

**"El documento original contiene páginas en mal estado"**

## V. FUTURE DIRECTIONS FOR EPIDEMIOLOGIC RESEARCH IN DISASTERS

Despite the thousands of deaths, the incalculable damage done by disasters and the millions of dollars spent on disaster relief, there is surprisingly little active scientific research in disasters. In the past natural scientists have been content to document the occurrence of natural disasters. Medical scientists become so involved with relief activities that they do not document their activities. At present, the status is becoming more encouraging.

### A. PRESENT STATUS OF DISASTER RESEARCH

There are at least four organizations which are engaged in regular field research in disaster situations. These four organizations have been cited frequently in this dissertation. They are:

1. United Nations Educational, Scientific, and Cultural Organization (UNESCO): At present UNESCO field investigations have been limited to earthquakes, volcanic eruptions, and windstorms. The teams of natural scientists have concentrated on the causes and environmental effects of these disasters.

2. Natural Hazards Research, University of Toronto: Natural Hazards Research is the most integrated of the four organizations. Geophysicists, economists, and sociologists have come together to produce field observations and working papers on most of the natural disasters.

3. Disaster Research Center, Ohio State University: The Dis-

aster Research Center has taken a strictly sociological approach to disasters. The sociological observations, however, have tremendous relevance to medical problems in disasters.

4. Center for Disease Control, US Public Health Service, Atlanta: The Center for Disease Control has applied epidemiologic techniques to disasters. Disease surveillance, disease control, and rapid assessment of nutritional and medical problems have been major areas of interest.

Within the past year, there have been four new developments in the field of disaster research.

1. The United Nations has appointed a coordinator for the diverse UN activities in disasters.

2. At the Seminar on the Ecology of Natural Disasters (Universite catholique de Louvain, 1972) the representatives of the major relief agencies urged:

a) that field studies in the epidemiology of disasters be undertaken; and

b) that more ingenious ways be developed to meet the basic human and medical needs following disasters.

3. The School of Public Health at the Universite catholique de Louvain expects to organize a center for disaster studies within the year.

4. The London Technical Group in England has been organized to encourage applied research in disasters.

## B. AREAS IN WHICH THE EPIDEMIOLOGIC METHOD CAN BE APPLIED

Throughout this dissertation I have asked a number of questions and pointed out areas in which our knowledge of what happens in disaster situations is most deficient. There are five areas where the epidemiologic method can be applied to advantage. They are:

1. Case studies of disasters
2. Gathering of disaster intelligence
3. Evaluation of the efficiency and effectiveness of relief activities;
4. Analysis of the long-term effects of disasters upon the community; and
5. Evaluating new techniques of disaster warning and methods to reduce the damage from disasters.

## C. THE DISASTER INVESTIGATIONS UNIT

I have drawn up a proposal for a Disaster Investigations Unit to apply the epidemiologic method to the five areas outlined above.

1. Title: The Disaster Investigations Unit. The Unit will concern itself with short, intermediate, and long-term natural and man-made disasters. Acute, circumscribed disasters such as railroad wrecks, mine explosions, and automobile accidents will be excluded because they are unlikely to affect large communities.

2. Location: At this moment the most suitable location for the Disaster Investigations Unit would be within the structure

of the Center for Disease Control (CDC) or elsewhere in the US Public Health Service.

3. Areas of Responsibility: If located within the CDC, the Unit could have ten areas of responsibility. They are:

- a) To serve as a focal point for CDC activities in the epidemiology of disaster;
- b) To collect and organize epidemiologic data from previous and new relief activities;
- c) To develop protocols for the collection and evaluation of data from various disaster situations;
- d) To identify the epidemiologic, administrative, environmental, and medical problems which arise after disasters;
- e) To provide epidemiologic assistance to states, communities, and agencies within the United States in predisaster planning and disaster assistance;
- f) To provide similar assistance for foreign agencies or governments concerned with predisaster planning or in need of disaster assistance;
- g) To train public health personnel in the epidemiology and technology of disasters;
- h) To assist in the selection of public health personnel to participate in predisaster planning projects or disaster relief efforts;
- i) To organize the briefing and debriefing of public

health personnel involved in disaster projects, and

- j) To distribute the results of these studies to agencies concerned with disaster relief. This information could take the form of case studies of individual disasters, working papers on problems encountered in recent disasters or abstracts of research being done in the field of disaster technology.

4. Personnel During the Initial Phases:

- a) Medical epidemiologist (1) with experience in disaster relief operations;
- b) One (1) draft-obligated physician assigned to the Epidemiology Program, CDC;
- c) Secretary (1); and
- d) Attention should be given to more of an interdisciplinary approach. Consultation with nutritionists, sociologists, engineers, and physical scientists should begin during the initial phases.

5. Contacts for Coordination:

- a) Within CDC--

Office of the Director  
Epidemiology Program  
Nutrition Program  
State and Community Services  
Smallpox Eradication Program

- b) Within US Government--

Office of Emergency Preparedness  
Foreign Disaster Emergency Relief Office, USAID  
State and Territorial Epidemiologists  
Office of Civil Defense

, , within the United States--

American Red Cross Society  
 Disaster Research Center, Ohio State University  
 National Academy of Sciences/National Research  
 Council

d. International organizations and agencies--

United Nations--Office of the Coordinator for Dis-  
 aster Relief  
 League of Red Cross Societies  
 International Committee of the Red Cross  
 International Committee of Voluntary Agencies  
 School of Public Health, Universite catholique  
 de Louvain  
 London Technical Group  
 Natural Hazard Research, University of Toronto

VI. SUMMARY

This dissertation attempts to apply the epidemiologic method to the disorganized data available on natural and man-made disasters. The historical approach is limited by incomplete data, changes since World War II, and limited predictive value. Data collected since 1945 is either concerned with a narrow scientific discipline or the operational aspects of disasters.

Disasters can be described epidemiologically in terms of 1) concentric zones, 2) time phases, and 3) their administrative, environmental, medical, and long-term effects upon the community. Present knowledge is particularly deficient in areas concerned with disaster intelligence and continued evaluation of relief activities.

The dissertation closes with a brief summary of the present status of research in disasters and a proposal for a Disaster Investigations Unit concerned with applied epidemiological research.

ACKNOWLEDGEMENT: I would like to thank Dr. W.L.B. Barton, Deputy Director of the Ross Institute for his help and patience during the writing and preparation of this manuscript.



## VII. REFERENCES

- AALL, C. (1970). Relief, nutrition and health problems in the Nigerian/biafran War. Monograph #9. J. trop. Pediat. 16, 69.
- ADAMS, D. (1970). The Red Cross: Organizational sources of operational problems. Am. behav. Sci. 13, 392.
- AMBRASEYS, N.N. (1972). Earthquake hazards and emergency planning. BUILD International, January-February.
- AMBRASEYS, N.N., ZATOPEK, A., TASDEMIROGLU, M., and AYTUN, A. (1968). Turkey: The Mudurnu Valley (West Anatolia) Earthquake of 13 July, 1967. UNESCO Report #622, Paris, June, 1968.
- AMERICAN MEDICAL ASSOCIATION (1966). An index to literature on disaster medical care. Chicago.
- Idem. (1967). An index to literature on disaster medical care. Supplement one. Chicago.
- AMINUL ISLAM, M. (1971). Human adjustments to cyclone hazards: A case study of Char Jabbar. Working Paper #18, Natural Hazard Research/University of Toronto, Toronto.
- ANDERSON, W.A. (1969a). Disaster warning and communication processes in two communities. J. Communic. 19, 92.
- Idem. (1969b). Social structure and the role of the military in natural disaster. Sociol. & soc. Res. 53, 242.
- Idem. (1969c). Disaster and organizational change: A study of the long-term consequences in Anchorage of the 1964 Alaska Earthquake. Monograph #6, Disaster Research Center/Ohio State University, Columbus.
- ARNHOLD, R. (1969). The "Quac" stick: A field measure used by the Quaker Service Team, Nigeria. J. trop. Pediat. 15, 243.
- ARSOVSKI, M., BOUWKAMP, J., CISMIGIU, A., and IZUMI, M. (1970). Yugoslavia: The Bosnian and Herzegovinian Earthquakes of 26 and 27 October, 1969. UNESCO Report #1919, Paris, June, 1970.
- ASSAR, M. (1971). Guide to sanitation in natural disasters. World Health Organization, Geneva.
- ASHCROFT, M.T., RITCHIE, J.M., and NICHOLSON, C.C. (1964). Controlled field trial in British Guiana school children of heat-killed-phenolized and acetone-killed lyophilized typhoid vaccine. Am. J. Hyg. 79, 196.

ATLANTA JOURNAL (1969). 30 October.

AUB, H.S. and BEECHER, H.K. (1943). Management of the Cocoanut Grove burns at the Massachusetts General Hospital. Ann. Surg. 117, #6.

BAESJOU, J.F. (1955). The problems of medicine during and after the flood in the Netherlands. Wld med. J. 2, 351.

BARTON, A.A. (1963). Social organization under stress: A sociological review of disaster studies. National Academy of Sciences/National Research Council, Washington.

BEACH, H.D. (1967). Management of human behavior in disaster. Department of National Health and Welfare, Canada.

BEELMAN, F.C. (1967). Disaster planning: Report of tornado casualties in Topeka. J. Kans. med. Soc. 68, 153.

BERALL, J. (1969). Final report of the Chief Medical Adviser. Nigerian Red Cross/International Committee of the Red Cross Joint Relief Operations, Lagos, November, 1969.

BERG, A. (1971). Famine contained: Notes and lessons from the Bihar experience. In: Famine. A symposium dealing with nutrition and relief operations in time of disaster edited by BLIX, G., HOFVANDER, Y., and VAHLQUIST, B., The Swedish Nutrition Foundation, Uppsala.

BERRY, L., HANKINS, T., KATES, R.W., MAKI, I., and PORTER, P. (1971) Human adjustment to agricultural drought: Pilot investigations. Working Paper #19, Natural Hazard Research/University of Toronto, Toronto.

BHATIA, B.M. (1963). Famines in India: A study in some aspects of the economic history of India, 1860-1945. Asia Publishing House, London.

BLAKE, P. (1970). Peru Earthquake, May 31, 1970. Travel Report - Center for Disease Control, Atlanta, July, 1970.

BLIX, G., HOFVANDER, Y., and VAHLQUIST, B. (1971). Famine. A symposium dealing with nutrition and relief operations in times of disaster. The Swedish Nutrition Foundation, Uppsala.

BLOCKER, V. and BLOCKER, T.G. (1949). The Texas City Disaster: A survey of 3,000 casualties. Am. J. Surg. 28, 756.

- BROWN, R.K. (1969). Mission to Biafra (January 1969). A study and survey of a population under stress. Clin. Pediat. 8, 311.
- BROWN, R.K. (1966). Disaster medicine. What is it? Can it be taught? J. Am. med. Ass. 197, 1081.
- BROZEK, J., WEISS, S., and KEYS, A. (1946). Medical aspects of semi-starvation in Leningrad (siege 1941-2). Am. Rev. sov. Med. 4, 70.
- BURGER, G.C.E., DRUMMOND, J.C., and SANDSTEAD, H.R. (1948). Malnutrition and starvation in Western Netherlands September, 1944 to July, 1945. 2 Vol. General State Printing Office, The Hague.
- BURNEY, L. (1957). Public health problems in major disasters. Ann. Am. Acad. pol. & soc. Sci. 309, 80.
- BYWATERS, E.G.L. (1944). Ischaemic muscle necrosis. J. Am. med. Ass. 124, 1103.
- CARRUTHERS, W.R. and ZAVELA, D. (1965). A narrative report on the tornado disaster in the Anchor Bay area. Mich. med. News 64, 843.
- CASBERG, M. (1954). Medical organizations in national catastrophe. J. Am. med. Ass. 154, 501.
- CENTER FOR DISEASE CONTROL (1972). Weekly summary: Countries showing areas infected with quarantinable diseases. U.S. Public Health Service, Atlanta, 11 May 1972.
- CHAMBERS'S CYCLOPEDIA (1950). Vol. 12. George Newness, Ltd., London.
- CHEN, L.C. and ROHDE, J.E. (1971). Famine and civil war in East Pakistan. Lancet 2, 557.
- CHURCHILL, E.D. (1953). Panic in disaster. Ann. Surg. 138, 935.
- CLIFFORD, R. (1955). The Rio Grande Flood. National Academy of Sciences/National Research Council, Washington.
- COONE, H.W. (1956). Military medical aspects of antibiotics and biologicals for mass casualties. Milit. Med. 118, 358.
- CRICKSHANK, R., DUGUID, J.P. and SMITH, R.H.A. (1948). Medical microbiology: A guide to the laboratory diagnosis and control of infection. 11th Ed. Livingston, London.

- CURRY, W. (1969). Camille revisited: A critique of community response to a major disaster. Hospital 43, 36a.
- DALY, R.A. (1926). Our mobile earth. Chas. Scribners Sons, New York.
- DAVIDSON, S. and PASSMORE, R. (1966). Human nutrition and dietetics. Livingston, Edinburgh.
- DAVIS, D.J. (1954). Epidemiology in natural emergency. Milit. Surg. 114, 356.
- DAVIS, I.E. (1971). Epidemiology of famine in the Nigerian Crisis: Rapid evaluation of malnutrition by height and arm circumference in large populations. Am. J. clin. Nut. 24, 358.
- DEFOE, D. (1722). A journal of the plague year, written by a citizen who continued all the while in London, etc. Reproduced by Dent, London, 1908.
- DER SPIEGEL (1970). 8 March, Hamburg.
- DIE WEIT (1970). 17 November, Hamburg.
- DISASTER RESEARCH CENTER (1972). Publications, January, 1972. Ohio State University, Columbus.
- DOLS, M.J.L. and VAN ARCKEN, D.J.A.M. (1946). Food supply and nutrition in the Netherlands during and immediately after World War II. Milbank meml Fund q. Bull. 24, 319.
- DOWNEY, F. (1938). Disaster fighters. Putnam & Sons, New York.
- DRAYERS, C.S. (1954). First aid for psychological reactions in disasters. Committee on Civil Defense/American Psychiatric Association, Washington.
- Idem. (1955). Disaster fatigue. Ibid.
- DYNES, R.R., HAAS, J.E., and QUARANTELLI, E.J. (1967). Administrative, methodological and theoretical problems of disaster research. Indian sociol. Bull. 4, 215.
- EDITORIAL (1967). Red Cross and disaster relief. Br. med. J. 653.
- FISHER, H.H. (1927). The famine in Soviet Russia, 1919-1923. MacMillan, London.

- FLORA, S.D. (1954). Tornadoes of the United States. University of Oklahoma Press, Norman.
- FOEGE, W.H. (1971). Famine, infections and epidemics. In: Famine. A symposium dealing with nutrition and relief operations in time of disaster edited by BLIX, G., HOFVANDER, Y., and VAHLQUIST, B.; The Swedish Nutrition Foundation, Uppsala.
- FOEGE, W.H. and CONRAD, J.L. (1969). Ikot Ibritam Nutritional Project. Protocol -- National Communicable Disease Center, Atlanta.
- FOGELMAN, M.J. (1958). The Dallas Tornado Disaster. Am. J. Surg. 95, 501.
- FOURNIER D'ALBE, M. (1969). Natural disasters, their study and prevention. Unesco Chron. 16, 195.
- FRITZ, C.E. and MATHEWSON, J.H. (1957). Convergence behavior in disasters. Committee on Disaster Studies, National Academy of Sciences/National Research Council, Washington.
- FRITZ, C.E. and WILLIAMS, H.B. (1957). The human being in disaster A research perspective. Ann. Am. Acad. pol. & soc. Sci. 309, 42.
- FURNEAUX, R. (1964). Krakatoa, Prentice-Hall, Englewood Cliffs.
- GAHNS, B. (1969). A Biafran relief mission. Lancet 1, 660.
- GARDNER, P., ROHDE, J.E., and MAJUMDAR, M.B. (1972). Health priorities among Bangladesh refugees. Lancet 1, 834.
- GIL, G.P. (1963). Organizacion de la asistencia sanitaria en las calamidades publicas. Medna trop. 39, 459.
- GLASS, R. (1970). Aid fiasco. The New Republic, 19 September.
- GLEASON, E.H. (1957). The sanitarian in disaster situations. Milit. Med. 124, 354.
- GLENNIE, H.R.R. (1969). Shipwreck in harbour. N.Z. med. J. 70, 299.
- GLASS, J.E. (1969). The Western Sicily Earthquake of 1968. National Academy of Sciences/National Research Council, Washington.
- LEGSTED, D.M. (1972). A deprivation syndrome or protein-calorie malnutrition? Nut. Rev. 30, 51.

- HERSEY, J. (1946). Hiroshima. Knopf, New York.
- HICKMAN, R. (1970). The relief operations in former Biafra. Lancet 2, 815.
- Idem. (1971). Deteriorating health of refugee children in India. Ibid. 2, 917.
- HIGHT, D., BLODGETT, J.T., CROCE, E.J., HORNE, E.O., MCKOAN, J.W., and WHELAN, C.S. (1956). Medical aspects of the Worcester Tornado Disaster. New Eng. J. Med. 254, 267.
- HOWE, R.E.G. (1968). The Aberfan Disaster. Med.-leg. J. (New York) 36, 107.
- HUGHES, S.P.F. (1969). Malnutrition in the field. Nigerian Civil War, 1968-1969. Br. med. J. 2, 436.
- IFEKWUNIGWE, A. (1971). Recent field experiences in Eastern Nigeria (Biafra). In: Famine. A symposium dealing with nutrition and relief operations in time of disaster edited by BLIX, G., HOFVANDER, Y., and VAHLQUIST, B.; The Swedish Nutrition Foundation, Uppsala.
- IKLE, F.C. and KINCAID, H.V. (1956). Social aspects of war-time evacuation of American cities. Disaster Study #4, National Academy of Sciences/National Research Council, Washington.
- INTERNATIONAL COMMITTEE OF THE RED CROSS (1970). ICRC Jordan relief in brief. Geneva, October, 1970.
- Idem. (1972). Annual Report, 1971, Geneva.
- INTERNATIONAL TELECOMMUNICATIONS UNION (1972). Annual Report, 1971, Geneva.
- KATES, W. (1970). Natural hazard in human ecological perspective: Hypotheses and models. Working Paper #14, Natural Hazard Research/University of Toronto, Toronto.
- KEATINGE, W.R. (1965). Death after shipwreck. Br. med. J. 2, 1537.
- KEYS, A. (1950). The biology of human starvation. 2 Vol. University of Minnesota Press, Minneapolis.
- KILLIAN, L.M. (1953). A study of response to the Houston, Texas Fireworks Explosion. Publication #391, National Academy of Sciences/National Research Council, Washington.

- Idem. (1954). Some accomplishments and some needs in disaster study. J. soc. Issues 10, 66.
- KRÖGER, E. (1971). International assistance in natural disasters: Experiences and proposals. Dissertation London School of Hygiene and Tropical Medicine, University of London.
- KYWE, K.M. (1972). The organization of maternal and child health services in Burma. Remarks - Seminar on Maternal and Child Health Services/London School of Hygiene and Tropical Medicine, London, May, 1972.
- LANGMUIR, A.D. (1965). Introduction to epidemiology. Lecture - Epidemic Intelligence Service Course/National Communicable Disease Center, Atlanta, July, 1965.
- LATTER, J.H. (1969). Natural disasters. Advmt Sci. 31, 362.
- LEAGUE OF RED CROSS SOCIETIES (1959). International disaster relief manual. Geneva.
- Idem. (1970a). Red Cross disaster relief handbook. Geneva.
- Idem. (1970b). Annual Report, 1969. Geneva.
- Idem. (1970c). Earthquake in Western Turkey, 28-29 March, 1970. Disaster Relief Bureau Circular #419, Geneva, 31 March 1970.
- Idem. (1970d). Ibid. #420, Geneva, 3 April, 1970.
- Idem. (1970e). Ibid. #423, Geneva, 6 May, 1970.
- Idem. (1970f). Earthquake in Peru, 31 May, 1970. Ibid. #434, Geneva, 2 June, 1970.
- Idem. (1970g). Ibid. #437, Geneva, 10 June, 1970.
- LEET, L.D. (1957). Earthquakes. Ann. Amer. Acad. pol. & soc. Sci. 309, 36.
- LEMONS, H. (1957). Physical characteristics of disasters: Historical and statistical review. Ibid. 309, 1.
- LEYTON, G.B. (1946). Effects of slow starvation. Lancet 2, 73.
- LINDBERG, J. (1946). Food, famine, and relief. League of Nations, Geneva.

- LOEWENSTEIN, M.S. (1971). Evaluation of the arm circumference/height measurement for determining the nutritional status of a population. Center for Disease Control, Atlanta.
- LOS ANGELES TIMES (1971). 14 February.
- MACKAY, S., FINNEY, C. and OKUBO, T. (1971). The typhoons of October and November, 1970. UNESCO Report #2387, Paris, May, 1971.
- MACMAHON, B., PUGH, T.F., and IPSEN, J. (1960). Epidemiologic methods. Little, Brown & Co., Boston.
- KANDELBAUM, I., NAHRWOLD, D., and BOYER, D.W. (1966). Management of tornado casualties. J. Trauma 6, 353.
- MARKOWSKI, B. (1945). Some experiences of a medical prisoner of war. Br. med. J. 2, 361.
- MAROC MED. (1961). Agadir: Lessons of an earthquake. 40, #2.
- MASEFIELD, G.B. (1963). Famine: Its prevention and relief. Oxford University Press, London.
- Idem. (1967). Food and nutrition procedures in time of disaster. Nutritional Series #21, Food and Agricultural Organization, Rome.
- Idem. (1972). Famine and famine relief. Lecture - London School of Hygiene and Tropical Medicine, London, May, 1972.
- MASTERS, R.V. (1950). Going to blazes. Sterling, New York.
- MAYER, J. (1969). Famine in Biafra. Postgrad. Med. 23, 236.
- MCCANCE, R.A. (1951). The history, significance, and aetiology of hunger oedema. Special Report Series #275, Medical Research Council, London.
- MCGILL, W.L. (1957). How a state prepares for disaster. Ann. Am. Acad. pol. & soc. Sci. 309, 118.
- MCLUCKIE, B.F. (1970). The warning system in disaster situations: A selective analysis. Report Series #9, Disaster Research Center/Ohio State University, Columbus.
- MENCZER, L.F. (1968). The Hartford disaster exercise. New Eng. J. Med. 278, 822.



- BERCHANT, J. (1971). The epidemiology of famine in the Biafran Crisis: Comparison of height and arm circumference, weight for height, and clinical evaluation techniques to determine malnutrition rates in a common population. Am. J. clin. Nut. (in press).
- BREWSTER, F.H.S. (1898). A tour through the famine districts of India: First person account by Reuter's special correspondent. Innes & Co., London.
- MILLER, J.P. (1970). Medical relief in the Nigerian Civil War. Lancet 1, 1330.
- MILLS, W.J. (1964). Emergency medical treatment of casualties at Providence Hospital. Alaska Med. 6, 39.
- MILNE, J. (1911). A catalogue of destructive earthquakes AD 7-1899. British Association for the Advancement of Science, London.
- MONTANDON, F. (1942). Les tempetes de poussiere: Leur origine et leurs effets, notamment aux Etats-Unis. Revue Etude Calam. 5, 3.
- Idem. (1959a). Les grandes catastrophes naturelles survenues pendant les annees 1948 a 1957. Ibid. 36, 58.
- Idem. (1959b). Quelle est la moyenne annuelle des morts causees par les tremblements de terre? Ibid. 36, 61.
- Idem. (1961). Les cyclones tropicaux de 1951 a 1960. Ibid. 37, 86.
- MONTANDON, R. (1938). L'etude des avalanches en Suisse. Ibid. 1, 21.
- MUKERJEE, T. (1971). Economic analysis of natural hazards. A preliminary study of adjustments to earthquakes and their costs. Working Paper #17, Natural Hazard Research/University of Toronto, Toronto.
- MUNCH. MED. WSCHR. (1962). 104, #42.
- NATURAL HAZARD RESEARCH (1971). Order Form. University of Toronto, Toronto.
- NEW ENG. J. MED. (1968). 278, #15.
- NEWSWEEK (1972). 27 March.

NEW YORK TIMES (1970). 2 June.

NORTH ATLANTIC TREATY ORGANIZATION (1970). Flood experts meeting and disasters assistance (flood mitigation). Committee on the Challenges of Modern Society, Venice, October, 1970.

ODLING-SMEE, G.W. (1969). Ibo civilian casualties in the Nigerian Civil War. Br. Med. J. 2, 592.

OFFICE OF EMERGENCY PREPAREDNESS (1964). The Alaska Earthquake: A progress report - 279 days of Federal reconstruction effort. Washington, December, 1964.

Idem. (1969). Hurricane Camille: A month of Federal assistance. Washington, September, 1969.

Idem. (1971). Q-Day + 100: The Federal response to the California Earthquake of February 9, 1971. Washington, May, 1971.

ORTH, G.L. (1959). Disaster and disposal of the dead. Milit. Med. 124, 505.

DOUGHTERSON, A.W. and WARREN, S. (1956). Medical effects of the atomic bomb in Nagasaki. McGraw-Hill, New York.

OXFORD ENGLISH DICTIONARY (1933). Clarendon Press, Oxford.

PACE, F.C. (1967). Emergency health services informational and educational programs: Development and present status. Can. med. Ass. J. 96, 221.

PANUM, P.L. (1846). Observations made during the epidemic of measles on the Faroe Islands in the year 1846. Reproduced in Panum on measles, Delta Omega Society/American Public Health Association, 1940.

PARRISH, H.M., BAKER, S.A. and BISHOP, F.M. (1964). Epidemiology in public health planning for natural disasters. Publ. Hlth Rep. 79, 863.

PASSMORE, R. (1951). Historical survey of famine in India. Lancet 2, 303.

PEARSON, I.B. (1969). Partners in development: Report of the Committee on International Development. Praeger, London.

PEAVY, J.E. (1970). Hurricane Beulah. Am. J. publ. Hlth 60, 481.

PEOPLE'S VIEW (1970). 29 November, Chittagong.

PERUVIAN RED CROSS SOCIETY (1970). Report of the Peruvian Red Cross to the League of Red Cross Societies on the relief operation for the victims of the earthquake on 31 May, 1970. Geneva.

PIAS, J. and STUCKMANN, G. (1970). Tunisie, Les inondations de septembre-octobre, 1969 en Tunisie. UNESCO Report #1957, Paris, June, 1970.

PITANGUY, I. and SINDER, R. (1964). Treatment of the patients with burns sustained in the catastrophe of the Grand Circus of Niteroi Norte Americano. Rev. bras. Cirug. 48, 256.

POISSON, C. (1938). La protection meteorologique contre les cyclones a Madagascar. Revue Etude Calam. 1, 8.

PRINCE, S.H. (1920). Catastrophe and social change: Based upon a sociological study of the Halifax Disaster. Columbia University Press, New York.

PUBL. HLTH REP. (1964). 79, #10.

QUARANTELLI, E.L. (1970a). A selected bibliography of social science studies on disasters. Am. behav. Scient. 13, 452.

Idem. (1970b). The community general hospital: Its immediate problems in disasters. Ibid. 13, 380.

RAMALINGASWAMI, M.G.D., GULERIA, J.S., MALHOTRA, K.K., SOOD, S.K., PRAKASH, O., and SINHA, R. (1971). Studies of the Bihar Famine of 1966 - 1967. In: Famine. A symposium dealing with nutrition and relief operations in time of disaster edited by BLIX, G., HOFVANDER, Y., and VAHLQUIST, B.: The Swedish Nutrition Foundation, Uppsala.

RANKIN, C.R. (1968). Fayette County disaster exercise. New Eng. J. Med. 278, 1181.

RAYNER, J. (1953). Hurricane Barbara: A study of the evacuation of Ocean City, Maryland, August, 1953. National Academy of Sciences/National Research Council, Washington.

RAYNER, J. and FINESINGER, J.E. (1953). Response to disaster in American cultural groups. Symposium on Stress, Walter Reed Army Medical Center/Army Service Graduate School, Washington.

- REICHELDERFER, F.W. (1957). Hurricanes, tornados and other storms. Ann. Am. Acad. polit. & soc. Sci. 309, 23.
- RENNIE, D. (1970). After the earthquake. Lancet 2, 704.
- RICE, P.A. (1972). Shigella sonnei and gastroenteritis in a summer camp - Bay St. Louis, Mississippi. Presentation-Epidemic Intelligence Service Conference/Center for Disease Control, Atlanta.
- ROBSON, G.R. and CANALES, L. (1968). Venezuela: The Caracas Earthquake of 29 July, 1967. UNESCO Reprint #571, Paris, May, 1968.
- ROTH, R. (1970). Cross-cultural perspectives on disaster response. Am. behav. Scient. 13, 440.
- ROTHER, J.-P. (1946). Seismes et volcan. Presses universitaires de France, Paris.
- Idem. (1961). Les seismes du Chile. Revue Etude Calam. 37, 3.
- ROUECHE, B. (1967). Annals of epidemiology. Little, Brown & Co., Boston.
- SAIDI, F. (1963). The 1962 Earthquake in Iran. New Eng. J. Med. 268, 929.
- SALISBURY, H.E. (1969). The 900 days (the Siege of Leningrad). Martin. Secker & Warburg, Ltd., London.
- SAYLOR, L.F. and GORDON, J.E. (1957). The medical component of natural disasters. Am. J. med. Sci. 234, 342.
- SCHNEIDER, D.M. (1957). Typhoons on Yap. Human Org. 16, 10.
- SCRIMSHAW, N.S., TAYLOR, C.E., and GORDON, J.E. (1968). The interrelationship between nutrition and infections. World Health Organization Monograph Series #57, Geneva.
- SHEEHAN, L. and HEWITT, K. (1970). A pilot survey of global natural disasters of the past twenty years. Working Paper #11, Natural Hazard Research/University of Toronto, Toronto.
- SHORT, T. (1749). General chronological history of the air, weather, seasons, meteors, etc. Nicoll, London.
- SMITH, D. (1957). Emergency mass care. Ann. Am. Acad. pol. & soc. Sci. 309, 118.

- SNOW, J. (1855). On the mode of communication of cholera. Reproduced in Snow on cholera, Commonwealth Fund, New York, 1936.
- JOMMER, A. and MOSLEY, W.H. (1971). Survey of 1970 cyclone affected region of East Pakistan, February-March, 1971. Final Report. Center for Disease Control, Atlanta.
- Mem. (1972). East Bengal Cyclone of November, 1970. Lancet 1, 1029.
- SPIEGAL, J.P. (1957). The English Flood of 1953. Human Org. 16, 5.
- STALLINGS, R.A. (1971). Communications in natural disasters. Report #10, Disaster Research Center/Ohio State University, Columbus.
- STURGIS, S.D. (1957). Floods. Ann. Am. Acad. pol. & soc. Sci. 309, 15.
- THERAPIEWOCHE (1965). 15, #9.
- TIMES (1972a). 11 February, London.
- TIMES (1972b). 1 March, London.
- TIMES (1972c). 27 March, London.
- TRIPP, S. (1970). Introduction. In: Foreign disaster emergency relief. Tenth Report. U.S. Agency for International Development, Washington.
- TYHURST, J.S. (1951). Individual reactions to community disaster: The natural history of psychiatric phenomena. Am. J. Psychiat. 107, 764.
- UN ECONOMIC & SOCIAL COUNCIL (1971). Document #E/4994, New York, 13 May, 1971.
- UN EDUCATIONAL, SCIENTIFIC & CULTURAL ORGANIZATION (1971). Reunion consultative d'experts sur la seismicite du Maghreb, Tunis, April, 1971.
- UN HIGH COMMISSIONER FOR REFUGEES (1971). Background paper on the Office of the United Nations High Commissioner for Refugees. Geneva.
- US AGENCY FOR INTERNATIONAL DEVELOPMENT (1968). Foreign disaster emergency relief. Eighth Report, Washington.

Idem. (1969). Ninth Report, Washington.

Idem. (1970). Tenth Report, Washington.

US PUBLIC HEALTH SERVICE (1959). Economical make-up techniques for disaster demonstrations. US Government Printing Office, Washington.

Idem. (1970). Emergency health services selected bibliography. Publication #1071-A-1, Washington.

US STRATEGIC BOMBING SURVEY (1947). The effects of bombing on health and medical services in Japan. Document #74180. US Government Printing Office, Washington.

UNIVERSITE CATHOLIQUE DE LOUVAIN (1972). Seminar on the ecology of natural disasters. Brussels, December, 1971.

VALAORAS, V.G. (1946). Some effects of famine on the population of Greece. Milbank meml Fund q. Bull. 24, 215.

VAYSSIERE, P. (1959). Le criquet migrateur en 1959. Revue Etude Calam. 36, 38.

VELLA, E.E. (1972). Cholera and vaccine prophylaxis. Br. J. hosp. Med. 7, 255.

VOJNO-SANIT. PREGI. (1964). 21, #7-8.

WALFORD, C. (1879). Famines of the world: Past and present being two papers read before the Statistical Society of London in 1878 and 1879, etc. Stanford, London.

WALLACE, A.F.C. (1956). Tornado in Worcester: An explanatory study of individual and community behavior in an extreme situation. Disaster Study #3, National Academy of Sciences/National Research Council, Washington.

WELLS, D.B. (1945). Circus disaster and Hartford Hospital. New Eng. J. Med. 232, 613.

WESTERN, K.A. (1970). Nutrition and population surveys in Biafra, October - November, 1969. Paper - American Public Health Association, Houston.

WESTERN, K.A., CONRAD, J.L., and FOEGE, W.H. (1971). Disaster planning. Center for Disease Control, Atlanta, April, 1971.

WHITE, G.F., KATES, R.W., and BARTON, J. (1970). Suggestions for comparative field observations on natural hazards. Working Paper #16, Natural Hazard Research/University of Toronto, Toronto.

- WHITNEY, J.M. (1958). Disaster management: Preventive medicine and public health. Milit. Med. 123, 181.
- WITKOW, A. (1956). "And the waters prevailed", Public health aspects of the 1955 New England Flood. New Eng. J. Med. 254, 843.
- WOODHAM-SMITH, C. (1962). The great hunger. Harper & Row, New York.
- WORLD HEALTH ORGANIZATION (1969). Cholera immunology. Wld Hlth Org. tech. Rep. Ser. #414.
- Idem. (1972). Smallpox surveillance. Wkly epidem. Rec. 47. 173.
- YUDKIN, J. (1971). Do vitamins have a role in relief operations? Seminar - Disaster Aid Working Party/ London Technical Group, London, November, 1971.
- YUGOSLAV TYPHOID COMMISSION (1957). Field and laboratory studies with typhoid vaccines. Bull. Wld Hlth Org. 16, 897.
- ZINSSER, H. (1935). Rats, lice, and history. Little, Brown & Co., New York.
- ZIPERMAN, H.H. (1957). Sorting: The key to management of victims of disaster. J. Am. med. Ass. 162, 1438.