) ITM home journal, with far greater international prestige as a considerable bonus. As for other home journals - or rather *serials* - the *Studies in Health Services Organization & Policy* series that started in 1997 under the *ITGPress* banner so far have also produced a fair number of ITM publications (43 items). As such contributions to this series have an official status, including standard metadata like ISBN and ISSN, which is an obvious advantage over former domestic series like *Health & Community Working Papers* (32 items) or *Epi Publicatie* (16 items). Coverage by *Medline* or the *ISI* citation databases is not yet a realistic option, but as most have been made freely available in digital format from the ITM website they obviously have gained visibility through web indexes like *Google*.

The high rankings of *Revue de Zoologie Africaine*, *Bulletin et Annales de la Société Royale Belge d'Entomologie* and *Acarologia* result mainly from the extraordinary number of studies devoted to mite taxonomy written by *Alex Fain* and are somewhat atypical for the overall ITM literature production. The third place of the journal *AIDS*, together with several other HIV/AIDS and STD journals further down the list, illustrates the impact HIV/AIDS has exerted on ITM research during the last two decades. Of the general medical journals *The Lancet* with its fifth place is clearly the most popular one - not surprising as overall it is more oriented towards international health issues than its peers. Yet the *New England Journal of Medicine (NEJM)* is also represented in the list, the *British Medical Journal (BMJ)* is close to the threshold with 17 items. It is remarkable though that 68% of the *Lancet* contributions consist of letters. For *NEJM* and *BMJ* this is 35% and 53% respectively. This once more confirms that tropical medicine related papers are not necessarily always published in specialty journals^{3,4}. Yet overall, the popular journals are not really unexpected ones, with prominent title words like 'tropical', 'parasitology', 'infectious diseases', 'pathologie exotique', 'sexually transmitted', 'tuberculosis', 'leprosy', etc. As for the historical evolution this more or less follows the same trends as described regarding the language distribution.

Table 3: journals with at least 20 ITM contributions (1933-2005)

Total	Journal	First	Last
891	Annales de la Société Belge de Médecine Tropicale [, de Parasitologie ...]	1933	1995
179	Revue de Zoologie et de Botanique Africaines	1933	1973
	Revue de Zoologie Africaine	1975	1988
	Journal of African Zoology	1990	1993
166	AIDS	1987	2005
151	Tropical Medicine and International Health	1996	2005
148	Lancet	1973	2005
133	Bulletin et Annales de la Société Belge d'Entomologie	1958	1971
	Bulletin et Annales de la Société Royale Belge d'Entomologie	1972	1993
113	Bulletins de la Société Royale de Zoologie d'Anvers	1939	1965
	Acta Zoologica et Pathologica Antverpiensia	1966	1983
105	Bulletin des Séances. Institut Royal Colonial	1933	1953
	Bulletin des Séances. Académie Royale des Sciences Coloniales	1956	1959
	Bulletin des Séances. Académie Royale des Sciences d'Outre-Mer	1960	2004
103	Acarologia	1959	1985
102	Veterinary Parasitology	1978	2005
88	Belgisch Tijdschrift voor Geneeskunde	1962	1955
	Tijdschrift voor Geneeskunde	1970	2004
85	Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie	1933	1939
	Comptes Rendus des Séances et Mémoires de la Société de Biologie et de ses Filiales	1939	1943
	Comptes Rendus des Séances de la Société de Biologie et de ses Filiales	1944	1948
84	Transactions of the Royal Society of Tropical Medicine & Hygiene	1947	2003
72	Bulletin de la Société de Pathologie Exotique [et de ses Filiales ...]	1933	2004
68	Journal of Clinical Microbiology	1982	2005
63	Acta Clinica Belgica	1954	2005
62	Boletin Informativo del Cenetrop	1975	1980
	Boletin Cientifico del Cenetrop	1985	1999
62	Journal of Infectious Diseases	1983	2005
51	American Journal of Tropical Medicine	1948	1951
	American Journal of Tropical Medicine and Hygiene	1975	2005
50	Acta Tropica	1947	2005
50	Bulletin de l'Académie Royale de Médecine de Belgique	1937	1974
	Bulletin et Mémoires de l'Académie Royale de Médecine de Belgique	1977	1994
48	International Journal of Acarology	1976	1996
47	Revue d'Elevage et de Médecine Vétérinaire des Pays Tropicaux	1961	2003
45	Annales de Parasitologie Humaine et Comparée	1935	1993
44	Bulletin de la Société Française de Mycologie Médicale	1969	1986
44	Huisarts Nu	1984	2004
44	International Journal of Tuberculosis and Lung Disease	1997	2005
43	Studies in Health Services Organization & Policy	1997	2003
42	Genitourinary Medicine	1985	1997
	Sexually Transmitted Infections	1998	2004
39	Bruxelles Médical	1933	1976
39	Verhandelingen. Koninklijke Vlaamse Academie voor Geneeskunde van België	1955	1968
	Verhandelingen. Koninklijke Academie voor Geneeskunde van België	1974	2002
36	International Journal of Leprosy	1938	1965

	International Journal of Leprosy and Other Mycobacterial Diseases	1968	1993
Total	Journal	First	Last
34	Leprosy Review	1972	2004
34	Archives Belges de Dermatologie et de Syphiligraphie	1948	1970
34	Bulletin of the World Health Organization	1968	2005
34	Tropicultura	1983	2005
33	AIDS Research and Human Retroviruses	1989	2004
33	Parasitology	1937	2005
32	Annals of Tropical Medicine and Parasitology	1968	2005
32	Health & Community Working Papers	1981	1995
31	Revue Médicale de Louvain Louvain Médical	1933 1969	1963 2002
30	Vlaams[ch] Diergeneeskundig Tijdschrift	1944	2005
29	Sexually Transmitted Diseases	1979	2005
27	Antimicrobial Agents and Chemotherapy	1978	2005
27	Bulletin. Institut Royal des Sciences Naturelles de Belgique	1954	1983
27	Médecine d'Afrique Noire	1967	2005
26	Mémoires. Institut Royal Colonial Belge. Section des Sciences Naturelles et Médicales	1939	1953
	Mémoires. Académie Royale des Sciences Coloniales. Cl. Sciences Naturelles et Médicales	1955	1957
	Mémoires. Académie Royale des Sciences d'Outre-Mer. Cl. Sciences Naturelles et Médicales	1964	2000
25	Health Policy and Planning	1988	2005
25	International Journal of STD & AIDS	1990	2004
25	Parasitology Today Trends in Parasitology	1986 2001	2000 2004
24	Médecine Tropicale	1982	2004
23	Acta Leprologica	1972	1990
23	Zeitschrift für Parasitenkunde Parasitology Research	1961 1988	1986 2005
22	New England Journal of Medicine	1984	2005
22	Veterinary Record	1962	2002
21	Acta Biologica Belgica	1941	1944
21	Journal of Virological Methods	1980	2003
20	Acta Gastro-Enterologica Belgica	1966	2005
20	Documenta de Medicina Geographica et Tropica Tropical and Geographical Medicine	1956 1958	1957 1995
20	Journal of Acquired Immune Deficiency Syndromes [and Human Retrovirology]	1989	2005

In order to illustrate the contemporary importance of research performed at ITM, a rank-order listing is given in [table 4](#) of the ISI source journals (i.e. indexed in the ISI citation databases) in which staff members published 15 or more in extenso papers during the last 20 years. This list includes a total of 1,535 papers published in 34 different journals. Impact factor (IF; year 2004) range between 0.179 and 38.570 with a mean of 3.791, which is a remarkably high rating. Journal citation ratings should of course be treated with caution^{5,6}, but the fact remains that such a high mean journal IF gives a positive rather than a negative or indifferent perception of the individual value of each of the papers published in these journals.

Table 4: ISI source journals with at least 15 ITM contributions (1986-2005)

Journal	Impact Factor 2004	Articles	Letters	Various	Total
AIDS	5.893	132	24	10	166
Annales de la Société Belge de Médecine Tropicale (*)	0,676	136	2	16	154
Tropical Medicine and International Health	1,969	122	7	22	151
Lancet	21,713	39	76	6	121
Veterinary Parasitology	1,445	98	1	0	99
Journal of Clinical Microbiology	3,439	63	1	0	64
Journal of Infectious Diseases	4,943	56	4	0	60
Transactions of the Royal Society of Tropical Medicine & Hygiene	1,746	57	3	0	60
International Journal of Tuberculosis and Lung Disease	1,484	36	7	1	44
Acta Clinica Belgica	0,353	39	2	1	42
American Journal of Tropical Medicine and Hygiene	2,013	41	1	0	42
Acta Tropica	1,952	40	0	0	40
Genitourinary Medicine = Sexually Transmitted Infections	2,204	35	2	3	40
AIDS Research and Human Retroviruses	2,375	33	0	0	33
Annals of Tropical Medicine and Parasitology	0,562	28	0	2	30
Bulletin of the World Health Organization	2,870	22	1	2	25
Health Policy and Planning	1,343	25	0	0	25
International Journal of STD & AIDS	1,506	22	2	1	25
Parasitology	1,685	25	0	0	25
Parasitology Today = Trends in Parasitology	5,497	18	7	0	25
European Journal of Clinical Microbiology and Infectious Diseases	1,742	20	4	0	24
Vlaams Diergeneeskundig Tijdschrift	0,179	23	1	0	24
Leprosy Review	0,810	20	1	0	21
Antimicrobial Agents and Chemotherapy	4,216	18	2	0	20
Journal of Acquired Immune Deficiency Syndromes [...]	4,100	19	1	0	20
New England Journal of Medicine	38,570	12	7	0	19
Sexually Transmitted Diseases	2,081	19	0	0	19
Social Science and Medicine	2,088	17	1	0	18
Journal of Virological Methods	1,729	18	0	0	18
Clinical Infectious Diseases	5,594	12	4	1	17
Veterinary Record	1,147	15	2	0	17
Clinical and Experimental Immunology	2,518	16	0	0	16
International Journal for Parasitology	3,092	16	0	0	16
Medical & Veterinary Entomology	1,405	15	0	0	15

(*): last Impact Factor (1995)

Prolific authors

Table 5 presents the researchers who have authored at least 50 papers in this database, and they are listed with their number of papers, main areas of excellence, and first and last year of their contributions. The rankings are led by a highly prolific entomologist, followed by a number of microbiologists (with specialties such as HIV/AIDS, STD, virology and

mycobacteriology/tuberculosis) and a mycologist. These data, however, are somewhat tricky to interpret correctly, as they often do not represent lifetime achievements. Apart from technical issues like variant name spellings and use of different (number of) initials, it is often difficult to ascertain whether and when exactly someone was really attached to the Institute or merely collaborated with its scientists. Wherever possible this was verified in the papers themselves. Yet several papers are authored by corporate bodies: groups of scientists where individual participants are only listed in an addendum (e.g. *The Kasongo Project Team*) or are not listed at all. Authors may also be hidden by the 'et al.' formula in database records of multi-authored publications.

Some authors, including more than one director, have published substantially before ITM (and the current dataset) started its activities in Antwerp in the early 1930's. Others have published their most important work before being engaged by the Institute, during the years they were stationed in the former Belgian colonies. As a rule such publications, or papers clearly originating from a (simultaneous) position at another research institute, have not been included in the core database (unless these were co-authored by genuine ITM staff).

Yet for emeriti who have finished their official careers at ITM and clearly do not represent other scientific bodies, papers published during their retirement have been included in these totals. One honorary director was in such a position for almost 30 years. Compared to those who have by now finished their career, current researchers are at an obvious disadvantage in that their future papers cannot yet be included in the present analysis. Finally, some disciplines advance rapidly and are prone to much writing while others demand long gestation times, require extensive field evaluation, show little advancement during the years and hence produce fewer publications.

Table 5: authors with at least 50 ITM publications

Total	Author	Major specialties	First	Last
812	Fain A	Entomology, acarology, helminthology	1954	1997
503	Piot P	Microbiology, STD, AIDS	1975	2000
347	Pattyn SR	Leprosy, virology	1957	2004
340	Colebunders R	AIDS	1984	2005
293	Vanbreuseghem R	Mycoses	1936	1985
283	Portaels F	Mycobacteriology, tuberculosis	1970	2005
270	Van der Groen G	Virology, HIV	1975	2004
235	Janssens PG	Tropical medicine	1950	2004
207	Geerts S	Animal helminthology	1977	2005
198	Van Gompel A	Travel medicine	1989	2005
195	De Muyck A(imé)	Trypanosomiasis, migrants health	1975	2005
191	Wéry M	Protozoology, malaria	1962	2004
189	Rodhain J	Parasitology	1933	1964
184	Dubois A	Tropical pathology, leprosy	1933	1971
162	Laga M	STD, AIDS	1986	2004
155	Mortelmans J	Veterinary medicine	1958	2003
152	Le Ray D	Protozoology	1965	2005
150	Van der Stuyft P	Epidemiology, health care	1986	2005
147	Jadin J(B)	Protozoology, rickettsiology	1937	1946
145	Brandt J	Animal helminthology	1976	2004
139	Van den Berghe L	Hemathology	1934	1951
136	Van Dyck E	Microbiology, STD	1971	2005

Total	Author	Major specialties	First	Last
119	Gigase P	Pathology, schistosomiasis	1964	1997
117	Van den Ende J	Clinical medicine	1988	2005
115	De Vroey C	Mycology	1964	1999
115	Van Lerberghe W	Primary health care	1981	2004
112	Lukoschus FS	Entomology, acarology	1966	1985
111	Kestens L	Immunology, virology, HIV	1980	2005
108	Coosemans M	Entomology, malaria	1978	2005
108	Dorny P	Animal parasitology	1985	2005
104	Van den Branden (J)F	Pharmacology	1933	1942
100	Pandey VS	Animal husbandry	1976	2003
100	Vercruyse J	Veterinary medicine	1962	2005
95	Van Meirvenne N	Serology, trypanosomiasis	1967	2004
92	Boelaert M	Leishmaniasis, refugee care	1994	2005
91	De Deken R	Animal entomology	1982	2005
88	Büscher P	Serology, trypanosomiasis	1989	2005
87	Elsen P	Entomology	1967	2005
86	Berkvens D	Animal epidemiology	1987	2005
86	Taelman H	AIDS	1981	2000
85	Van Marck E	Schistosomiasis	1975	2005
84	Fransen K	Virology, HIV	1991	2005
83	Verhulst A	Animal husbandry	1973	2001
81	Kageruka P	Animal protozoology	1959	2000
78	Kumar V	Animal helminthology	1973	2001
77	Swinne D	Mycology, cryptococcosis	1970	2004
77	Van Riel J	Tropical hygiene, leptospirosis	1939	1977
76	D'Alessandro U	Malaria	1996	2005
76	Van Balen H	Primary health care	1966	2004
76	Van Sande M	Biochemistry	1954	1965
75	Eyckmans L	Tropical medicine, infectious diseases	1978	1997
75	Van den Enden E	Clinical medicine	1988	2005
75	Vanham G	Immunology, HIV	1988	2005
74	Gryseels B	Schistosomiasis	1980	2004
72	Buvé A	AIDS	1993	2005
71	Limbos P	Clinical medicine	1955	1982
70	Thys E	Animal husbandry	1981	2005
69	Kolsteren P	Nutrition	1992	2005
68	De Brouwere V	Health services, maternal health	1986	2005
66	Criel B	Health insurance	1986	2005
65	Janssens W	Virology, HIV	1994	2004
63	Dujardin JC	Protozoology, leishmaniasis	1986	2005
63	Heyndrickx L	Virology, HIV	1987	2004
63	Vervoort T	Laboratory medicine	1972	2004
60	Magnus E	Serology, trypanosomiasis	1973	2005
59	Hardouin J	Veterinary medicine, animal husbandry	1977	2003
58	Mercenier P	Health care organization	1963	2000
58	Peeters M	Virology, HIV	1984	1999
58	Van Ros G	Hematology, hemoglobinopathies	1954	1988
52	Van Damme W	Public health, refugee care	1992	2005
51	Beghin I	Nutrition	1979	2002

The inclusion of certain researchers may produce some frowns, as they have not or only briefly worked at ITM. Yet they do appear in the rankings simply because they have co-authored a sufficient number of genuine ITM publications and as such can be considered as closely associated with the Institute. Needless to say, the ranking criterion in this table is the total number of publications listed in this specific dataset, which does not necessarily equal their impact on medical science or their contribution to ITM's prestige. It may be interesting to compare this with a related listing elaborated from a different point of view⁷.

Major subjects

While journals and authors may pose their specific intricacies, subjects are even more difficult to analyse. Inherent elements like title words cannot be depended upon, even if one makes abstraction of the different languages being used. So the major tools here are the keywords that were added to the records by the librarians. And even for the most sophisticated databases this is an issue hardly two information professionals can be found to agree upon. For this analysis we have selected a number of major categories (e.g. infectious disease agents: bacterial, viral, mycotic, protozoal and helminthic) with a selection of popular individual subjects ([table 6](#)).

Once more, the prominent place of entomology is not surprising, considering that it includes no less than 678 acarology papers by *Alex Fain*, leaving less than 400 papers on the entomological aspects of disease transmission, vector control, etc. With the above exception and considering that ITM is an institute of tropical medicine, the subjects covered do well reflect its mission. Among the eye-catching features are the comparatively high ranking of mycology (the *Vanbreuseghem* effect), the share of AIDS and sexually transmitted diseases (the *Piot* and co-workers effect), the rather high number of veterinary science papers (891) and, maybe, the fact that trypanosomiasis (including Chagas' disease) still precedes malaria (638 vs 511). If the last 20 years only are considered, both diseases (and their causative agents) generate roughly the same number of publications (351 vs 318). Other major categories include public health & health services (633) and travel medicine and imported diseases (338).

Africa is the continent of choice for (cooperative) investigation ([table 7](#)). Evidently the obvious reasons for this are amply discussed elsewhere in this book. The number of full papers where a geographical component could be identified amounts to 2,528 for the whole of Africa, with Congo (DRC) obviously on top (1,281), followed by Rwanda (335), Burundi (276), Cameroon (123), Kenya (108), Côte d'Ivoire (102), Senegal (75), Benin (70), Zambia (68), etc. The next continent is Europe (697), predominantly Belgium alone (590; migrants' health care and imported diseases!). In Asia (255) the main focus is on Southeast Asia (139) and Latin America & the Caribbean (also 255) has Bolivia (117) as main country of interest. Considering the last 20 years only, the geographical distribution remains more or less the same: Africa: 1,437 (DRC: 453, Rwanda: 189, Burundi: 168), Europe: 436 (Belgium: 347), Asia: 216 and America: 161). The fact that ITM researchers have published over 1,600 full-text papers on Central Africa in no way implies that they have monopolized the biomedical literature on DRC, Rwanda and Burundi. Another database named *Medical Literature on Central Africa (1878-)*, created by the present authors and also freely available from <http://lib.itg.be/bs.htm>, lists 12,300 full-text papers on these three countries published since 1933 (plus 1,800 pre-1933 items).

Table 6: subject distribution

5122	Microbiology & infectious diseases	
	1527	Protozoology & protozoal diseases
		638 Trypanosomiasis
		511 Malaria
		138 Leishmaniasis
		80 Amoebiasis
	719	Helminthology & helminthic diseases
		194 Schistosomiasis
		82 Taeniasis
		73 Onchocerciasis
		71 Cysticercosis
		61 Filariases
	1201	Bacteriology & bacterial diseases
		266 Leprosy
		220 Tuberculosis
		112 Buruli ulcer
		110 Gonorrhoea
	1390	Virology & viral diseases
		881 HIV & AIDS
		128 Rickettsial diseases (incl. Chlamydia)
		60 Ebola & Marburg virus disease
		44 Hepatitis
	521	Mycology & mycoses
		93 Dermatophytoses
		72 Cryptococcosis
		45 Histoplasmosis
		29 Candidiasis
1069	Entomology	
	699	Acari
	87	Mosquitoes
	81	Tsetse flies
	69	Simuliidae
	57	Ticks
891	Veterinary science & animal husbandry	
633	Public health & health services	
338	Travel medicine & imported diseases	

Table 7: geographical interest

2528	Africa		
	1628	Central Africa	
		1281	Congo RD
		335	Rwanda
		276	Burundi
		123	Cameroon
	438	West Africa	
		102	Côte d'Ivoire
		75	Senegal
		70	Benin
		47	Mali
		44	Gambia
		29	Guinea
		27	Burkina Faso
		27	Ghana
	225	East Africa	
		108	Kenya
		39	Uganda
		28	Tanzania
	169	Southern Africa	
		68	Zambia
		39	Zimbabwe
		30	South Africa
	71	North Africa	
		47	Morocco
697	Europe		
		590	Belgium
255	America		
	242	Latin America & Caribbean	
		117	Bolivia
		34	Peru
255	Asia		
	139	Southeast Asia	
		30	Vietnam
		24	Cambodia

Book-type publications

Books are difficult to define let alone to evaluate. A 10-page journal paper or WHO-report may be far more important than a 500-page book. Nevertheless, authoring or editing textbooks, monographs or conference proceedings may generally be regarded as a token of expertise and authority. In ITM's history several book-type publications have enriched and guided the scientific community, with special reference to tropical and parasitic diseases, travel medicine and imported diseases, sexually transmitted diseases, and health care organization.

The early manuals on the diseases prevailing in the Congo and their prophylaxis⁸ were followed in 1948 by the first comprehensive textbook of tropical medicine *Les maladies des pays chauds; symptômes, diagnostic et traitement* by *Albert Dubois* and *Louis van den Berghe* (American edition in the same year). As a matter of fact, this edition was also the last Belgian textbook on the subject, the competition of the British, German, French and American 'bibles' with their much wider distribution and larger geographical coverage probably being a decisive obstacle. But in the last decade, *Erwin Van den Enden* and co-editors, a.o. *Alfons Van Gompel*, produced a digital multimedia tropical medicine textbook on CD-ROM (Dutch: 1997; French: 1998; Spanish: 2002 and English: 2004).

Several manuals aimed at the student populations of ITM (including medical doctors, nursing and auxiliary personnel) largely surpassed domestic interest only. To name just a few: *Henri Schouteden* on the identification of insects (1938, with almost annual reprints), *Albert Dubois* on tropical clinical practice (1951), *Joseph Van Riel* on tropical hygiene (1958 and 1965), *Jean-Baptiste Jadin* on hematology, *Raymond Vanbreuseghem* and co-workers on medical and veterinary mycology (1966 and 1978), *Marc Wéry* on medical protozoology (1983 and 1995) and with co-workers on malaria in Africa (1993 and 2001), *Eddy Mangelschots* and co-workers on microbial identification (1990), etc.

Books aiming at professionals only were *Précis de mycologie* co-authored by *Raymond Vanbreuseghem* (French edition in 1952, English edition in 1965), *Chemotherapy of gastrointestinal helminths* co-authored by *Pieter Gustaaf Janssens* (1985), *Wormen en wormziekten bij mens en huisdier* by *P.G. Janssens* and others (1989), *Trematode infections and diseases of man and animals* by *Vinai Kumar*, *Biodiversité du paludisme dans le monde*, co-edited by *Marc Coosemans* (2004) and *Multidrug-resistant tuberculosis*, co-edited by *Françoise Portaels* in 2000. *Albert Dubois* published comprehensive monographs on his life-time dedication leprosy in 1939 and 1955, an exercise followed by *Stefaan Pattyn* and colleagues in 1981.

With respect to travel medicine and imported diseases ITM director *P.G. Janssens* and co-author *P.J. Zuidema* published *Importziekten* in 1973. In the second half of the 1970s the next director *Luc Eyckmans* started his Dutch and French language travel health booklets; due to their enormous success they were re-issued almost every year up till the early 1990s. The same positive reception was met with by the equally Dutch and French language 'practical travel guidelines' issued almost annually from 1991 till to date by *Alfons Van Gompel*. The latter also co-edited a Dutch language textbook on travel and health (2000).

A few book-type publications have also been written on behalf of the *World Health Organization*, i.e. *A guide to nutritional assessment* by *Ivan Beghin* and co-workers (1988, with translations into French and Spanish), *AIDS in Africa; a manual for physicians* by *Peter Piot* and colleagues (1992, French language edition in 1993), *Basic laboratory procedures in clinical bacteriology*, co-authored by *Piot* (1991, French language edition in 1994); *Laboratory diagnosis of sexually transmitted diseases* by *Eddy Van Dyck* and co-workers (1999, French and Spanish language editions in 2000).

The latter publications bring us to the numerous books, congress proceedings, meeting reports, journal supplements on sexually transmitted diseases in general and HIV/AIDS in particular where either *Peter Piot* or *Marie Laga* acted as author, editor, compiler, etc., to name a few: *Chlamydial infections* (1982), *AIDS and HIV infection in the tropics* (1988), *The handbook for AIDS prevention in Africa* (1990, French language edition in 1991), *Hepatitis B; a sexually transmitted disease in heterosexuals* (1990), *Reproductive tract infections* (1992), *Compendium seksueel overdraagbare aandoeningen* (1996), *Control of sexually transmitted diseases* (1996, French language edition in 1997), and *AIDS in Africa* (1991; second edition in 1997).

Most of the book-type 'primary health care' publications have been included in the earlier mentioned series *Studies in Health Services Organization & Policy* issued by ITGPress: 22 remarkable monographs from 1997 to date. A complete listing of these publications and their in extenso contents can be found on the ITM website at <http://www.itg.be>. A limited number of books with public health interest have, however, been published as separate monographs. As these do not figure on the internet, here are some of their titles: *Guide pratique de la coopération médicale* (*Jean-Pierre Unger*, 1992), *Nutrition et communication* (co-authored by *Ivan Beghin*, 1973), *Les besoins obstétricaux non couverts* (*Vincent De Brouwere & Wim Van Lerberghe*, 1998).

Another highly interesting series is constituted by the proceedings of the international colloquia organized by ITM every year since 1959 until today. They dealt with a multitude of timely subjects and were generally published as special issues or supplements to the *Annales*, but some also as independent monographs. Of these, the colloquia on *Ebola virus infections and other haemorrhagic fevers* edited by *Stefaan Pattyn* (1978), *Sexuality and pathogenicity of fungi* edited by *Raymond Vanbreuseghem* and *Charles De Vroey* (1981), *From parasitic infection to parasitic disease* edited by *Paul Gigase* and *Erik Van Marck* (1983), *Helminth zoonoses* edited by *Stanny Geerts*, *Vinai Kumar* and *Jef Brandt* (1987), seem worth mentioning as they were published by international publishing houses. In recent years colloquia proceedings have been published in house by ITGPress (e.g. *Promoting growth and development of under fives* (2002), edited by *Patrick Kolsteren* and collaborators) or as special sections of *Tropical Medicine & International Health*. A full listing of all colloquia and their mode of publication is available on the ITM website.

The magnum opus of the Belgian knowledge and achievements with respect to health and medicine in Central Africa has been compiled by honorary director *P.G. Janssens*, assisted by *M. Kivits* and *J. Vuylsteke*. Two large volumes were published in 1992 under the title *Médecine et hygiène en Afrique centrale de 1885 à nos jours*; an updated translation into English appeared in 1997 under the title *Health in Central Africa since 1885: past, present and future*. More than half of the contributions to both scholarly treatises has been written by ITM scientists showing once again the expertise ITM has accumulated over the years.

This is also clear from [table 2](#) which shows that more than 1,000 chapters have been written by ITM scientists in book-type publications (among which 84 chapters in the two *P.G. Janssens* treatises alone...). Commenting on all these chapters would lead us too far. It seems perfectly legitimate to state, however, that ITM has not only contributed substantially to the scientific literature in terms of journal papers but also with respect to the non-journal publications.

Before 1933

As there is no practical way to unambiguously identify publications of the former Brussels school of tropical medicine, a set of 221 publications (1906-1932) by a few major researchers and later ITM directors was identified. This set has no pretensions of accurately representing the literary output of the school, but allows us to give a few characteristics of these early publications. Per definition, *Alphonse Broden*, *Jérôme Rodhain* and *Albert Dubois* feature as its major authors. All but 3 of these publications were written in French. 209 (92.5%) were journal articles. In these early years, the *Annales* (35) starting only in 1920 yield first place to the older French *Bulletin de la Société de Pathologie Exotique...* (60), with *Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie...* (19) and the German *Archiv für Schiffs- und Tropenhygiene* (13) in third and fourth rank.

International recognition

Since the early 1990's ITM's publication output is continually being monitored, resulting in an annual bibliometric report produced by the librarians⁹. But ITM's published research has also been evaluated by external experts. In 2003 the *Centre for Scientific and Technology Studies (CWTS)* of the *Leiden University* made a thorough analysis of 10 years of ITM scientific publications and their international impact¹⁰, using the ISI citation databases for 1991-2000. These databases have their practical limitations in that they build on the citation practices of a selective set of about 7,000 journals, ignoring citations from journals outside this set, or from non-journal material. Nevertheless, because there exist no other comprehensive alternatives, they have been the bibliometric de facto standard for decades now.

Numbers of citations (both with and without self-citations) were counted and compared to global field and journal category averages. The analyses were carried out on several levels of aggregation: per institution (all ITM publications combined), per department, and per unit (the latter only for the years 1996-2000, due to internal restructuring). The major overall findings were that the 1,025 ITM publications thus identifiable in the citation databases were cited 10,052 times by the source publications represented in *ISI's* databases. As such "ITM publications are cited well above the level of world reference values". Various standard indicators were calculated for the whole 10-year period, and for time series of 4-year citation windows. In general and over the whole period there was an increase of output, but a decline of impact, though this continually remains above the world average. The portion of never-cited articles lowers, while self-citations increase – a logical evolution

when the number and standard of own papers increase – but on the whole do not reach an unusually high level.

Especially fields like (in order of output) infectious diseases, immunology, general medicine, virology, microbiology, veterinary sciences and dermatology received marks significantly above average. Somewhat surprising, tropical medicine and parasitology (numbers 1 and 3 in output ranking) scored below average. Regarding this matter there is always a degree of uncertainty, in that it is not the individual articles but the journals they are published in that are accorded to specific research fields, and this leaves some room for debate.

As for the different types of co-authoring, international cooperation (65% of the output) scored a high impact (1.42 times the world average), as does national cooperation (15%; 1.34), while 'ITM only' publications had far lower impact rates (20%; 0.69) possibly due to the selection of less international journals aiming at a different audience.

Also in 2003, independently from the specific ITM analysis, a major *European Community* report was published, including a chapter on bibliometric data of the European universities, research institutes and industry labs¹¹. This was also compiled by *CWTS* and based on the ISI citation databases for the years 1993-1999. Again, it featured remarkably good results for ITM. Evidently, the total number of ITM publications (702) was far lower than that of bigger institutions (i.e. not correlated to the actual manpower), but when the average impact (citation based) per publication is compared to the overall field average, ITM, with a 1.28 ratio, featured in 15th place of European universities and research institutes. As the only smaller Belgian biomedical institute listed, ITM thus ranked above all other Flemish contenders, and in a national perspective it was only preceded (narrowly) by the *Université Catholique de Louvain (UCL)* (1.30).

In the last decades ITM has clearly produced a fair number of highly cited papers. A manual search in *ISI's Web of Knowledge* revealed 131 papers published during the period 1984-2003 that by mid-2005 had been cited at least 50 times and 34 of these had been cited over 100 times, one even over 500 times. They invariably dealt with HIV/AIDS (and to a lesser extent mycobacteria/tuberculosis). It is no surprise that these 34 ITM *citation classics* were published in high impact journals such as *AIDS* (8), *The Lancet* (5), *NEJM* (5), *Journal of Virology* (4), *American Review of Respiratory Disease* (2), *Science* (2), etc. Before this 20 year period, the Belgian *Annales* (listed by *ISI* since 1976) produced at least one citation classic¹². This 1978 paper on trypanosomiasis diagnosis had received 144 citations. Interestingly, 55 of these were received during the last 5 years, so it can be said to be very much alive.

As these citation data are necessarily limited to *ISI's universe*, meaning that papers published in journals that are not in *ISI's* core collection, and citations given in such publications are not included, the actual number of citations is appreciably higher. It is also unfortunate that the usefulness of bibliometric tools like citation indexes is limited in time, so the impact of the older ITM papers cannot be measured adequately in this way.

Conclusion

It is difficult, as a conclusion, to evaluate the enormous amount of work that has gone into the investigations which led to the 7,970 publications presented here. All in all, ITM staff has proved to be fully present on the tropical and infectious diseases research scene. Several have become leading experts in their field and a number of papers have become part of the happy few which may be considered as indispensable for any investigator, newcomer or experienced researcher alike, in their respective subject areas.

Notes

1. Cronin 2001
2. Schoonbaert *et al.* 1998
3. Roelants 1987
4. Schoonbaert 2004
5. Schoonbaert & Roelants 1996
6. Schoonbaert & Roelants 1998
7. Roelants 1992
8. Roelants 1992
9. Demedts & Schoonbaert 2005
10. van Leeuwen *et al.* 2003
11. EC 2003
12. Magnus *et al.* 1978