
30 THE DEVELOPMENT OF SCIENCE COMMUNICATION IN THE CARIBBEAN - A BRIEF SURVEY

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In this paper we intend to examine, in outline, the growth of traditions of science within the Caribbean and the ways in which they allowed of a wider dissemination of ideas and research findings. This survey is not intended, given the limited time in its preparation, to deal with the Spanish speaking Caribbean, although it is most likely that many of the generalisations could be extended to this area.

1. Systematic scientific activity is not something new to the Caribbean. This activity has, in essence, taken five major forms, viz. that of the individual, private indigenous institutions, private metropolitan institutions, and official metropolitan and local agencies.
 - a. Individual research needs no major attention. From its very early history, the Caribbean has been a stimulus and a challenge to the individual researcher, to the curious traveller and naturalist. It offered an abundance of raw material for the anthropologist, the linguist and the zoologist. From Pelleprat in the 17th century to Schumann in the 18th, Brinton in the 19th and Goeje in the 20th century we see merely the glimpses of a massive and vigorous tradition of scientific linguistic observation and theory; from the writings of D'Aublet, Descourtilz, Richard Schomburgk and Charles Chubb we see only a few indications of the massive work in natural history. Anthropology carries no less important names. Yet, in a sense, this tradition does not need much said about it. It was largely the work of interested travellers, explorers, resident missionaries and the occasional resident learned researcher. Occasionally some of the findings were widely published, but a great deal of this work, particularly in linguistics and anthropology, would end up in obscure journals, or in unpublished archives of some learned society. In recent years the private researcher has depended usually on the financial backing of a university or related institution - and frequently he is a doctoral student using the Caribbean as the raw data for some academic scientific research.
 - b. The work of indigenous institutions has to be seen as emerging at two levels, viz. out of the curiosity of individuals who live in a new territory, and out of the major economic interests of those territories. In the British Caribbean one sees the growing phenomenon in the early 19th century of the growth of a number of local

societies, some for entertainment, some for cultural research, some for natural history studies, and others for agricultural research. The classic example of a society with the latter three functions is the Royal Agricultural and Commercial Society of Guyana. It was initially controlled by the planter interests and was fundamentally designed to stimulate discussion and research into the problems of drainage, improved sugar technology, and needed agricultural diversification. In the late 19th century this society sponsored a regular journal which produced some of the most systematic agricultural and related research of the period. The other example is the growth in the latter 19th century of British West Indies medical associations as branches of the British Medical Associations. Here we have largely expatriate doctors presented with a challenge of varied tropical diseases and finding it personally necessary to adapt their training to the new circumstances. This burst of medical activity can be seen in the context of an even longer tradition of vigorous medical research generated in the West Indies, including the work of Rotscheid, Landre, Blair, Beauperthuy and Hillis covering the broad field of epidemiology. Yet the point about curiosity needs to be modified. Medical research is of the oldest order in the Caribbean, going back in origins substantially to the 17th century. At one level it was necessary for the survival of European planters, and, perhaps not surprisingly even more so for the survival of slaves who represented, per person, major economic investments. K.O. Laurence, in referring to Guyana and Trinidad, shows the connexion between the development of medical services and the demands of organised East Indian immigration. It is worth noting that the membership of both the Royal Agricultural and Commercial Society and the British Guiana Medical Association, was taken almost totally from the economic and political elite of the society.

- c. The third level of activity (i.e. by private metropolitan agencies) is a wide and varied field. At one simple level, planter interests, as represented in the 'mother countries', found it necessary to encourage research, usually in agriculture, in the Caribbean. An early example of this is the late 18th century effort to sponsor the transfer of food plants, particularly the breadfruit, to the West Indies. The visiting expert, as representative of the 'company' or 'corporation' is still a visible part of the scene today in the 20th century, and with the diversification of economic interests in the Caribbean (the discovery of bauxite is a good example) his research takes on dimensions other than in agriculture. Even in the 19th century the United States consuls were sending back systematic data on the economic resources of the Caribbean territories. Private research institutions abroad, some out of a need for pure research, and others out of philanthropic motives have played their role, but this level of research is a relatively recent one. In the first category one could place the Smithsonian Institute; and in the second, the Rockefeller Foundation activities in malaria and filaria research early this century, and recently the activities of various branches of UNESCO.

- d. The fourth level of research sponsored by colonial governments themselves has a long history, and the intensity and emphasis correlates largely with the state of industrial development and the dominant concepts of colonialism in the metropolitan areas. In essence this research has been practical, covering largely the fields of cartography, hydrology, meteorology, forestry, geology, and civil engineering. It is not difficult to see why these emphases should exist. The French in the 18th century were particularly interested in the potential of tropical woods in Guyana for improving their naval power, and the British saw forestry reserves in Guyana as of immense value to themselves. Scientific cartography was essential for a naval role and for realising the potential of colonies. The Dutch and the British became aware in the 19th century of the immense potential of the Guianas, and more particularly of their gold resources. The Caribbean as a source for raw material has never disappeared as a stimulus for scientific research, but in the 19th century new types of colonial relationships started to emerge. This development is a complex one in its own right, involving, in the case of the British Government, new attitudes to slaves and later to an emancipated population, - attitudes which themselves help to explain the growth of Crown Colony government in the Caribbean. By the end of the 19th century we find this concept of colonialism informing the types of apparently disinterested research into problems of health, nutrition, and agriculture. We see it in the development of the Imperial College of Tropical Agriculture, and in the substantial research of J.B. Harrison in Guyana early in the 20th century. In the case of the Dutch the research is earlier and even more systematic. Like that of France it is more centrally organised. Latterly, both France and Holland had closer political relationships with their Caribbean territories and this closeness of relationship partly explains the detailed manner in which scientific data was and is gathered in these territories. Martinique and Guadeloupe, for example, have largely outstripped the Caribbean in the organisation of their agricultural documentation and research programmes.
- e. It is easy to see how this concern of metropolitan countries should inform the scientific activities undertaken by the various government departments of colonial territories. In the post-war era with the movements toward various forms of internal self-government we see a major transfer of this activity. Nevertheless even though the control of research is in the hands of the particular territories, the activity is not indigenous. In most cases the visiting expert or team does the research and makes the recommendations.
- f. The final stage comes with a relative state of independence, when these Caribbean territories are now forced to come to terms with their own problems of economic development, and the particular need to transfer technology and research methods to their own circumstances.

They are faced with a problem of, essentially, starting a new tradition. To some extent the growth of an indigenous tradition begins with the founding of the U.W.I., and its development into a serious centre for research. Yet, with the partial exception of its medical faculty, this institution does not fully come into the area of contribution to science and technology, as distinct from the humanities and social sciences, until recent years.

Problems of Communication

2. The last point about the need for starting a tradition is significant. If we are correct in pointing out the existence of a relatively rich set of scientific traditions in the Caribbean, why does it seem that each newly independent territory presently appears as if it is discovering the idea of science and its relevance? Why is it that even now our schools cannot produce a sufficient number of science-based workers? Why is it that the Caribbean researcher frequently has to seek so much information relevant to his work in foreign institutions? Or, conversely, why do so many present-day researchers seem to be unaware of the information, relevant to their research, in foreign institutions, or even nearby in the Spanish-speaking territories and Brazil? Why does one frequently find the only copy of an important research paper on, say Guyana, in Britain? The questions are many and complex, and answering them would involve reference to attitudes that emerge with colonialism, to the major Caribbean debate in the 19th and 20th centuries on education, etc. Yet, many of these questions have their answer in the ways in which communication processes operated in relation to the various traditions of scientific activity we have identified.
 - a. At a general level one cannot separate both the technology of communication and the levels of communication from the political and economic context in which these have an existence. In relation to the first it is easy to understand that countries which have recently emerged from a colonial past will not have the sophisticated techniques of communication. Yet, communication does not depend on complicated technologies, and it is this belief, part of the mental detritus of the colonial experience which, historically, explains many of the failures in the dissemination of scientific and other data at the Caribbean level. One only has to think of the number of books written in the Caribbean which are published in America or Britain not because local publishers are not available, or because they could get greater sales, but because there is the belief that greater prestige accrues to the user of the more sophisticated printing technology.
 - b. Levels of communication for our purposes can be either horizontal (i.e. from territory to territory, or from researcher to researcher within a particular territory) and vertical (i.e. from researcher to user). That there

should be very little communication of research within the various language speaking areas should not be difficult to understand granted the exclusive nature of the 'mother-country' - colony relationship and the very fact of language difference. It is interesting that the one grouping within the Caribbean which has managed to overcome this has been the Dutch one - and that is simply the consequence of a transplanted metropolitan Dutch concept of education which, because of the limited international use of Dutch as a language emphasised the thorough learning of other languages. Equally understandable is the failure of inter-regional communication within the British Caribbean, if one realises, by comparison, that at one time the very mail from some of these territories had to pass through London before reaching an adjacent territory. The first major attempt to develop an inter-Caribbean scientific transfer of information is probably in the establishment of the Imperial College of Tropical Agriculture, and later, in the 40's, of the Caribbean Research Council as an arm of the Caribbean Commission. That the latter failed is no more surprising than that the political federation collapsed in 1962.

- c. In very recent years several attempts have been made to encourage the establishment of inter-Caribbean documentation centres, and to connect the Caribbean with the invaluable data banks of North America and Europe. As yet, with the possible exception of agriculture, no system has evolved which makes relevant scientific research in Brazil, Venezuela and Colombia easily accessible to the territories of the Caribbean. These attempts have not been largely successful because the fact is that the creation of inter-Caribbean mechanisms for information transfer depends on the creation of intra-territorial information policies and systems. Only some Caribbean territories have started to take this step - Jamaica being a good example. This, naturally, leads us to ask why it was that library and information services were and are being neglected in the British Caribbean. Only now are we beginning to see that libraries have more than the amorphous 'cultural' or 'entertainment' functions of the public libraries, and that such organisation of information cannot be left to Carnegie's charity.
- d. There are many historical reasons which might be offered to explain this. The first is the very nature of the colonial experience which led the colonial administrations to be concerned with the 'dispensing' of information rather than the 'communication' of it, and in due course, bred an attitude of mind which disposes us to believe that scientific information is something that one always gets, like motorcars and the definitions of words, from 'abroad'. It is the attitude of mind that allows us to pay little attention, in financial terms, to our archives because 'the originals would be preserved abroad' - or makes our researchers inclined to deposit the first copies of their research in foreign libraries before considering making a copy available in the country of the research.

- e. The other historical reasons relating to the failure in wider communication of scientific information have to do with the very nature of the type of research undertaken by the agencies we have identified in the first half of this paper. The older private researcher has never, as a rule, been concerned with the dissemination of his work at a local level. It usually was sent to a foreign academic journal and, to a large extent, lost in its pages. And, in recent years, if one looks at the number of doctoral theses developed on and in the Caribbean and the attendant difficulties for local institutions to acquire these, then one sees that the principle has not been varied. More acutely disconcerting is the fact that the researchers are not always too anxious to communicate the nature of their research whilst it is ongoing, presumably for fear of being cut out by academic bandits. What this means is that quite a bit of duplication takes place. Still, even this is understandable if one sees it in the context of a series of values which stress the value of research (publish or perish etc.) for the individual's advancement as distinct from its social role.
- f. Much can be said about the inhibiting communication factors in relation to the research stemming from private indigenous institutions in the Caribbean. Yet, these institutions did manage in many cases to establish broader bases of communication of their research. The journal Timehri of the Royal Agricultural and Commercial Society (if we may use this example again) was easily obtainable and widely distributed in the 19th century, and, quite amazingly, when one considers the relevant social interests of its members, this body did attempt seriously after 1890 to promote the public dissemination of knowledge by a series of well-organised public lectures. Added to this, much of the scientific work was promoted through a series of participations in international exhibitions. The first major European studies on the medicinal barks of Guyana were promoted by the preliminary surveys and samples forwarded to the various international exhibitions of the 19th century. The medical associations of the British Caribbean managed to generate a public forum for the discussion of new dimensions in tropical research, through journals and lectures.
- g. In respect of the work of private metropolitan agencies it is difficult to generalise about approaches to communication of research when these institutions are of the philanthropic variety. Much of the failure in communication here is more a consequence of accident than design. A good example of this is the immense work recently done by the United Nations of relevance to the Caribbean. The lack of access to this is not a failure on the part of the United Nations, but a failure within the Caribbean to exploit the vast data available. Private economic institutions, however, are a different matter. Next to official government agencies, this grouping has been responsible for the largest output, but almost all of the research in this category has had special economic

motives - and, given the nature of the economic competition, it is perfectly intelligible why, say, the important hydro-electric survey organised by Alcan in Guyana should not be readily accessible, or subsequently even known to the persons responsible for the present hydro-electric planning in the Mazaruni. Understanding failures in communication in relation to the activities of both metropolitan and local official agencies is crucial to the answering of many of the questions generated earlier. It is important here to realise that very little of this research is theoretical in outlook and function. It is invariably given an impetus by a need or problem which, in turn, inevitably has political import. At an early stage we can easily see why the Dutch would not be prepared to make their discoveries or innovations in relation to drainage or fortification readily accessible, or why the massive French research in the 18th and 19th centuries into forestry potential should be restricted. Even with modifications in an exploitative and competitive concept of colonialism which takes place in the later 19th century and this century, this restriction on material still applies, partly because the colonial administration cannot separate the political sensitivity of policies from the types of scientific research which relates to those policies. Here we are perhaps also pointing to the major inhibiting factor in the dissemination of scientific research in the non-Spanish speaking Caribbean and largely in the British Caribbean. The politically autonomous Caribbean territories of the late fifties and sixties inherited this legacy of concealment and official classification. A new drainage system of agricultural project was (and still is) seen as a project which made or broke the image of the administration of the day - a feasibility study which is not implemented is the subject of criticism on the grounds that the very research represents a waste of money and time. When one considers that the major part of scientific research in these territories is sponsored by such indigenous official agencies, that government departments have overlapping interests and varying portfolios, and that no proper methods for classification or declassification have, in most cases, been worked out, then one understands that these territories have no effective way of ensuring that research is not duplicated.

- h. The university libraries of the Caribbean are still frantically seeking to acquire much of this important material, (some of it no longer possibly sensitive) usually locked away in the worm-eaten cupboards of some administrator. In the extreme situation, when one is referring to the type of research which emerged in only ten numbered copies, it frequently is the case that one is confronted with the total disappearance of the research. What this means is that the Caribbean territories, in no way unique in this respect, have inherited and developed a tradition of secrecy, and it needs no elaboration to show that such a tradition conflicts with the very basic canon of scientific activity viz. the need for publicity, criticism and discussion.

- i. Much of what has been said above about communication relates to the question of publishing. From the development in the Caribbean of vibrant publishing traditions in the 19th century to the emergence of the present day mimeograph tradition we see one constant strand (with the exception indicated earlier), i.e. that the audiences were intended to be limited. Perhaps it could be argued that this is so because of the very complex nature of scientific work, but the explanation probably lies more in the social function of information and in the power, social or political, that comes from the control of knowledge. The sociology of publishing should not detain us, except for throwing some quick light on the question of the vertical aspect of communication of scientific data. With some notable exceptions, it is only recently that the Caribbean territories have seen it necessary to be concerned with the transmission of ideas from the research paper to the level of understanding which the practical farmer or technician will have. In all of this the immediate potential of wireless (to give only one example) in a tradition which has been largely oral has still to be realised.

In this paper we have been attempting a brief survey of both the historical development of scientific activities and the attendant problems of communication without attempting a definition of the science. There is a sense in which science, if it is seen as a systematic and organised, publicly accessible and testable set of views about the world, is more than statistics and test-tubes. What this means is that within the oral West Indian tradition to which we have referred, people have accumulated a body of knowledge which they have tested over the years. Such a body of knowledge covers, as examples, both the ecological understandings of the Amerindian peoples, and the vast ethno-medical data of the 'ordinary' people. In this sense if communication at the vertical level were a two-way process, then quite a bit of orthodox research might have been unnecessary, short-circuited as fruitless, or redirected into feasible areas. This two-way understanding has never fully emerged in the Caribbean.

In **summary**, the Caribbean has not been the scientifically sterile place that it has been pictured to be. Various traditions of research have developed in the past; but in most cases they all developed patterns for the dissemination of ideas and data which served the purposes and needs of groups outside of the territory. Ours, today, is a task, not necessarily of recapturing those traditions as they functioned, but of learning how to structure our new scientific work to escape the limitations of them. It is also one of recovering some of the invaluable data, to which we referred earlier, generated within those traditions. Did the planners, during the feasibility studies for the clay works along the Demerara river, know that maps exist which locate the claybrick sites found to be most useful to the Dutch? Are the geologists aware of the 1796 map that locates the area of a pitch deposit in the Pomeroon area and silver mines along the Essequibo, or are we presently aware of the technology involved in modifying

Dutch wind-mills and water-mills to the New World situation?
The historical information might not be useful, but we cannot
afford to ignore it.

Sample list of Serial Publications in Science published in
the Caribbean

Pre 1900

Agricultural record. vol. 1-4, 1889-1891. Port-of-Spain.
Central Agricultural Board.

Agricultural journal of British Guiana. vol. 1-10, 1928-1939.
Georgetown. Dept. of Agriculture.
Supersedes Journal of the Board of Agriculture of British
Guiana.

Agricultural journal of the Leeward Islands. 1894-1895. St.
Johns. Agricultural & Commercial Society of the Leeward
Islands.

Barbados agricultural gazette & planters journal. vol. 7-20,
1885-1896. Bridgetown. Barbados General Agricultural
Society.

Bulletin of miscellaneous information, Trinidad. 1888; 1897
-1908. Trinidad. Department of Agriculture. Botanical Dept.

Bulletin of the Botanical Dept. Jamaica. nos. 1-50. 1887-1894.
Jamaica. Department of Agriculture.

Journal of the Agricultural Society of Trinidad and Tobago.
vol. 51, 1951. Port-of-Spain. Agricultural Society of
Trinidad and Tobago.
Formerly Proceedings of the Agricultural Society of
Trinidad and Tobago.

Journal of the Institute of Jamaica. vol. 2, 1899. Kingston.
Institute of Jamaica.

Journal of the Jamaica Agricultural Society. vol. 1, 1897.
Kingston, Jamaica Agricultural Society.

Proceedings of the Agricultural Society of Trinidad and
Tobago. vol. 1-50, 1894-1950. Port-of-Spain. Agricultural
Society of Trinidad and Tobago.

Timehri: the Journal of the Royal Agricultural and Commercial
Society of British Guiana. vol 1, 1882. Georgetown. Royal
Agricultural and Commercial Society of British Guiana.

West Indian bulletin. vol 1-19, 1899-1922. Barbados and
London. Imperial Dept of Agriculture for the West Indies.

Pre 1945

Agricultural experimental. vol 3, No. 3, 1943. Rio Piedras. Universidad de Puerto Rico. Estacion Experimental Agricola.

Agricultural bulletin (Bermuda). vol. 2, 1922. Bermuda. Department of Agriculture.

Agricultural journal of Barbados. vol 1, 1932. Barbados. Department of Science and Agriculture

Agricultural news. vol. 1, 1902-1922. Barbados. Imperial Department of Agriculture for the West Indies.

Bulletin of the Department of Agriculture. Jamaica. vol 1, 1903-1915. Kingston. Department of Agriculture. Formerly Bulletin of the Botanical Department. Jamaica.

Agricultural notes (Trinidad and Tobago). vol. 1-4, 1930-1933. Port-of-Spain. Department of Agriculture.

Bulletin Agricole. New series. vol.1, 1930. Fort de France. Service de l'Agriculture. Formerly Bulletin Agricole de la Martinique.

Bulletin of the Department of Agriculture. Trinidad and Tobago. vol. 9-21, 1909-1927. Trinidad. Department of Agriculture. Bulletin.

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Caribbean medical journal. vol 1- , 1939. Port-of-Spain. Trinidad and Tobago Medical Association.

Farm journal of British Guiana. vol. 1, 1936. Georgetown. Department of Agriculture. Superseded by the Farm Journal of Guyana.

Horticultural journal. vol. 1, No. 2, 1940. Trinidad. Horticultural Club of Trinidad and Tobago.

JAST quarterly. vol. 1-10. 1937-1947. Jamaica Association of Sugar Technologists. Superseded by JAST Journal.

Journal of Agriculture of the University of Puerto Rico. vol. 18, 1934. Puerto Rico. Agricultural Experiment Station. Formerly Journal of the Department of Agriculture. P.R.

Journal of the Barbados Museum and Historical Society. vol. 1, 1933. Bridgetown. The Society.

Journal of the British Guiana Board of Agriculture. vol 1, 1908. Georgetown. Board of Agriculture.

Journal of the British Honduras Agricultural Society. Vol. 1,

1935. Belize. British Honduras Agricultural Society.

Natural history notes. vol. 1, 1941. Kingston. Natural History Society.

Revue agricole: organe du service de l'Agriculture de la Guadeloupe et dependances. Annees 1-3, 1926-1928. Basse-Terre. Service de l'Agriculture.

Ste Madeleine quarterly review. no. 1, 1921. Trinidad Ste Madeleine Sugar Co. Ltd.

Tropical agriculture. vol. 1, 1924. Trinidad. ICTA.

West Indies fruit and vegetable bulletin. vol. 1, 1935. Trinidad. Imperial College of Tropical Agriculture.

Pre 1960

The Advocate - incorporating the Agricultural Advocate. col. 1, No. 1, 1951. Kingston.

Bulletin. Fisheries Division. B.G. Department of Agriculture. 1958.

Bulletin de la societe Francaise d'histoire naturelle des Antilles. no. 1, 1952. Fort de France. Societe Francaise d'Histoire Naturelle de Antilles.

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Journal of the Geological Society of Jamaica. vol 10, 1969. Jamaica. The Society.

Journal of the Trinidad field naturalists club. vol 1, 1956 Trinidad. Field Naturalists Club.

The Peasant. vol. 1, 1957. Trinidad. Federation of Agriculture. Cooperative Societies Ltd., becomes Federation of Agricultural Fishing and other Coop Socs. of Trinidad and Tobago, Ltd.

Revue agricole sucriere et rhumiere des Antilles Francaises. vol. 1, 1956. Guadeloupe. Centres techniques de la Canne et du sucre de la Guadeloupe et de la Martinique.

Rice review. vol. 3, 1961. Georgetown, B.G. British Guiana Rice Producers Association.

Science notes and news. No. 17, 1960. Mona. Jamaica.
UCWI. Assn of Science Teachers of Jamaica.

Shell agricultural newsletter. No. 7, 1958. P.O.S. Shell
Trinidad Ltd.

De Surinaamse Landbouw. vol. 1, No. 2, 1953. Paramaribo.
Department van Landbouw.

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Cane Farmers Association, Inc.

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Caribbean conservation news. vol 1, 1976. Barbados.
Caribbean Conversation Association.

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of the Virgin Islands, U.S.

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Society of Medical Lab technologists. Pathology Department
U.W.I. Mona. Jamaica.

Caribbean journal of science. vol. 1, 1960. P.R. Univer-
sity of Puerto Rico. Mayaguez.

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1970-76. Caribbean Met Institute. Husbands, St. James
Barbados.

Car. Monthly bulletin. 1966. Puerto Rico. Institute of
Caribbean Studies. University of Puerto Rico.

Guyana journal of science. vol. 1, 1972. University of
Guyana. Department of Biology.

Journal of the Association of Professional Engineers of
Trinidad and Tobago. vol. 1, 1960. Port-of-Spain. The
Association.

Journal of the Geological Society of Jamaica. vol. 1, circa
1960. Jamaica. The Society.

Journal of the Scientific Research Council of Jamaica. vol.

1, 1970. Jamaica. The Scientific Research Council.

Medi-news. vol. 1, 1974. Trinidad. Trinidad and Tobago. Medical Association.

Les nouvelles maraicheres et vivrieres de l'inra aux Antilles. vol, 1, 1971. Guadeloupe. Institut National de la Recherche Agronomique.

West Indian journal of engineering. vol. 1, 1968. Trinidad. U.W.I. Faculty of Engineering.

Winban news. vol. 1, 1965. Windward Islands. Banana Growers Association Ltd.