

8. THE BIOMEDICAL LITERATURE ON CENTRAL AFRICA 1880-1991

PRELIMINARY OBSERVATIONS

The Library of the Prince Leopold Institute of Tropical Medicine in Antwerp, Belgium (IMTPL) has recently begun to store the complete biomedical literature on Central Africa (limited to Zaire, Rwanda and Burundi) in an electronic database. In fact, the scope of this endeavour is wider as it is essentially an IMTPL database, incorporating all bibliographic references to the following literature supplemented with an in-depth indexation for easy retrieval:

1. All publications issued by the staff of IMTPL, since its creation in 1906, on whatever subject or region.
2. All theses or dissertations presented at IMTPL since 1906.
3. All biomedical publications on Zaire, Rwanda and Burundi since the beginning of modern science.
4. All papers published in the journal *Annales de la Société Belge de Médecine Tropicale* since its creation in 1920.

This database has been given the name "Belgian and Central African Tropical and Geographical Medical and Veterinary Science Database", in short "BELCAT". By the end of May, 1992 more than 15,000 references have been entered.

For the purpose of this paper a subset of the database has been created including the following type of material:

1. All publications of biomedical interest realized in Zaire, Rwanda, or Burundi (including public health and hygiene, human and animal nutrition, veterinary medicine and animal husbandry, etc.).
2. All such publications with an *immediate* bearing on one of these countries.

Altogether 9,081 bibliographical references are available in this subset, namely 7,568 on Zaire, 1,570 on Rwanda and 807 on Burundi (many papers relate to more than one country). Unfortunately, not all publications on these countries have been covered as yet. Priority has been given to material readily available in the ITMA library and, generally, to the more recent

literature retrievable by electronic devices. However, it is safe to assume that more than 80% of the literature has been covered. The mere number of papers certainly allows to examine this scientific literature production more closely and to discuss a few statistical features. A comprehensive account may not be expected before a few more years have enabled the IMTPL librarians to add the remaining material which, in any case, will be of lesser importance.

Scientific literature may be arranged according to its physical form: articles (papers published in journals or serials), book-type material (textbooks, manuals, monographs, conference proceedings, pamphlets), book chapters (chapters in books or contributions to conferences), report chapters (original articles published in annual reports), theses or dissertations, abstracts (in conference proceedings), and document-type material (non published). In the BELCAT subset on Zaire, Rwanda and Burundi (henceforth called ZRB database), the distribution is as shown in Table 1, further subdivided by language.

Table 1. Form and language of publications in ZRB database

Form	Number	Language			
		French	English	Dutch	Other
Journal articles	7,199	5,750	1,268	111	70
Books	320	268	42	10	-
Book chapters	668	480	180	6	2
Report chapters	87	85	1	1	-
Theses	487	428	29	29	1
Abstracts	263	130	131	2	-
Documents	57	53	4	-	-
Total	9,081 (100%)	7,194 (79.2%)	1,655 (18.2%)	159 (1.8%)	73 (0.8%)

Before examining each of these different forms of publication it is maybe of interest to see which authors (out of a total of 6,000 in the ZRB database) have been the most prolific in terms of number of publications whatever their physical form. Table 2 (p. 236) gives a listing of the authors having published 20 or more items, together with an *indication* of their *main* areas of excellence.

Table 2. Authors in ZRB database with 20 or more publications.

272	Schwetz, J. [schistosomiasis, malacology]	32	Maertens, K. [ophthalmology]
179	Rodhain, J. [parasitology]	32	Parent, M. [paediatrics]
162	Dubois, A. [tropical pathology, leprosy]	31	Hennart, P. [nutrition, MCH]
158	Van Saceghem, R. [veterinary medicine]	31	Meheus, A. [STD]
157	Fain, A. [helminthology, entomology]	31	Thilly, C. H. [endemic goitre]
142	Van den Branden, F. [pharmacology]	31	Walravens, P. [various]
120	Vandepitte, J. [microbiology]	30	Kivits, M. [public health, endemic diseases]
118	Piot, P. [microbiology, STD, AIDS]	29	Omanga, U. [paediatrics]
102	Van Hoof, L. [various, trypanosomiasis]	28	Davachi, F. [AIDS]
101	Vanbreuseghem, R. [mycoses]	28	De Smet, M. P. [endemic goitre]
93	Jadin, J. B. [protozoology, rickettsiology]	28	Gryseels, B. [schistosomiasis]
90	Peel, E. [parasitology, entomology]	28	Radna, R. [leprosy]
90	van den Berghe, L. [various]	27	Batungwanayo, J. [AIDS]
75	Janssens, P. G. [tropical medicine]	27	Kadende, P. [various, AIDS]
73	Pattyn, S. R. [leprosy, virology]	27	Perriens, J. [AIDS]
68	Van de Perre, P. [AIDS]	26	Curran, J. W. [AIDS]
67	Van Nitsen, R. [occupational health, yaws]	26	De Maeyer, E. M. [(mal)nutrition]
63	Quinn, T. C. [AIDS]	26	Devignat, R. [plague]
58	Courtejoie, J. [health education]	26	Gillain, J. [veterinary medicine]
58	Duren, A. [endemic diseases, public health]	26	Laroche, R. [various, AIDS]
54	Broden, A. [trypanosomiasis]	25	Bequaert, J. [entomology]
53	Ryder, R. W. [AIDS]	25	Butzler, J. P. [microbiology, AIDS]
53	Vis, H. L. [(mal)nutrition]	25	Lambotte-Legrand, J. [sickle cell anaemia]
52	Bogaerts, J. [microbiology, AIDS]	25	Mattlet, G. [various]
52	Colebunders, R. L. [AIDS]	25	Pangu Kaza Asila [public health, AIDS]
52	Henrard, C. [parasitology, entomology]	25	Tobback, L. [veterinary medicine]
51	Holemans, K. [nutrition, MCH]	25	Todd, J. L. [trypanosomiasis]
51	Lepage, P. [microbiology, AIDS]	25	Vanderick, F. X. [clinical medicine]
51	Wanson, M. [entomology, helminthology]	25	Van Slype, W. [clinical medicine]
50	van Oye, E. [salmonellosis]	24	Aubry, P. [various, AIDS]
49	Gatti, F. [microbiology]	24	Browne, S. G. [clinical medicine]
49	Mortelmans, J. [veterinary medicine]	24	Courtois, G. [poliomyelitis]
49	Mouchet, R. [various, occupational health]	24	Deom, J. [veterinary medicine]
49	Rotsaert de Hertaing, I. [health education]	24	Giroud, P. [rickettsiology]
49	Taelman, H. [AIDS]	24	Lambrechts, A. [nutrition]
48	Bila Kapita, M. [AIDS]	24	Paluku Kalenga Mbudi [various, AIDS]
48	Lambotte, C. [paediatrics, sickle cell anaemia]	24	Talleyrand, D. [paediatrics]
48	Wéry, M. [malaria]	24	Van Puyvelde, L. [medicinal plants]
45	Francis, H. [AIDS]	24	Van Ros, G. [haemoglobinopathies]
44	Vincke, I. H. [malaria, vector control]	23	Brown, C. C. [AIDS]
43	Van Riel, J. [tropical hygiene, leptospirosis]	23	Gillet, J. [endemic diseases, schistosomiasis]
42	Chardome, M. [parasitology]	23	McCormick, J. B. [Ebola virus, AIDS]
42	Neujean, G. [various, trypanosomiasis]	22	Dupuy, L. [various]
38	Bourguignon, G. C. [various]	22	Elsen, P. [entomology, simuliidae]
38	Ermans, A. M. [endemic goitre]	22	Laga, M. [STD, AIDS]
37	Baumann, H. [malaria, schistosomiasis]	21	Bourdoux, P. [endemic goitre]
37	Thienpont, D. [vet. medicine, helminthology]	21	Butera, S. [public health]
35	Delville, J. P. [virology]	21	Caraël, M. [various, AIDS]
35	Lambillon, J. [obstetrics]	21	Fondu, P. [kwashiorkor]
35	Mann, J. M. [AIDS]	21	Henry, M. C. [various, onchocerciasis]
34	Delange, F. [endemic goiter]	21	Izaley Lebughe [AIDS]
34	Limbos, P. [clinical medicine]	21	Lambrecht, F. L. [entomology]
33	Barlovatz, A. [clinical medicine]	21	Ngandu Kabeya, G. [paediatrics]
33	Muyembe Tamfum, L. [microbiology, AIDS]	21	Thys, A. [pathology, cancer]
33	Trolli, G. [various]	20	Coosemans, M. H. [entomology, malaria]
32	Evens, F. [entomology, tsetse flies]	20	Jezek, Z. [monkeypox]
32	Gigase, P. L. [pathology, schistosomiasis]		

It is clear that this listing is headed by Belgian scientists who have lived most of their professional careers in Central Africa. That *Jacques Schwetz* is on top of the ranking is not surprising. Besides being a scholar in schistosomiasis and malacology he probably also had a degree in polemics. *Jérôme Rodhain* and *Albert Dubois* are the true leaders covering between them almost all aspects of tropical pathology with first-quality papers. Among these 114 authors with a rather impressive record of publications, there are eleven African nationals. In fact, there may even be more but the technical problems posed by Zairean names often made their correct identification extremely difficult.

As we shall see further on, the main subjects of investigation from the very beginning until the early eighties were trypanosomiasis, malaria, leprosy and schistosomiasis. As if these scourges were not bad news enough, AIDS has surpassed them during the last decade, as can be judged from the fact that the names of no less than twenty-six scientists primarily

involved in AIDS research do already appear in the listing of most prolific authors.

A few notorious scientists are missing from this list. They did not publish yet that many papers but the quality and originality of their studies needs to be recognized, e.g. G. Dryepondt and E. Van Campenhout (early days), L. Mottoulle (occupational health), C.C. Chesterman, D. Fountain and M. De Clerck (clinical medicine), J. Hissette and M. D'Hooghe (onchocerciasis), E. Lejeune, J.F. Ruppel and J. Burke (trypanosomiasis control), L. van Bogaert and P. Janssen (neurology), J. Vyncke (psychiatry), F. Hemeryckx, M.F. Lechat and J. Cap (leprosy), M. Jancloes and W. van Lerberghe (primary health care), Mulumba Madishala and Ngimbi Nkuku Pela (clinical and experimental parasitic diseases).

Many of the still active authors listed in Table 2 will probably object that they have published many more papers. Indeed they have. This is illustrated by Table 3 which gives the number of papers published by the 100 most prolific authors in the *complete* BELCAT database.

Table 3. 100 most prolific authors in BELCAT database ranked by number of publications

915	Fain, A.	70	Geerts, S.	47	Verhulst, A.
439	Piot, P.	69	Van Ros, G.	45	Francis, H.
335	Pattyn, S. R.	68	Elsen, P.	45	Giroud, P.
323	Vanbreuseghem, R.	67	Quinn, T. C.	45	Neujean, G.
316	Rodhain, J.	67	Van Nitsen, R.	44	Chardome, M.
302	Dubois, A.	65	van Oye, E.	44	Delville, J. P.
290	Schwetz, J.	65	Vincke, I. H.	41	Baumann, H.
235	Jadin, J. B.	64	Meheus, A.	41	Bruynoghe, R.
227	Van den Branden, F.	62	Wanson, M.	41	Ermans, A. M.
200	van der Groen, G.	61	Brandt, J.	41	Evens, F.
196	Mortelmans, J.	60	Bafort, J. M.	40	Gillet, J.
190	Janssens, P. G.	60	Laga, M.	40	Hardouin, J.
177	van den Berghe, L.	59	Duren, A.	39	Bourguignon, G. C.
163	Wéry, M.	58	Courtejoie, J.	38	Beghin, I.
161	Van Saceghem, R.	57	Kageruka, P.	38	Mann, J. M.
136	Vandepitte, J.	57	Vis, H. L.	38	Nzila Nzilambi
126	Gigase, P. L.	56	Gatti, F.	38	Peeters, M.
104	Van Hoof, L.	56	Van Balen, H.	37	De Wildeman, E.
102	Portaels, F.	55	Brodén, A.	37	Kayembe, K.
102	Taelman, H.	55	Ryder, R. W.	37	Parent, M.
98	De Vroey, C.	52	Bogaerts, J.	36	Delange, F.
98	Le Ray, D.	52	Henrard, C.	36	Ndinya-Achola, J. O.
95	Limbos, P.	52	Mouchet, R.	36	Coosemans, M. H.
93	Colebunders, R. L.	52	Plummer, F. A.	35	Lambillon, J.
92	Peel, E.	51	Holemans, K.	35	Thys, E.
91	Van Riel, J.	51	Lepage, P.	35	Van der Stuyft, P.
86	Eyckmans, L.	51	Takashio, M.	34	Desmyter, J.
81	Kumar, V.	51	Willaert, E.	34	Kivits, M.
80	De Muynck, Aimé	49	Lambotte, C.	34	Trolli, G.
79	Van Meirvenne, N.	49	Rotsaert de Hertaing, I.	33	Barlovatz, A.
77	Van Dyck, E.	48	Bila Kapita, M.	33	De Smet, M. P.
76	van Sande, M.	48	Mercenier, P.	33	Muyembe Tamfum, L.
74	Van Marck, E. A. E.	48	Swinne, D.		
73	Van de Perre, P.	47	Kestens, L.		

The number of publications produced by each author is much higher than in Table 2 as they include *all* papers irrespective of their geographical interest. It should again be stressed that all following considerations are based solely on the ZRB database,

geographically limited to Zaire, Rwanda and Burundi, and incomplete.

A distribution of the literature production (ZRB) according to the year of publication is given in Table 4.

Table 4. Publications in ZRB database arranged by year of publication

1	1880	28	1916	52	1942	90	1968
1	1885	24	1917	25	1943	48	1969
2	1887	20	1918	49	1944	160	1970
2	1892	39	1919	64	1945	49	1971
3	1894	24	1920	106	1946	60	1972
4	1895	60	1921	114	1947	95	1973
1	1896	75	1922	116	1948	61	1974
4	1897	72	1923	104	1949	93	1975
6	1898	75	1924	224	1950	58	1976
3	1899	98	1925	168	1951	89	1977
7	1900	69	1926	181	1952	93	1978
6	1901	93	1927	157	1953	96	1979
4	1902	77	1928	186	1954	73	1980
11	1903	88	1929	175	1955	90	1981
22	1904	149	1930	190	1956	176	1982
16	1905	103	1931	209	1957	179	1983
26	1906	92	1932	214	1958	202	1984
16	1907	112	1933	177	1959	180	1985
21	1908	127	1934	159	1960	210	1986
17	1909	107	1935	90	1961	223	1987
26	1910	93	1936	81	1962	306	1988
30	1911	126	1937	72	1963	269	1989
36	1912	117	1938	74	1964	317	1990
22	1913	96	1939	56	1965	272	1991
26	1914	71	1940	54	1966	27	1992
30	1915	37	1941	61	1967		

The pre-1920's are, understandably, rather short of publications, as is the World War II period. Zaire independence is followed by two whole decennia (the sixties and seventies) of reduced activity due to the prevailing difficult working conditions. During this same period, however, African national medical doctors took the relief devoting themselves primarily to cosmopolitan clinical science. Belgian scientists, especially at IMTPL, remained very much involved in tropical medicine research but more so in the fields of basic and applied laboratory research, training and follow-up, and short-term field expertise, also broadening their geographical scope of interest. The eighties and early nineties show an explosion of publications, partly as a result of the devastating AIDS epidemic.

Scientific investigation needs an appropriate and fast means of publication in order to communicate its results to the general public and to the scientific community in particular. Since the foundation of the *Journal des Sçavans* in Paris in 1665, journals have always been the vehicle of choice for publication in the

biomedical field. The 7,199 articles included in the ZRB database have been published in 694 journals, which is 694 different journal *titles*. As many journals experienced title changes during their lifetime, essentially the same journals but with all their different titles are, for the sake of convenience, grouped together in Table 5 (p. 239), which gives a rank-order listing of the journals and serials in which 10 or more articles have been published.

The *Annales de la Société Belge de Médecine Tropicale*, created in 1920 on the initiative of Alphonse Broden, is by far the most solicited title. Although of course many more papers have appeared in all other journals combined, the *Annales* may reasonably be identified with Belgian tropical medical science. Before its creation most studies by the pioneering medical doctors in Central Africa were published in domestic Belgian journals and, when they became available, in the French *Bulletin de la Société de Pathologie Exotique* or, to a lesser extent, in the German *Archiv für Schiffs- und Tropenhygiene*.

Table 5. Journal titles ranked by frequency of occurrence in ZRB database

2296	Annales de la Société Belge de Médecine Tropicale Annales de la Société Belge de Médecine Tropicale, de Parasitologie et de Mycologie
485	Bulletin Agricole du Congo Bulletin Agricole du Congo Belge Bulletin Agricole du Congo Belge et du Ruanda-Urundi
337	Bulletin de la Société de Pathologie Exotique et de ses Filiales Bulletins de la Société de Pathologie Exotique et de sa Filiale de l'Ouest Africain Bulletins de la Société de Pathologie Exotique et de ses Filiales de l'Ouest Africain et de Madagascar
208	Revue Médicale Rwandaise
200	Bulletin des Séances. Académie Royale des Sciences Coloniales Bulletin des Séances. Académie Royale des Sciences d'Outre-Mer Bulletin des Séances. Institut Royal Colonial Belge
193	Bulletin Médical du Katanga
128	Médecine d'Afrique Noire
128	Mémoires. Académie Royale des Sciences Coloniales. Classe des Sciences Naturelles et Médicales Mémoires. Académie Royale des Sciences d'Outre-Mer. Classe des Sciences Naturelles et Médicales Mémoires. Institut Royal Colonial Belge. Section des Sciences Naturelles et Médicales
125	Njanja Médical
122	Afrique Médicale
116	Aide Médicale aux Missions
111	Transactions of the Royal Society of Tropical Medicine and Hygiene
84	Publications de l'Université de l'Etat à Elisabethville Publications de l'Université Officielle du Congo à Elisabethville Publications de l'Université Officielle du Congo à Lubumbashi
83	Recueil de Travaux de Sciences Médicales au Congo Belge
82	Lancet
80	Bruxelles Médical
75	Bulletin du Centre d'Etude des Problèmes Sociaux Indigènes Bulletin Trimestriel du Centre d'Etude des Problèmes Sociaux Indigènes Problèmes Sociaux Congolais Problèmes Sociaux Zaïrois
74	Revue de Zoologie Africaine Revue de Zoologie et de Botanique Africaines Revue Zoologique Africaine
58	Bulletin de l'Académie Royale de Médecine de Belgique Bulletin et Mémoires de l'Académie Royale de Médecine de Belgique
57	Servir
52	Documenta de Medicina Geographica et Tropica Tropical and Geographical Medicine
47	Bulletin de l'Organisation Mondiale de la Santé Bulletin of the World Health Organization
42	AIDS
40	Médecine Tropicale
38	American Journal of Tropical Medicine American Journal of Tropical Medicine and Hygiene
37	Bulletin d'Information de l'Institut National pour l'Etude Agronomique du Congo (INEAC) Bulletin d'Information de l'Institut National pour l'Etude Agronomique du Congo Belge (INEAC)
36	Congo
34	Bulletin de la Société d'Etudes Coloniales
33	Annales. Musée Royal de l'Afrique Centrale. Série in-8°. Sciences Zoologiques Annales. Musée Royal du Congo Belge. Série in-8°. Sciences Zoologiques
33	Annales de Parasitologie Humaine et Comparée
33	Archiv für Schiffs- und Tropenhygiene

- 31 Journal of Tropical Medicine
Journal of Tropical Medicine and Hygiene
- 29 Annals of Tropical Medicine and Parasitology
- 27 Revue d'Élevage et de Médecine Vétérinaire des Pays Tropicaux
- 26 Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie
Comptes Rendus Hebdomadaires des Séances et Mémoires de la Société de Biologie et de ses Filiales
- 24 Journal of Tropical Pediatrics
Journal of Tropical Pediatrics and African Child Health
Journal of Tropical Pediatrics and Environmental Child Health
- 23 New England Journal of Medicine
- 23 Revue Médicale de Liège
- 22 Acta Tuberculosea Belgica
Acta Tuberculosea et Pneumologica Belgica
Revue Belge de la Tuberculose
- 22 Relevé Épidémiologique Hebdomadaire
Weekly Epidemiological Record
- 22 Social Science and Medicine
- 20 Journal of Infectious Diseases
- 20 Louvain Médical
Revue Médicale de Louvain
- 19 Folia Scientifica Africae Centralis
- 19 British Medical Journal
- 17 Acta Tropica
- 17 Tropenmedizin und Parasitologie
Tropical Medicine and Parasitology
Zeitschrift für Tropenmedizin und Parasitologie
- 16 Missions Belges de la Compagnie de Jésus
- 16 Leprosy Review
- 16 Odontostomatologie Tropicale
Tropical Dental Journal
- 16 Rivista di Malariologia
- 15 East African Medical Journal
Kenya and East African Medical Journal
Kenya Medical Journal
- 15 Journal of the American Medical Association
- 15 Tropical Doctor
- 13 Bulletin de l'Office International d'Hygiène Publique
Bulletin Mensuel de l'Office International d'Hygiène Publique
- 13 Lovania
- 13 Revista Medica de Angola
- 13 Revue Coloniale Belge
- 12 Bulletin d'Information sur la Lèpre
- 12 Journal of Ethnopharmacology
- 12 Rivista di Parassitologia
- 11 American Journal of Clinical Nutrition
- 11 Archives Médicales Belges
- 11 Etudes Rwandaises
- 11 Journal of Clinical Endocrinology and Metabolism
- 11 Missions des Pères Blancs
- 11 Revue de l'Université de Lubumbashi à Lubumbashi. Série B. Sciences
Revue de l'Université Nationale du Zaïre. Campus de Lubumbashi. Série B. Sciences
- 11 Verhandelingen. Koninklijke Academie voor Geneeskunde van België
Verhandelingen. Koninklijke Vlaamse Academie voor Geneeskunde van België
- 10 Journal de Gynécologie, Obstétrique et Biologie de la Reproduction
- 10 Presse Médicale
- 10 Zaïre

What the *Annales* meant for medicine, the *Bulletin Agricole* meant for agriculture, veterinary science and animal husbandry. In contrast to the *Annales*, this journal ceased publication after Zaire's independence and only recently (1983) a successor has been founded by the name of *Tropicultura*.

A word of praise should also be given to the *Bulletin des séances* and, especially, the *Mémoires* of the *Académie Royale des Sciences d'Outre-Mer* (formerly *Institut Royal Colonial Belge*) in which many epoch-making papers have been published.

The main medical journals published in Central Africa itself are the *Bulletin Médical du Katanga*, *Njanja Médical*, *Recueil de Travaux de Sciences Médicales au Congo Belge* (during the war), and the *Revue Médicale Rwandaise*, the only one still surviving and doing well. In Zaire, several attempts have been made to launch a national medical journal, but they all aborted after varying periods of time. Maybe there is no need for such a journal as *Médecine d'Afrique Noire* and *Afrique Médicale* seem to be adequate media of communication for French-speaking African doctors.

In the same order of opinion and in view of the present scatter of publications on tropical medicine and public health on the European scene, the creation should seriously be considered of an *International (European) Journal of Tropical Medicine*, capable of competing with the dominating American and British journals.

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Although indexation is not quite completed and is also in need of further refining and standardization, some general conclusions may be drawn with respect to the main subject areas covered by the publications included in the ZRB database. Infectious diseases and their modes of transmission have always been, of course, prime research targets. Table 6 shows the distribution of publications (whatever their form) on infectious diseases arranged according to their causative agents, and vectors.

No one will be surprised that the study of protozoal diseases was first priority. The majority of these studies dealt with the human and animal trypanosomiasis and their causative agents and another significant number of the entomology section dealt with their vectors, the tsetse flies. Malaria was a close second and should nowadays probably be first if it were not for AIDS and HIV.

Detailed analysis of the figures mentioned in Table 6 is not very rewarding as conclusions can barely be drawn

Table 6. Distribution of publications on infectious diseases their agent and vector, highlighted by ZRB database

Protozoology & protozoal diseases		1,726 (19.0%)
Trypanosomiasis	918	
Malaria	640	
Amoebiasis	85	
Theileriasis	61	
Blackwater fever	39	
...		
Helminthology & helminthic diseases		748 (8.2%)
Schistosomiasis	270	
Onchocerciasis	127	
Filariasis	110	
Ankylostomiasis	49	
Dipetalonemiasis	34	
Ascariasis	28	
...		
Bacteriology & bacterial diseases		1,464 (16.1%)
Tuberculosis	343	
Leprosy	331	
Yaws	121	
Salmonellosis	105	
Shigellosis	71	
Tropical phagedenic ulcer	59	
Relapsing fever	57	
Gonorrhoea	51	
Plague	50	
Brucellosis	29	
...		
Virology & viral diseases		1,106 (12.2%)
HIV & AIDS	608	
Rickettsial diseases	78	
Typhus	44	
Measles	66	
Smallpox	47	
Yellow fever	47	
Poliomyelitis	45	
Rinderpest	44	
Hepatitis	40	
Ebola virus disease	32	
Rabies	27	
...		
Mycology & mycoses		229 (2.5%)
Dermatophytoses	45	
Cryptococcosis	45	
Histoplasmosis	45	
Candidiasis	22	
...		
Entomology		538 (5.9%)
Tsetse flies	185	
Mosquitoes	166	
Aedes	17	
Anopheles	120	
Culex	30	
Simuliidae	62	
Ticks	62	
...		
Malacology		115 (1.3%)

from figures alone. Some papers give only scarce information on the subject(s) covered, others are state-of-the-art masterpieces. It is the overall picture that matters.

In Table 7 an attempt is made to give some quantified information on the main subjects covered by the publications included in the ZRB database. The same word of caution as above should be kept in mind when viewing the data.

Table 7. Number of papers on main subjects and topics of investigation highlighted by ZRB database

	Subjects	Topics
Biochemistry	113	
Food & nutrition	776	
Malnutrition		259
Demography	233	
Family planning		62
(In)fertility		84
Public health & hygiene	718	
Mother & child health		95
Occupational health		112
Clinical medicine	1,033	
Traditional medicine	149	
Laboratory & experimental medicine	842	
Haematology	218	
Sickle cell anaemia		104
Cardiology	84	
Neurology & psychiatry	197	
Ophthalmology	142	
Oto-rhino-laryngology	40	
Respiratory system	94	
Gastroenterology	272	
Oncology	256	
Endocrinology	165	
Dermatology	257	
Urology	35	
Infectiology & infectious agents	4,898	
Sexually transmitted diseases		804
Gynaecology & obstetrics	374	
Paediatrics	743	
Surgery	252	
Stomatology & dentistry		70
Veterinary science	712	
Animal husbandry	291	

The figures for most medical specialties in this listing are really underestimates. It is in practice almost unfeasible to assign to each disease all index terms necessary to classify them in every possible specialty, for example leprosy may be included in infectiology, dermatology, neurology, orthopaedics, osteology, oto-rhino-laryngol-

ogy, paediatrics, surgery, etc. Again, this table has no other purpose than to conveniently bring together a number of data, which otherwise would be hard to retrieve.

It is at this stage equally hazardous to try and classify the publications included in the ZRB database according to their subject *approaches*. Yet, such a preliminary rough listing is presented in Table 8. Fair warning should be given that expert (re)indexation may more or less alter the picture. One should also consider that many publications experience a multitude of approaches to their subject, and that others are too general or too brief to allow for adequate indexing.

Table 8. Main approaches highlighted by ZRB database

History	209
Biography	98
Classification, taxonomy	92
Surveys, distribution	606
Epidemiology	587
Transmission	311
Diagnosis	252
Radiography	60
Pathology	148
Immunology	221
Serology	117
Treatment, chemotherapy	1,074
Surgery	252
Mortality	256
Control & prevention	594
Vaccination	195
Health education	86
Legislation	26
Training, education	96
Review	176

* *
* *

We have seen that journals played a major role in the dissemination of information on biomedical research in Central Africa. Book production has never been high. There are, however, a few books which have had considerable impact on medical practice, research and education.

They are more or less presented in chronological order of publication: P. DUTRIEUX: *Souvenirs d'une exploration médicale dans l'Afrique intertropicale (1885)* and C. MENSE: *Résumé de l'état sanitaire de Léopoldville (1888)* gave important early descriptions of diseases prevailing in the tropics, G. DRYEPOND: *Guide pratique hygiénique et médical des voyageurs au Congo (1895)* was the first travel hygiene handbook *avant-la-lettre* and knew several editions,

A. POSKIN: *L'Afrique équatoriale: climatologie, nosologie, hygiène* (1897) was the first textbook of geographical (tropical) medicine and hygiene.

These were followed by more "modern" publications, e.g. H. VANDERYST: *Notions élémentaires concernant les maladies tropicales* (1920), an extremely popular manual with a second edition in 1929, R. MOUCHET and A. PEARSON: *L'hygiène pratique des camps de travailleurs noirs en Afrique tropicale* (1922), a handbook of occupational health (English edition in 1923), followed by a more elaborate version R. MOUCHET and R. VAN NITSEN: *La main-d'oeuvre indigène au Congo; les problèmes qu'elle évoque* in 1940, E. HEGH: *Les tsé-tsés* (1929), a monumental monograph, which had been preceded by a smaller booklet, published in London in 1918, under the title *Comment nos planteurs et nos colons peuvent-ils se protéger contre les moustiques qui transmettent des maladies* and followed, in 1946, by an updated but shorter manual *Les tsé-tsés; description, biologie, moyens de destruction*.

The first really practical manual for daily use was C.C. CHESTERMAN's *African dispensary handbook* (1932), published during the same year in French *Manuel du dispensaire africain* and knowing several reeditions, the title ultimately being changed into *Tropical dispensary handbook*. Two years later R. VAN NITSEN & J. DUWEZ: *Traitement et prophylaxie des maladies des pays chauds* appeared, followed in 1939 by H. GILLET & A. DUREN: *Notions élémentaires d'hygiène coloniale* (new edition by M. KIVITS in 1957 the title of course having been changed into *hygiène ... tropicale*). Also in 1939 A. DUBOIS published his *La lèpre; diagnostic, traitement, prophylaxie*, with an updated and enlarged edition in 1955.

A. DUBOIS & L. VAN DEN BERGHE: *Les maladies des pays chauds* (1948), was and still is an outstanding well-illustrated textbook of tropical diseases. During the same year an English translation appeared in the USA under the title *Diseases of the warm climates*. It is very much to be regretted that this clinical bible has never been updated. It was only supplemented, in 1951, by a manual for medical assistants and nursing personnel by A. DUBOIS: *Maladies et syndromes importants dans la pratique médicale congolaise*.

M. KIVITS & W. VANDERYST published in 1958 the *Code de législation sanitaire du Congo belge et du Ruanda-Urundi*. Also in 1958 appeared the student's bestseller *Hygiène tropicale* by J. VAN RIEL followed, due to its success, by a new edition in 1965 under the title *Santé publique tropicale*.

The *Bureau d'Etudes et de Recherches pour la Promotion de la Santé*, created in 1963 in Kangu-Mayombe (Zaire) under the leadership of J. Courtejoie, published numerous books, pamphlets and educational

material for nursing personnel and teaching staff in French-speaking Africa.

With respect to animal diseases E. MEULEMAN: *Rapport sur les maladies tropicales des animaux domestiques* (1907) took the lead, later followed by L. Tobback: *Les maladies du bétail du Congo belge* (1933 and 1951). Several books and booklets were published on tropical animal husbandry.

In 1982 the treatise *Santé et maladies au Rwanda* by A. MEHEUS *et al.* introduced the era of reviewing what has been done, what do we know and what needs to be done in particular geographical regions. On a more general scale, a retrospective view was provided by the *Livre blanc* of ARSOM in 1962 (*Apport scientifique de la Belgique au développement de l'Afrique centrale*) and, on a more specific scale, by the FBEI publication in 1964, *A work of co-operation in development; fifteen years' operation of the Native Welfare Fund in the Congo, Rwanda and Burundi*.

Reports of medical missions and expeditions include the already mentioned *Dutrieux* and *Mense* expeditions, the *du Bourg de Bozas Exploration* (1901-1902), the *Dutton-Todd Expedition of the Liverpool School of Tropical Medicine* (1903-1905), the *Rodhain-Pons-Vandenbranden-Bequaert Mission Scientifique du Katanga* (1910-1912), the *Harvard African Expedition to the African Republic of Liberia and the Belgian Congo* (1926-1927), and the *Mission "Benoit" de Zoologie Médicale au Maniema* (1959). Still fresh in mind is the dramatic mission to Yangambi (Zaire) for studying the outbreak of *Ebola Virus Hemorrhagic Fever* (1976). In 1977 a colloquium on the subject was organized by S.R. Pattyn at the Antwerp Institute of Tropical Medicine, the proceedings of which were published a year later.

The first conference of any significance was held in 1898 in Brussels. It presented, at the occasion of the "Congrès National d'Hygiène et de Climatologie Médicale de la Belgique et du Congo", a *Rapport sur le climat, la constitution du sol et l'hygiène de l'Etat Indépendant du Congo*. Main contributors were A. Bourguignon, J. Cornet, G. Dryepondt, C. Firket, A. Lancaster and E. Meuleman.

Local medical conferences were held in 1950 (*Congrès scientifique, Elisabethville, Volumes IV and V*), in 1954 (*Journées médicales de Léopoldville*), in 1955 (*Conférence interafricaine sur la coopération médicale, Léopoldville [CCTA]*), in 1957 (*Symposium sur les maladies à virus en Afrique centrale, Stanleyville*), in 1958 (*Désordres mentaux et santé mentale en Afrique au sud du Sahara, Bukavu [CCTA]*), in 1958 (*Colloque sur l'histopathologie de la lèpre, Léopoldville*), and in 1959 (*Colloque sur la tuberculose, Léopoldville*).

FOMETRO organized several colloquia in Gisenyi (Rwanda) on *Protection maternelle et infantile* (1965), *Alimentation et nutrition* (1966), and *Education sanitaire* (1968). Other conferences include the *Colloque sur la nutrition et la santé de l'enfant en Afrique, Kinshasa 1967* (CIE), the *Colloque international médico-social, Gisenyi 1973*, the colloquium on *Santé et communauté au Zaïre, Kinshasa 1975*, the workshop on *Santé et médicaments, Kigali 1982*, and, finally, the *Cinquième conférence internationale sur le SIDA en Afrique, Kinshasa 1990*.

The famous international colloquia organized each year, since 1959 until today, by the Antwerp Institute of Tropical Medicine assembled experts from all over the world. They dealt with a multitude of timely subjects and were published as special issues of the *Annales* or as independent monographs.

When reviewing the biomedical literature on Central Africa, particularly Zaire, no one should overlook the extreme importance of the reports issued by government health services, benevolent organizations, institutions, laboratories, industrial bodies, religious missions, etc. Their impact cannot be overemphasized.

The *Rapports annuels (1925-1958)* published by the *Direction Générale des Services Médicaux du Congo belge* were invaluable mines of information, as were the *Rapports annuels des Services Médicaux du Ruanda-Urundi (1957-1960)*. Their quality and usefulness could only be matched by the *Rapports annuels (1931-1964)* of the *Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge (FOREAMI)*.

Other reports of considerable interest were published by the *Croix-Rouge du Congo*, the *Fonds du Bien-Etre Indigène (FBEI)*, the *Fondation Père Damien pour la Lutte contre la Lèpre au Congo Belge et au Ruanda-Urundi (FOPERDA)*, the *Centre Médical de l'Université Libre de Bruxelles en Afrique Centrale (CEMUBAC)*, the *Fondation Médicale de l'Université de Louvain pour l'Afrique Centrale (FOMULAC)*, the *Institut pour l'Encouragement de la Recherche Scientifique en Afrique Centrale (IRSAC)*, the *Institut National pour l'Etude Agronomique au Congo Belge (INEAC)*, the *Comité Spécial du Katanga (CSK)* and the *Comité Spécial du Kivu*.

Reports of laboratories knew an early start. The *Rapports sur les travaux du Laboratoire Médical de Léopoldville (1899-1908)* became real classics. This same laboratory and many others, the *Laboratoire Médical de Stanleyville* in particular, have always lived up to the standards set by the illustrious pioneers

G. Dryepondt, E. Van Campenhout, A. Broden and J. Rodhain at the beginning of this century.

Among the industrial firms especially the *Union Minière du Haut-Katanga*, the *Société des Mines d'Or de Kilo-Moto* and the *Compagnie Minière des Grands Lacs Africains* published informative reports on the health and well-being of their employees.

To finish this summary of report literature, the coordinating role played by the *Bureau Permanent Inter-africain de la Tsé-Tsé et de la Trypanosomiase (BPITT)*, with its headquarters in Kinshasa, should be recalled. On a smaller, national, but still challenging scale its aims have been continued until today by the *Bureau Central de la Trypanosomiase*.

An era has been closed thirty years ago. Science, however, cannot be stopped in its development by political events or boundaries, nor can human solidarity, compassion or an uneasy sense of responsibility. The ravages the "traditional" tropical diseases still bring about, the dreadful AIDS curse we witness today in many parts of Africa, the unacceptable nutritional deficiencies and diarrhoeal infections in children, are all the justification that is needed to continue and intensify scientific investigation. African doctors and scientists should not be left alone in their unequal struggle. A combination of efforts worldwide is more imperative than ever. The merits of the achievements of the past should be evaluated in their proper context and the good things kept in mind for future action. A prerequisite for this is to know what these achievements are, by whom they were described and where they were published. That was the sole purpose of this contribution and of the BELCAT/ZRB databases in particular.

N.B. After the preparation of this chapter the BELCAT database has been continuously completed and updated. It now contains more than 20,304 records. The ZRB subset includes 12,029 records, of which, 9,831 relate to Zaire, 2,211 to Rwanda, and 1,128 to Burundi (November 1, 1994).

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