WHO
International Reference Centre
for
Community Water Supply

June 1976

The Hague, The Netherlands

Sixth Annual Report 1974

Nw. Havenstraat 6, Voorburg (The Hague)
The Netherlands

Postal Address:
P.O. Box 140, Leidschendam, The Netherlands

WHO INTERNATIONAL REFERENCE CENTRE
FOR
COMMUNITY WATER SUPPLY

SIXTH ANNUAL REPORT
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CONTENTS

1. INTRODUCTION

In many respects the year 1974 has acted as a bridge between the preceding period and the year 1975. Following on from the activities of 1973 considerable energy has been devoted to aspects concerning internal organization. In the year under review intensive deliberations concerning the increase of the budget and the staffing of IRC were successfully concluded. Furthermore the discussions about the establishment of a foundation IRC were continued and now also with a view to the discussions concerning future financial participation by international organizations in the IRC.

Much preparatory work has been carried out in relation to project planning, an activity which has steadily become more prominent in the IRC programme. It is gratifying to find that this has led to the financing of projects by external organizations. Thus it was agreed that the Netherlands Ministry of Foreign Affairs would finance the project on slow sand filtration, which has accelerated the development of this project. New projects including a study on standpipes for developing countries (in cooperation with the World Bank), a project on appropriate techniques adapted to the situation in developing countries with the University of Oklahoma (U. S. A.), and the organization of a meeting of experts in January 1975 concerning the health aspects of the direct and indirect re-use of waste water for human consumption.

In addition the the reception of a number of prominent visitors for discussions of future development and programmes, it was also possible to pursue an active policy related to the improvement of the functioning of the network of collaborating institutions by means of visits to Africa and the Far East.

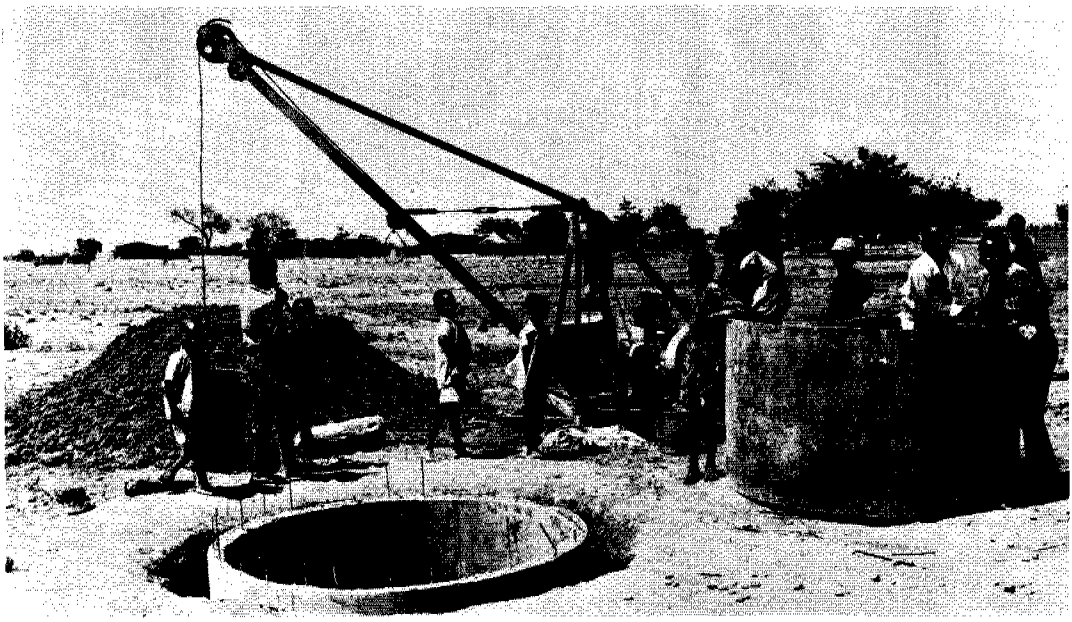
Notably in the international context, the activities in 1974 have once more contributed considerably to strengthening further the position of the IRC. Moreover, there are signs of an increasing expertise in the IRC particularly concerning water problems in developing countries. This expertise has led to an increasingly large number of calls on the centre

ot pump in operation

by international organizations as well as experts and workers in many fields of activity.

Just as formerly, much thought has been given to the aspect of the general provision of services such as the publication of newsletters, the handling of requests for information and the reception of foreign visitors. On a number of occasions the IRC also took part in meetings of experts.

It can be said that, in cooperation with the WHO, it was again possible to give more substance in 1974 to the aims of the IRC which are directed towards the solution of global water supply problems, by promoting research, carrying out development projects and demonstrations for developing areas, the transfer and exchange of technical and scientific information and the initiation and guidance of training programmes. Owing to the lack of specialized personnel, only little attention could be given to the latter aspect. Receptivity of existing problems and of cooperation on an international level, as well as its tenacity in pursuing a policy directed toward effective "follow-up" have, this year, resulted in the IRC assuming a promising role amongst organisations working on water supply problems throughout the world.



Cement casings for a dug well

2. ORGANIZATIONAL MATTERS

The IRC

It is a matter of satisfaction that in 1974 the long cherished wish concerning the IRC budget was fulfilled. In 1974 this budget was in the order of Dfl. 400,000; commencing in 1975, however, through an increase in the amount made available by the Ministry of Public Health and Environmental Hygiene, and through participation of the Ministry of Foreign Affairs (within the framework of the Netherlands Foreign Aid programme), a budget of some Dfl. 1,000,000 will stand to the credit of IRC.

Discussions also took place concerning a number of new staff posts in the IRC made possible by the increase in the budget. In principle, agreement was reached on the composition and the number of the staff. In 1975 the aim will be to form a staff of 10 people comprising a manager, four engineers, two information experts and three administrative personnel. A start has been made with the selection of potential candidates. In 1974 the staff comprised only a manager, two engineers and one administrative staff member. In the course of the year it was possible to engage an additional project engineer with the assistance of the Ministry of Foreign Affairs for the slow sand filtration project being financed by this Ministry.

The deliberations concerning the Foundation IRC were continued and a decision thereon is expected in the course of 1975. In the year under review it became clear that operational freedom was not the only argument in favour of the organizational change but also the possibility for foreign organizations to participate financially in the IRC will be influenced hereby to a high degree.

Unfortunately an offer from an English organization could not be accepted on account of the status of the IRC. It should, however, be mentioned that initial discussions were held concerning the role of the IRC in an international 5 year programme directed to water supply and sanitation problems in rural areas of developing countries. The initiative was taken

by seven international organizations, namely: The United Nations Children's Fund (UNICEF), The United Nations Development Programme (UNDP), The United Nations Environment Programme (UNEP), The International Bank for Reconstruction and Development (World Bank, IBRD), The World Health Organization (WHO), The Organization of Economic Cooperation and Development (OECD) and The International Development Research Centre (IDRC of Canada). At the invitation of the WHO, the Director and Manager of the IRC took part in the discussions concerning the programme. A delegation from the "Institutions Panel" of this Group, who visited the organizations, which may be requested to implement the agreed programme in various parts of the world also visited the IRC. Discussions at present are thus directed toward an international coordinating role of the IRC on the basis of the already existing network of centres and institutions. The possibilities of achieving substantial increase in staff and budget of the IRC by contributions from outside are now being investigated by the organizers. This is conditional on the form the IRC takes.

The WHO and the network of regional centres and collaborating institutions

It was possible to evaluate the IRC programme through various travels in 1974. IRC personnel made two visits to a total of 16 countries in Africa and the Far East. In Africa the following countries were visited: Ghana, Upper Volta, Niger, Nigeria, Cameroon, Gabon, Congo, Zaire, Kenya, Ethiopia, and Sudan. This journey also includeda visit to Turkey. In Ghana, Kenya and Sudan discussions were held with various persons and institutions, concerning the slow sand filtration project, to determine the correct choice of field investigations. In Kenya and Ghana particularly, this has already been started in cooperation within the scope of this project. In Kenya, an epidemiological investigation relating to the use of water coupled to the project has been planned to be carried out in cooperation with the Medical Research Centre, a department of the Royal Netherlands Tropical Institute in Amsterdam. In Upper Volta contacts were made with a future regional centre at Ouagadougou; this matter was also discussed in Kenya. In Nigeria (and Turkey) as well as in Ghana and Kenya visits to collaborating institutions were coupled with field investigations to determine support for the choice of future IRC programmes. Orientation

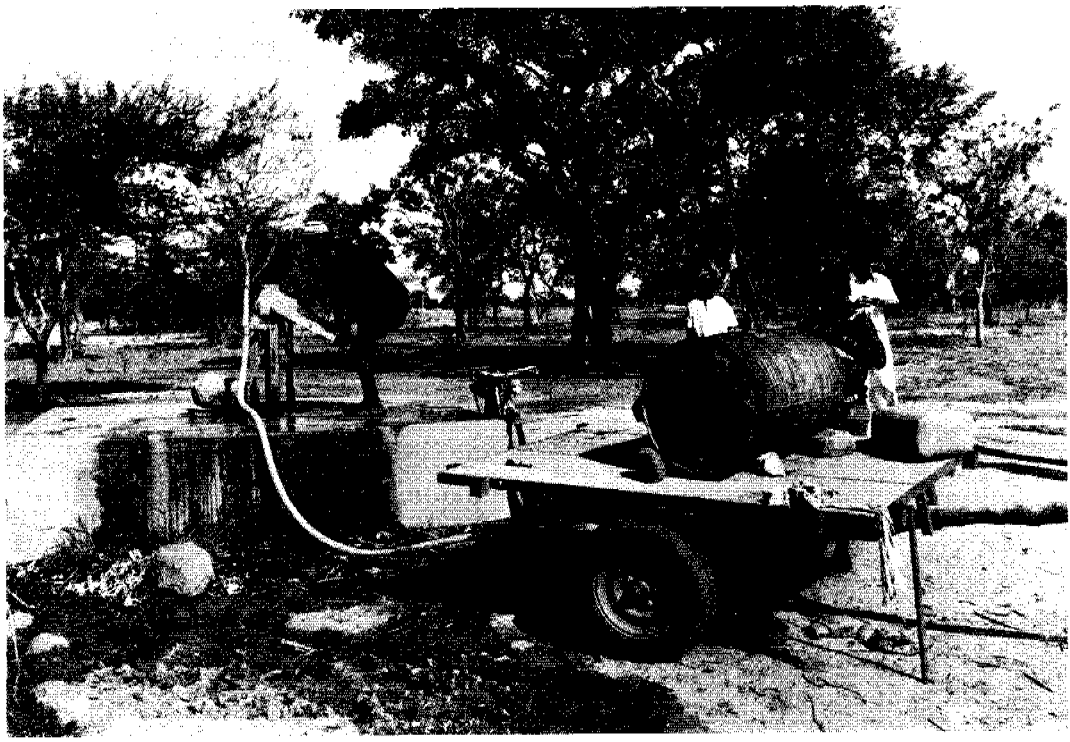
visits were also organized to the Sahel area. Another visit was made to the Regional Office of WHO at Brazzaville (Congo) to discuss the exchange of information previously arranged. A subject which was also raised in most countries, was the development of bilateral relations between Water Supply Companies in the Netherlands and those in Africa ("Twinning"). In all countries a wealth of experience was gained which, for the proper functioning of the IRC, should be considered as indispensable. Numerous contacts were also made with institutions and persons in the field of activity concerned as well as with Government departments and the various Netherlands Embassies.

The journey to the Far East included: Pakistan, India, Thailand, and Indonesia. In these countries as well, contacts were made concerning the execution of the work on the slow sand filtration project referred to above. In Thailand it was possible to commence research work immediately. In India preparatory consultations were concluded. In Pakistan deliberations took place concerning a study which could be included in the framework of a preliminary investigation of the project; whilst in Indonesia, it was arranged for contacts to be maintained regarding an existing initiative of a similar nature. In India, a workshop was attended at the Regional Centre at Nagpur on the subject of "Information Management", where the need for an improved exchange of information between research institutes and engineers was stressed. At this meeting a report on "Information Systems for the Initiation of a Program for the Supply of Drinking Water and the Disposal of Waste Water" was discussed. The IRC contributed a working document and a publication about "Twinning".

In New Delhi, the regional adviser for environmental hygiene of the World Health Organizaton showed great interest in the IRC. Reference was made to the possibility of cooperation within the scope of regional projects. Before extensive consultation took place with the World Health Organization in particular, a discussion ensued concerning improved regional and national representation from within the network and a better choice of institutes. There was regular consultion about the programmes being carried out by the IRC. In April, October, November and December visits were made to the WHO, partly for the purpose of participating in technical-

scientific meetings, some of which dealt with "information systems". Return visits took place in February, October and December.

Cooperation with the International Water Supply Association has grown steadily. At the Brighton Congress a paper entitled "Training through cooperation - a case for the developed world" was presented to the session of the Steering Committee for Developing Countries, and at the same time there was active participation in sessions and meetings of the Education and Training Committee. In April a preparatory meeting in Zurich was attended.



Water vendor laying his supply

3. PROJECT AND STUDIES

Slow Sand Filtration for developing countries

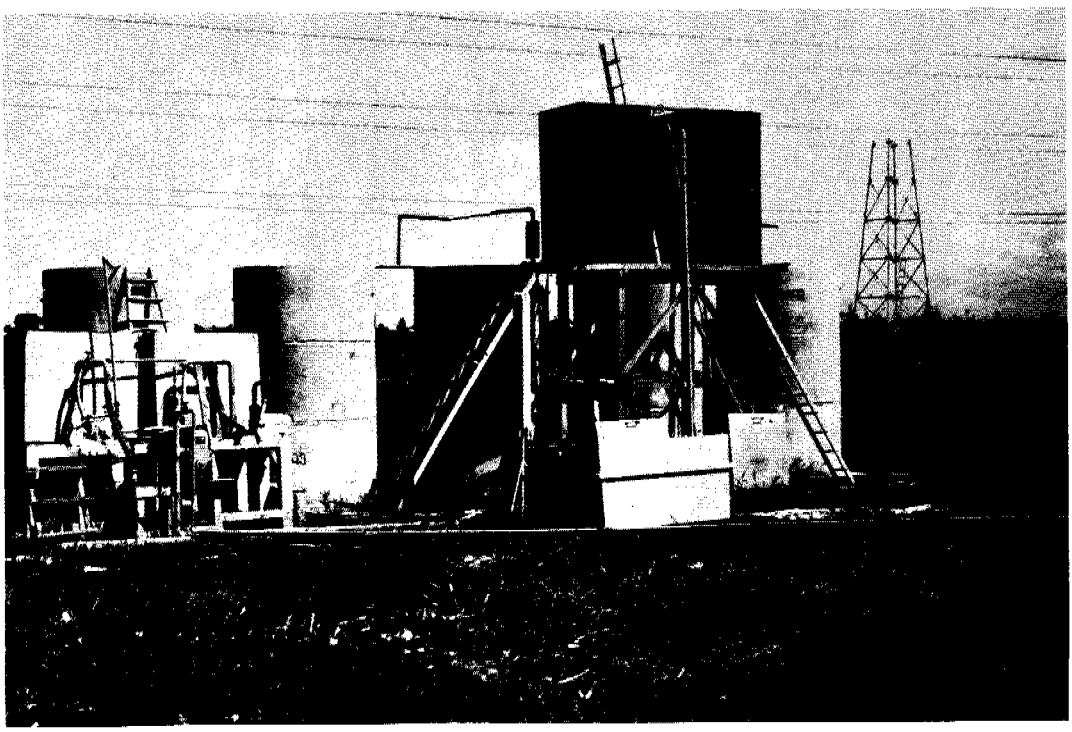
Slow sand filtration is a simple, efficient and reliable method of purifying drinking water. The process is most appropriate for application in developing countries. It can contribute essentially to a good water supply which is one of the prerequisites of an acceptable standard of living anda satisfactory level of public health.

The objective of the project on slow sand filtration is to promote the use of slow sand filtration for the preparation of drinking water in developing countries. For this purpose design criteria suitable for tropical and sub-tropical conditions have to be developed.

The project is divided into two phases. The first phase includes preparatory pilot experiments, literature studies and investigations at existing plants. Various local circumstances, such as high temperatures, periodic high levels of suspended matter content and specific chemical and bacteriological contamination of the river water may have an unfavourable effect on the filtration process. For this reason, preparatory research is concentrated mainly on the prevention of abundant algal growth and on the development of an adequate pre-treatment system which would reduce the level of turbidity in raw water.

In the second phase, research will be continued at some full-scale village pilot plants. These installations will be taken over later on by the local population. As more use is made of locally available labour and indigenous materials for the construction of such plants they will be more readily accepted. During this phase training courses and seminars will also be held to teach and to encourage the use of this purification process.

During the past year a careful selection was made of countries and institutions which, in mutual cooperation, can carry out the various investigations within the framework of this demonstration project, the work being coordinated by IRC. As many different climatic zones as



Experimental village filtration plant (Thailand)

possible were incorporated into the programme. It is essential that the actual research be carried out in the developing countries themselves. Several fact-finding visits were made to the relevant regions in Africa and Asia. Study trips were also made to Belgium (Municipal Water Supply in Ypres), Germany (on the occasion of the annual meeting of the DVGW in Duisburg) and England (Metropolitan Water Board). A full-time project leader has been appointed to ensure the effective coordination of all aspects of the project. The financing of the project has also been arranged: the International Technical Assistance Department of the Ministry of Foreign Affairs has incorporated the project into the Dutch programme for development cooperation.

Backing of an entirely different nature is provided by the WHO publication "Slow Sand Filtration", compiled by Professor L. Huisman and W. E. Wood, the purpose of which is to foster a better understanding of the technical, physical and bacteriological aspects of the slow sand filtration process.

Increased interest from the scientific section and from the international organizations is being manifested in this demonstration project. In particular, the seven international organizations referred to earlier have expressed great interest in view of their combined efforts to improve the water supply situation in the rural areas of developing countries.

The slow sand filtration project is at present in the early stages. The various proposals of the collaborating institutions have been incorporated into an overall programme and investigations have already been started or are about to start in Brasil, Ghana, India, Kenya, Pakistan, Sudan, Thailand and Turkey.

The establishment of an adequate exchange of information also constitutes an integral part of this international demonstration project, the duration of which has been tentatively set at three years.

Queue at a public standpost

Public Hydrants for developing countries

A study on the use of public hydrants in developing countries which will be financed mainly by the World Bank, was recently started after preliminary discussions had been held on the subject. Water supply by means of public hydrants is accepted in many developing countries as a current solution for meeting consumer requirements because often neither the funds nor the technical manpower are available to establish complete national supply systems to private dwellings at present or to keep these systems in operation.

The purpose of the study is to inventorize technical systems which are being used in various parts of the world and to study methods for the operation and maintenance of such systems.

The scattered data available is being collected from literature studies by correspondence and during visits to a number of developing countries and will be published later. Most of the field investigations are being carried out by the firm of engineering consultants, IWACO (Rotterdam) and the responsibility for coordination and the further collection of data lies with the IRC. The Royal Tropical Institute will make its contribution in the form of two sociological studies. A literature study was started during the year under review and the consultants completed the first visit to West Africa. An interim report was drafted based on the information thus gathered. The study is expected to be completed in July 1975 and will be reported in the IRC series.

Appropriate Technologies

In cooperation with Professor E. W. Mood of Yale University, New Haven, Connecticut, U. S. A., an evaluation programme for a "hypochlorite feeder" was prepared at the Department of Water of the Agricultural University in Wageningen, the Netherlands, for which equipment was made available by an American company. The device works with a column of Ca-hypochlorite tablets along the bottom of which a certain amount of water passes, which is in a constant ratio to the main stream.

The study which was completed in the year under review and summarized in the report "Investigation of simple drinking water disinfection methods" demonstrated that no reproducible result could be obtained with the feeder, and recommendations were made for its improvement. The same apparatus was also tested in the field and reports were received from Dr. W.J. Schäfer, WHO Sanitary Chemist, Tripoli, Libya and from V.J. Emmanuel, WHO Sanitary Engineer, Consultant, Bangalore, India. The field studies also indicated a lack of reproducibility in the dosing.

A study is being undertaken by Professor G. W. Reid of the University of Oklahoma, U. S. A. with financial backing from the U. S. Agency for International Development, the aim being to develop a model with which the most appropriate solutions for water and waste water processes can be given, using data on the community (such as socio-economic aspects, local resources, financial means available, manpower, demographic data and materials available). Data will be collected for this model and some 20 research projects in various developing countries will give supplementary information on possible processes.

The IRC will collect information from world-wide sources on "Practical solutions in drinking water supply and waste water disposal". The information received will be collated and evaluated and will be studied by a working group to be set up in 1975.

Surveillance of the quality of drinking water

The WHO has initiated a study, the purpose of which is to publish a guide on the surveillance of the quality of drinking water. The IRC contribution was a review of the consultant's draft report. The IRC project on this subject is in course of preparation.

Re-use of water

After prior consultation with the World Health Organization and a number of research workers in various countries, preparations were made for an international meeting on the health aspects of the re-use of waste water for human consumption to be held in Amsterdam from 13 to 16 January 1975.

The scientific contributions were provided by the chemical-bacteriological department of the Netherlands Institute for Water Supply. Twenty specialists from 13 countries agreed to attend the meeting. Several international organizations such as EEC, the WHO and the Pan-American Health Organization will be represented. The Netherlands will be represented by delegates from the Ministry of Public Health and Research (RIV) and the Testing and Research Institute of the Netherlands Water Undertakings KIWA. The aim of the meeting will be to report on the present world situation regarding the re-use of waste water for the preparation of drinking water, to investigate the lack of knowledge concerning related health aspects, to establish priorities in the research required and to research agreement on ways of intensifying and accelerating research work. The meeting will precede and contribute to a similar meeting at national level to be organized by the Environmental Protection Agency of the United States in March 1975. The IRC will publish the results of the meeting in 1975.

Friendly chat at a public supply

4. TRAINING

Twinning

The initiative taken by the IRC with reference to the "twinning" system was revealed by means of a paper on the subject presented on the occasion of the Congress of the International Water Supply Association held in Brighton (Great Britain). In this context, "twinning" is a bilateral relationship built up between two water supply organizations, one in the Netherlands and one in a developing country. The aim of this relationship is to bring about a system of training for employees of the organization in the developing country by arranging for them to be sent to the Netherlands because of the facilities available in this country and by follow-up instruction given by a (Netherlands) "instructor" in the developing country. At the same time advice can be given, for example, operation problems of the supply organization in the developing country. Considerable interest has been shown in this initiative in the Netherlands. Contacts with developing countries, particularly in Africa are now being looked into, verbally and by correspondence.

Study programmes for foreign visitors

As in previous years, a number of visitors were received from abroad for whom, in many cases, study programmes were organized.

In addition two lectures were given to visiting representatives of the Netherlands Universities Foundation for International Cooperation.

A lecture on unconventional drinking water supply methods in Latin America was given to a Dutch audience by Professor de Azevedo Netto of the University of Sao Paulo.

5. INFORMATION AND DOCUMENTATION

Newsletter

This year the Newsletter was distributed on a wide scale in English, French and Spanish (2,500, 2,300 and 2,000 copies respectively). In principle it will remain a paper containing short news items drawing the attention of investigators, engineers and technicians working in the water supply sector to new developments, publications and meeting which are directly or indirectly related to drinking water supply.

The newsletter meets a need felt particularly by "Field engineers" and in developing countries where literature is scarce. The newsletter has led to an increased number of inquiries from Latin American on sources of information and literature.

Requests for Information

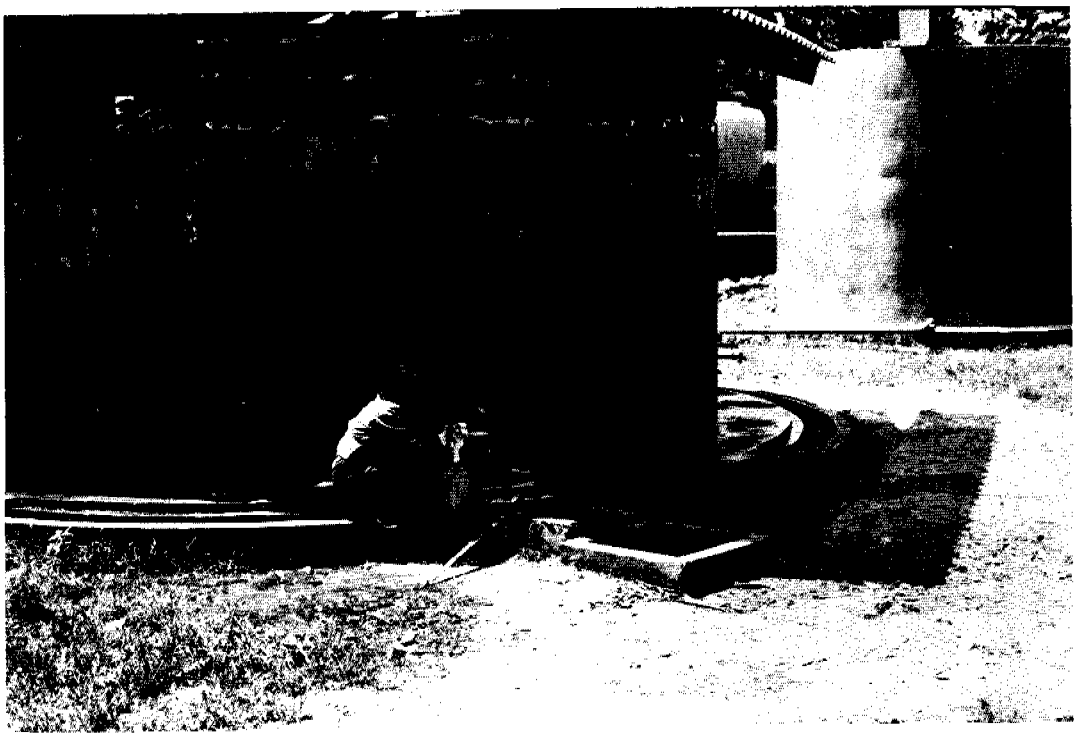
Subjects on which information was given in 1976 include:

- the relation between the quality of water and cardiovascular diseases.
- rapid filtration.
- desalination of salt water and brackish water.
- parameters for water quality.
- parameters for waste water.
- internal diseases caused by viruses, bacteria and other organisms in water.
- fluoride level in water and its effect on plant growth.
- experience in and studies on running water and clean water storage and the bacteriological quality of water.
- experiments on sulphite removal.

In addition, an extensive correspondence was conducted on a variety of subject. In all 3,000 postal items were sent and received.

Advice and miscellaneous

When the WHO asked for comments on an article regarding the use of E.coli as a health indicator, the assistance of specialists from Collaborating



Daily core near a storage reservoir

Institutions was requested. Reactions have been received from Denmark and England.

The WHO and a representative of a portable filter installation were advised on the possibilities of utilizing the installation after tests has been carried out in the Netherlands.

On behalf of Aquatech,an exhibition on water supply and waste water, an audio-visual presentation with slides was arranged and a number of panels were made.

A request was received from the United States to participate in a meeting of the American Society of Testing Materials on indicators of potential hazards for health.

In November, the IRC attened a WHO meeting of experts on information systems for planning and education relating to water supply and waste water treatment programmes. At the request of the WHO, a follow-up seminar will be organized by the IRC on this subject in 1975.

Library and Documentation

Additions to the library included material on the developing countries and reports on drinking water supply which are generally not easily obtainable. The preliminary work for building up a documentation system was continued.

VISITORS

Country/Name	Organization	Subject
Australia		
Mr. J.C. Killick	Engineering and Water Supply Department, Adelaide	Re-use of waste water
Brazil		
Prof. J.M. de Azevedo Netto	Ad Hoc Working Group in which 7 international organizations participate	International programme on rural water supply and sanitation
Federal Republic of Germany		
Dr. W. Willicks	Battelle Institute e.V. Frankfurt a.M.	Possible cooperation
Great-Britain		
Dr. E. Windle-Taylor	Pinegrove End, London	Slow sand filtration
Hungary		
Mr. L. Bukai Mr. L. Markó	N. Transdanubian District Water Authority, Gyor	Introduction to IRC
India		
Prof. N. Majumder	National Environmental Engineering Research Institute, Nagpur	Collaboration within the network; functioning of NEERI as Regional Reference Centre
Dr. Rao	National Environmental Engineering Research Institute, Nagpur	Introduction to IRC
Indonesia		
Mr. Soetikno	Faculty of Geography University of Gadjah Mada, Yogyakarta	Rural water supply

Country/Name	Organization	Subject
Israel		
Prof. H.I. Shuval	Hebrew University, Hadassah Medical School Jerusalem	Preparatory discussions concerning expert meeting on re-use of waste water
Japan		
Ir. E.D. Kunst	Royal Netherlands Embassy, Tokyo	Information on Japanese water supply and industry
Kenya		
Prof.Dr. O. Kranendonk Dr. R. Slooff	Royal Tropical Institute, Amsterdam/Medical Research Centre, Nairobi	Possible cooperation on slow sand filtration and organizational aspects
Sri Lanka		
Ir. J. Haijkens	UNDP Office, Colombo	Slow sand filtration; twinning
Switzerland		
Dr. R.C. Ballance	WHO Community Water Supply and Sanitation Unit, Geneva	Strengthening of the network
Mr. L.A. Orihuela	WHO Community Water Supply and Sanitation Unit, Geneva	International programme on rural water supply and sanitation

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REGIONAL REFERENCE CENTRES AND COLLABORATING INSTITUTIONS FOR COMMUNITY WATER SUPPLY

(as at 31 December, 1974)

Regional Reference Centres

National Environmental Engineering Research Institute (NEERI)
Nehru Marg
Nagpur-440020
India

Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS)
Calle los Pinos 259, Urbanizacion Camacho
Casilla Postal 4337
Lima-100
Peru

Collaborating Institutions

- Institut d'Hygiène et d'Epidémiologie
  14, rue Juliette Wytsman
  1050 Brussels
  Belgium

- Funadaçao Estadual de Engenharia do Meio Ambiente (FEEMA)
  Rua Fonseca Teles 121-15º and
  Caixa Postal 23011 - ZC 09
  Rio de Janeiro, GB
  Brazil

- Centre of General and Environmental Hygiene
  Institute of Hygiene and Epidemiology
  Srobárova 48
  10042 Prague-10
  Czechoslovakia

- Institute of Hygiene
  University of Aarhus
  Universitetsparken
  8000 Aarhus-C
  Denmark

- Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM)
  Section d'Hydrology
  24, rue Bayard
  Paris 8e
  France

- Department of Civil Engineering
  Faculty of Engineering
  University of Science and Technology
  Kumasi
  Ghana

- Victoria Jubilee Technical Institute
  Matunga
  Bombay-19
  India

- All-India Institute of Hygiene and Public Health
  110, Chittaranjan Avenue
  Calcutta-12
  India

- Institute of Hydro-sciences and Water Resources Technology
  University of Tehran
  64, Ghadessi Street, North Blv. Elizabeth
  Tehran
  India

- Environmental Health Laboratory
  Hebrew University - Hadassah Medical School
  P.O. Box 1172
  Jerusalem
  Israel

- Centro Studi e Ricerche di Ingegneria Sanitaria
  University of Naples
  Piazzale Tecchio
  80125 Naples
  Italy

- Instituto di Recerca sulle Acque
  Consiglio Nazionale delle Ricerche
  Via Reno 1, Irsa
  Rome
  Italy

- Department of Sanitary Engineering
  Faculty of Engineering
  University of Tokyo
  Tokyo
  Japan

- Department of Civil Engineering and Architecture and
  School of Public Health
  American University of Beirut
  Beirut
  Lebanon

- Testing and Research Institute of the Netherlands
  Waterundertakings, KIWA Ltd.
  Sir Winston Churchill-laan 273
  Rijswijk 2109
  The Netherlands

- Faculty of Engineering
  University of Lagos
  Lagos
  Nigeria

- Departamento Academico de Saneamiento
  Universidad Nacional de Ingenieria
  Avenida Tupac Amaru s/n
  Apartado 1301
  Lima
  Peru

- Battelle Geneva Research Centre
  7, Route de Drize
  1227 Carouge
  Geneva
  Switzerland

- Faculty of Engineering and Architecture
  University of Khartoum
  P.O. Box 487
  Khartoum
  Sudan

- Division of Environmental Hygiene
  Asian Institute of Technology
  Henri Dunant Street
  P.O. Box 2754
  Bangkok
  Thailand

- Middle East Technical University
  Sanitary Engineering Laboratory
  Ankara
  Turkey

- The Water Research Centre
  45, Station Road
  Henley-on-Thames, Oxon RG9 1BW
  United Kingdom

- Department of Civil Engineering
  University of Newcastle-upon-Tyne
  Claremont Road
  Newcastle-upon-Tyne, NE1 7RU
  United Kingdom

- College of Engineering
  University of Florida
  Gainesville, Florida 32601
  U.S.A.

- Division of Water Hygiene
  Water Quality Office
  Environmental Protection Agency
  5600 Fishers Lane
  Rockville, Maryland 20852
  U.S.A.

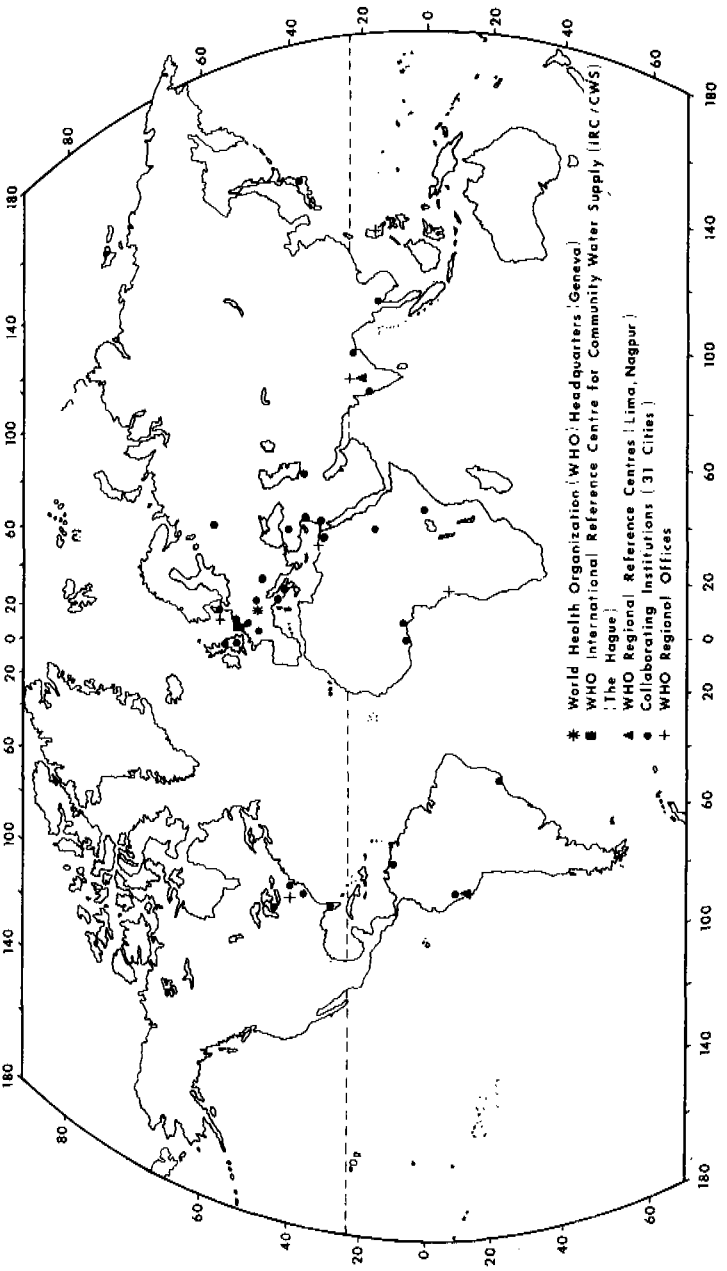
- National Sanitation Foundation
  P.O. Box 1468
  2355 West Stadium Boulevard
  Ann Arbor, Michigan 48106
  U.S.A.

- School of Public Health
  The University of North Carolina
  Box 630
  Chapel Hill, North Carolina 27514
  U.S.A.

- Academy of Community Services
  (K.D. Pamfilov Academy of Community Services)
  Volokamskoe Sosse 16
  Moscow D-373
  U.S.S.R.

- Department of Sanitary Engineering
  Faculty of Engineering
  Central University of Venezuela
  Caracas
  Venezuela

THE INTERNATIONAL NETWORK FOR COMMUNITY WATER SUPPLY AND W.H.O. OFFICES



IRC PUBLICATIONS

Technical Papers

Nr. 1 - Plastic pipe in drinking water distribution practice, 1971

Nr. 2 - The suitability of iodine and iodine compounds as disinfectants for small water supplies, 1972, B.C.J. Zoeteman

Nr. 3 - The purification of water on a small scale, 1973 (also in French)

Nr. 4 - Health aspects relating to the use of uPVC pipes for community water supply - Report of a Consultant Group, 1973

Nr. 5 - Health aspects relating to the use of polyelectrolytes in water treatment for community water supply - Report of a Consultant Group, 1973 (also in French)

Nr. 6 - The potential pollution indez as a tool for river water quality management, 1973, B.C.J. Zoeteman

Bulletins

Nr. 1 - Community Water Supply Research, 1971

Nr. 2 - Training Courses in Community Water Supply, 1971

Nr. 3 - Community Water Supply Research, 1972

Nr. 4 - The Story of CPHERI, 1972 (out of stock)

Nr. 5 - Meeting of Directors of Institutions collaborating with the WHO International Reference Centre for Community Water Supply, Bilthoven, The Netherlands. Report of the Proceedings, 1973

Nr. 6 - Community Water Supply Research, 1973
