Emergency Medical Technicians as Allied Health Professionals

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APPLICATION of medical scientific knowledge to the health care needs of a population is often possible only with "paramedical" help. Allied health disciplines, generally, have evolved through the efforts of individuals, as the result of pilot projects and/or under the pressure of public need and interest.

Although the quality of patient care is difficult to quantitate, particularly in retrospective studies, care given outside hospitals can be evaluated at the emergency room entrance. While extended studies are not available, individual case reports, including unpublished material and expert testimony, indicate an appalling lack of needed skills and knowledge at the scene and during transportation.[1-3] Studies have shown that intensified practice-oriented, high-caliber training[4-6] improves performance of life-saving measures by lay and paramedical personnel.

This paper reviews our *personal experience* with the ambulance profession during the past 15 years and proposes large-scale support of a paramedical specialty, Emergency Medical Technicians (EMTs), to work as physicians' helpers in ambulances, emergency rooms, intensive-care units, respiratory therapy services, and anesthesia departments.

BACKGROUND

The lack of physician-staffed ambulances in this country should long ago have pointed out the need for ambulance attendants with paramedical training and professional status. These attendants could apply life-saving, life-supporting measures at the scene and during transportation rather than merely transporting patients to the hospital as rapidly as possible. Interest in training ambulance attendants to the status of paramedical specialists has probably been delayed because most physicians have not

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realized the necessity for prehospital emergency treatment.

Before the 1950s, emergency medical transportation received little attention from physicians. The Red Cross First Aid Course, at the time, taught the back-pressure arm-lift method of artificial respiration as the only resuscitation maneuver. The low training standard is evident from the 1967 observation by Blue Shield/Medicare of Western Pennsylvania that about 80 percent of the ambulance attendants in Pennsylvania did not even have a Red Cross Advanced First Aid Course certificate.

Interest has developed around individuals[7-9] and around organizations like the American College of Surgeons (A.C.S.),[10] who have emphasized rescue *and care* of the traumatized patient. War experiences drew attention to training of medical corpsmen. However, in emergency medical transportation under combat conditions, emphasis was still on speedy transfer to the hospital rather than on treatment at the scene and during transportation.

Advances in resuscitation in the late 1950s gave birth to the concept of the need for paramedically trained ambulance attendants. Following the first studies on exhaled air (mouth-to-mouth) ventilation,[11] we became aware that the efficacy of this new method should be compared with the manual methods of artificial ventilation then being taught.[12,13] Chief Martin McMahon and his men of the Baltimore City Fire Department Ambulance Service collaborated as rescuers in the crucial artificial-ventilation experiments on curarized human volunteers at the Baltimore City Hospital.[12-14] This affiliation resulted in physician-directed, hospital-based training for attendants and written manuals which included the newly proved methods of airway care and artificial ventilation.[15] It also motivated attendants toward self-improvement and taught involved physicians to appreciate the need for emergency care outside hospitals.

Recognition of the mechanisms of airway obstruction,[16] the universal introduction of positive-pressure methods of artificial ventilation,[5,6,13,17] and recognition of the failure of mechanical resuscitators for emergency artificial ventilation[18] called for training beyond the level of the Red Cross First Aid Course. With the introduction of external cardiac resuscitation,[19] it became necessary to teach diagnosis in addition to skills.

Next came studies involving details of technics and training,[4-6,20] development of the realistic Laerdal training manikin,[5] increasing use of cardiopulmonary resuscitation in ambulances,[21] and—finally—development of the American Heart Association (AHA), Cardiopulmonary Resuscitation (CPR) Courses and training aids.[22] The CPR courses for medical students, physicians, and paramedical instructors initiated in 1962 at the University of Pittsburgh were developed as pilot courses for the AHA program.[22,23]

Attempts have been made to bring together the trauma-oriented teaching of the ACS and the oxygenation and CPR-oriented teaching of the AHA and anesthesiologists.[24-26] Learning from studies of ambulance systems in the United States, New Zealand, Australia, Western Europe, Czechoslovakia, and the USSR that others had implemented such goals led us to promote the professional development of ambulance attendants both nationally[2,15,24,26] and internationally.[5,6,27-29]

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TABLE

Ambulance Attendants (EMTs) Training Programs
Authors' Present Recommendations

A. *Level I:* 70-100 hours (depending on type of teaching and backgrounds of trainees)

1. Equivalent of American Red Cross Standard and Advanced First Aid Course (25 hours)
2. Anatomy, physiology (5 to 10 hours) including recognition and management of vital system dysfunction
3. Life-support (12 hours) with manikin practice
   American Heart Association CPR Course
   Airway care, ventilation, oxygenation (including safe handling of compressed gas systems), external cardiac compression to perfection
   Management of serious and life-threatening medical emergencies
4. Control of hemorrhage, treatment of shock and wound care (2 hours)
5. Extremity fractures (2 hours)
6. Defensive driving, control at accident scene, emergency vehicle operation, equipment (6 hours)
7. Rescue and release from entrapment including extrication of spine injured patients
8. Co-ordinated disaster response and managemnent of multiple casualties (2 hours)
9. Communications (2 hours)
10. Records, forms, debriefing (2 hours)
11. Obstetrics, childbirth, and newborn resuscitation (2 hours)
12. Pediatrics, neonatal transfer (2 hours)
13. Poisoning and burns (2 hours)
14. Psychiatry (2 hours)
15. Health services organization, hospital relationships, medicolegal aspects (1 hour)
16. Observation in hospital ER, OR, PAR, ICU (10 hours minimum)

B. *Level II:* approximately 3 to 4 months; hospital-based training in addition to Level I training (70 to 100 hours)

1. Clinical rotations coupled with appropriate didactic and seminar sessions (sequence depends upon rotation)
   a. Practice of resuscitation including definitive care technics during transfer
   b. Recovery room (life-support techniques, monitoring, venous infusion)
   c. Cardiac care unit (arrhythmia control)
   d. ICU (life-support techniques, care of intubated and tracheotomized patient)
   e. Emergency room
   f. Inhalation therapy
   g. Delivery room
   h. Morgue (Medical Examiner)
2. Special exercises (may be during rotation of [1])
   a. Practice of resuscitation including definitive care technics during transfer
   b. Practice of light rescue and extrication
   c. Use of definitive care (physician's) equipment at scene and in transit
   d. Training in observation and communication (verbal and written) techniques (code communication, radio usage, report forms, etc)
3. Cardiac care (1 month); arrhythmia recognition and control under physician direction (electrocardiogram, use of drugs, defibrillation, telemetry)
4. On-the-job field experience (additional 1 month)
5. Ambulance service administration and operations

C. *Level III:* 2 to 4 years hospital and college education; university degree

N.B.: Individual variation in the speed of learning makes establishment of course duration purely arbitrary. Programmed self-instruction and individualized practice should provide flexibility.

The evolution of EMTs also includes public health recognition that treatment outside hospitals is feasible and desirable,[30] publication of national standards and goals on emergency medical services[1,2,22,31-33] the Federal Highway Safety Program Standards 4.411 (granting programs promoting implementation of these goals), and local pilot projects studying the feasibility of such implementation.[34-38]

EMT TRAINING RECOMMENDED

Training should be reoriented toward recognition of vital signs, recognition of life-threatening emergencies, and development of the skills and judgment required to support life and reduce morbidity, in addition to the traditional Red Cross First Aid Course.

Our subsequent recommendations are tentative and are based on past experience which culminated in the pilot projects described in detail elsewhere.[35,36] The recommended levels of training, tentatively three, and their curricula (summarized in the table), differ slightly from those of the pilot project and are in basic agreement but not identical with national recommendations. Curricula, including some recently proposed,[39-41] require pilot project exploration before more definitive training levels, course durations and EMT job descriptions can be defined.

Training Projects and Methods.—Level I and II curricula have been developed and successfully implemented since 1967 at the University of Pittsburgh Health Center with 43 educationally disadvantaged Negroes as trainees, most of whom did not have a high-school diploma when entering the course.[35] Thirty-five completed the course successfully.

Since potential trainees (college students, former corpsmen, minority groups, educationally disadvantaged) come with such a variety of backgrounds, training methods must be individualized. Introductory sessions should consist of small group seminars.

Acquisition of facts in anatomy and physiology should be facilitated by anatomic manikins and prepackaged, programmed, self-instruction courses. Formal lectures have proved of limited value in conveying knowledge and skills. Emphasis should be placed on films; self-instruction through the use of manuals, tapes and slides; live demonstrations underlined by repetition; and question/answer periods.

All instruction should emphasize simplicity, repetition, and supervised practice of skills to perfection, using trainee volunteers and manikins as subjects. Sessions should begin with coaching by the instructor and proceed to individual self-practice. Experience with hospital patients must be continuously and directly guided by hospital personnel specially assigned to this task. Examinations and periodic re-examination should test skills as well as knowledge.

Level I Training.—All ambulance personnel within a community should be upgraded immediately to improve the quality of present care. This can be accomplished by a 70 to 100 hour course curriculum (table). The Red Cross First Aid Course (25 hours), should be prerequisite or included in the 100-hour curriculum. This recommendation evolved from the course tested in Pittsburgh in 1967[35] which helped development of the Level I course recommended by the National Research Council in 1968.[31] Similar programs were proposed by the ACS in 1969,[39] the "Dunlap report" funded by the U. S. Department of Transportation in 1970,[40] and the American Academy of Orthopedic Surgeons in 1971.[41] There is no magic number of course hours, since results with use of any curriculum vary with the quality and motivation of instructors and trainees.

The Pittsburgh curriculum[35] included the AHA-CPR Course,[42] (including backward tilt of the head, forward displacement of the mandible, suctioning, insertion of a pharyngeal tube, exhaled air ventilation with and without adjuncts, ventilation with bag-valve-mask unit, oxygen inhalation technics and CPR during simulated transfer over stairways and in the ambulance); control of hemorrhage (using wound moulages); fracture immobilization (emphasizing those which have major consequences, for example, skull, spine, pelvis, hip, thigh); extrication practice to perfection; and physician-conducted seminars (table), recognition and treatment of heart attack, acute pulmonary edema, and insulin shock versus diabetic coma. Emergency care in the light of total provision of health care, welfare services, the role of the Coroner's or Medical Examiner's Office, instruction in vehicle operation, the community's communication system and proper use of ambulance communication equipment were taught.

Level II Training.—This should immediately become a requirement for EMTs staffing mobile ICU type ambulances; and ultimately for one man on every emergency ambulance. The recommended Level II course consists of the Level I course in greater depth plus concurrently scheduled, closely supervised experience in selected areas of the *hospital* for about 3 months full time (table, B1). Much of this experience is possible only by individual or small group instruction.

In the pilot project,[35] anatomy instruction was reinforced by assignment to the morgue. The operating room/anesthesia experience proved of paramount importance in acquiring life-supporting skills. The trainee, under "hand-holding" control of the anesthesiologist, monitored vital signs, gave airway care, and oxygenated and ventilated anesthetized patients. He used "his" equipment, a bag-valve-mask unit with oxygen reservoir tube (Laerdal RFB II), through which nitrous oxide, oxygen, and halothane were administered. He also learned care of the intubated patient, including suctioning. These skills cannot be learned in the emergency room, since life-threatening cases are both rare and unsuitable for practice.

Teaching tracheal intubation was attempted.[35] Only skilled, intelligent EMTs could intubate successfully within 60 seconds, after exposure to preceptor-type practice on at least five anesthetized patients each. Suitable anesthetized patients for practice are scarce. Therefore, a new realistic adult intubation manikin (Laerdal) may make teaching tracheal intubation feasible on a larger scale.

Venous infusion of plasma substitutes could be taught successfully with use of manikin, recovery-room patients, and practice with a hospital infusion team.[35]

Level II trainees had an apprenticeship with a physician-directed ambulance service for the remainder of the year, with weekly reporting sessions and case discussions. Examinations suggested that a national registry for EMTs would be feasible.[43]

Preliminary results with the University Hospital-based mobile ICU-type ambulance service staffed by the graduates of the Levels I and II curricula showed that the trainees were able to perform the life-support technics they had been taught. They proved particularly successful with respiratory resuscitation and oxygenation. In the first 12 months of operation (1968/1969), 4647 patients were transported; about 366 had life-threatening conditions and 40 required CPR because of pulselessness. Five of the 40 survived and were discharged with intact central nervous system status.

At least one half of acute *cardiac deaths* occur outside hospitals.[33] This fact plus the pilot projects by Nagel and associates[38] and Pantridge and Geddes[44] suggest that the Level II course should include recognition and control of arrhythmias (bradycardia, ventricular extrasystoles, ventricular tachycardia, ventricular fibrillation). We therefore initiated training attempts with arrhythmia recognition (electrocardioscopy) and control with the use of drugs (intramuscular and intravenous atropine, lidocaine, morphine) and electric defibrillation.[35,42] We have applied these measures so far only through physicians who were at the scene or accompanied the attendants. Simultaneous electrocardiographic telemetry and two-way voice communication equipment have been ordered to permit physicians to control these actions from the hospital. Provided these acts are physician-directed, there seem to be no legal obstacles.

Level III Training.—In our degree-conscious society, paramedical leaders and instructors of EMTs will benefit increasingly from education leading to a college degree. New Level III curricula of 2 to 4 years duration should be explored by teaching hospitals in affiliation with colleges and universities. Level I and II training should be included in Level III training, and credit should be given for those who have already completed Levels I and II.

PROPOSED EXAMINATION, REGISTRATION AND LICENSURE

In order to give professional recognition to those who can provide modern care, formation of a Registry and Board of Schools for ambulance attendants (EMTs) was initiated by the Committee on Acute Medicine of the ASA in May 1968. This idea was approved by the NRC, the AMA, the ACS, and the American Academy of Orthopedic Surgeons.[43] The AMA in conjunction with some ambulance representatives is now implementing such a plan but in an altered form.

We recommend that schools and registry should be under the direction of physicians, with broad representation of the ambulance

profession. Physician and EMT representatives should be chosen on the basis of competence and interest rather than organizational affiliations. Approval of schools should be under the auspices of the AMA Council on Medical Education; examination and registration under the auspices of the Registry; and licensure under the auspices of government. The American Registry of EMTs (AREMT) may be formed according to the model of the American Registry of Inhalation Therapists (Chicago, Illinois, 1968).

When we presented the tentative plan to the three major ambulance associations at a meeting in 1969, we also urged the formation of a national society, which should represent individuals (not services) on the basis of professional involvement and competence; be devoid of financial and other vested interests; be under the direction of paramedical professionals; and rely upon the guidance of physicians.

Physician Assistants in Critical Care Medicine. — The alarming decline in the number of general practitioners and the current tendency of medical schools to produce scientific specialists have left a nationwide void in medical care delivery outside the hospital. In addition, hospitals lack clinical manpower, in part because of a shortage of nurses and an uneven distribution of physicians.

We, therefore, propose that schools of allied health professions or medical schools explore degree programs leading to baccalaureate and master's degrees in medicine. These might include a "major" in critical care medicine (that is, acute medicine), which encompasses emergency care, intensive care, resuscitation, and respiratory therapy.

Basic knowledge, skills, judgment and attitudes required for physicians' helpers in emergency transportation, emergency rooms, ICUs, respiratory therapy services, pulmonary function laboratories and anesthesia services are similar. Job opportunities in these areas are unpredictable, which makes interchangeability desirable among these roles. Respiratory therapists, for instance, have not only been excellent instructors in resuscitation courses and EMT training programs but also functioned well as anesthesiologists' helpers in operating rooms. We have applied our valuable experience in training respiratory therapists to the development of EMTs.

For trial, we thus propose core curricula for training critical care medicine technicians (nondegree program) and technologists (degree program), with specialization in any of the above-mentioned fields, with multiple entry and exit opportunities in these individuals' educational and professional careers.

Their training at all levels should be patient-care oriented, to create not only knowledgeable but also skilled "feldscher"-type practitioners who would work under the immediate or remote direction of physicians, inside and outside hospitals.

SUMMARY AND CONCLUSIONS

Personal experience of 15 years with the ambulance profession is summarized.

Application of modern advances in resuscitation and intensive care to prehospital health care calls for upgrading ambulance personnel—both part-time and full-time—to paramedical professionals, that is, emergency medical technicians (EMTs). They must receive status and pay commensurate with their skill, knowledge, and responsibility. Their services should cover the whole range from extrication and resuscitation to prevention of cardiac arrest in myocardial infarction by prehospital arrhythmia control and support of life-threatening cases during interhospital transfer.

Pilot projects have defined curricula for two of the three following levels of training: (1) a 70 to 100 hour course for upgrading all ambulance attendants; (2) a course which includes work with hospital patients for EMTs who will staff mobile ICUs; (3) a college-based course for instructors and leaders. Ultimate training levels and course curricula should evolve from evaluating the results of pilot projects. Evaluation should include examinations, which are part of the course; periodic testing of skills; and quantitation of service results in terms of mortality and morbidity, using appropriate controls.

A national Registry and Board of Schools for EMTs, initiated by the ASA in May 1968, are now being implemented by the AMA Commission on Emergency Medical Services. A single national professional organization (society) for ambulance attendants has been proposed.

A coordinated multiple-level paramedical educational program should be explored for critical-care medicine (acute medicine).

This program would train technicians (without degrees) and technologists (with degrees) who would function as physicians' assistants in emergency transportation, emergency rooms, ICUs, respiratory therapy services, anesthesiology departments, and, perhaps, other areas.

REFERENCES

1. Accidental Death and Disability. National Academy of Sciences/National Research Council, September 1966

2. Community-wide emergency medical services: recommendations by the Committee on Acute Medicine of the American Society of Anesthesiologists. JAMA 204:595-602, 1969

3. Farrington JD: Death in a ditch. Bull Amer Coll Surg 52:1-10, 1967

4. Winchell SW, Safar P: Teaching and testing lay and paramedical personnel in cardiopulmonary resuscitation. Anesth & Analg 45:441-449, 1966

5. International Symposium on Emergency Resuscitation, Stavanger, Norway, 1961. Acta Anaesth Scand Suppl 9, 1961

6. International Symposium on Emergency Resuscitation, Oslo, Norway, 1967. Acta Anaesth Scand Suppl 29, 1968

7. Young CB Jr: First Aid and Resuscitation. Springfield, Illinois, Charles C Thomas, Publisher, 1954

8. Kennedy RH: Current problems in emergency transportation fields. Int Rescuer 7:5-19, 1963

9. Hampton OP: Present status of ambulance service in the United States. Bull Amer Coll Surg 50:177-179, 1965

10. Standards for emergency ambulance services. Bull Amer Coll Surg 52:131-132, 1967

11. Elam JO, Brown ES, Elder JD Jr: Artificial respiration by mouth-to-mask method; study of respiratory gas exchange of paralyzed patients ventilated by operator's expired air. New Eng J Med 250:749-754, 1954

12. Safar P, Escarraga L, Elam J: A comparison of mouth-to-mouth and mouth-to-airway methods of artificial respiration with the chest-pressure, arm-lift methods. New Eng J Med 258:671- 677, 1958

13. Symposium on Mouth-to-Mouth Resuscitation (Expired Air Inflation). JAMA 167:317-341, 1958

14. Safar P, McMahon M: Mouth-to-airway emergency artificial respiration. JAMA 166:1459-1460, 1958

15. Safar P, McMahon M: Resuscitation of the Unconscious Victim, A Manual, orig, Baltimore City Fire Department, 1957. Springfield, Illinois, Charles C Thomas, Publisher, 1959 (first edition); 1961 (second edition)

16. Safar P, Aguto-Escarraga L, Chang F: A study of upper airway obstruction in the unconscious patient. J Appl Physiol 14:760-764, 1959

17. Emergency Artificial Respiration Without Adjunct Equipment, Ad Hoc Committee Report. National Academy of Sciences/National Research Council, December 1958

18. Safar P, Brose R: Ambulance design and equipment for resuscitation. Arch Surg 90:343-348, 1965

19. Kouwenhoven WB, Jude JR, Knickerbocker GG: Closed-chest cardiac massage. JAMA 173:1064-1067, 1960

20. Safar P, Brown T, Holtey W, et al: Ventilation and circulation with closed-chest cardiac massage in man. JAMA 176:574-576, 1961

21. Wilder RJ, Jude JR, Kouwenhoven WB, et al: Cardiopulmonary resuscitations by trained ambulance personnel. JAMA 190:531-534, 1964

22. American Heart Association Committee on Cardiopulmonary Resuscitation: (a) A Manual for Instructors. New York, 1967 (first edition); (b) CPR Discussion Guide for Ambulance Attendants. New York, 1965

23. Safar P: Cardiopulmonary Resuscitation: A Manual for Physicians and Paramedical Instructors. World Federation of Societies of Anaesthesiologists, 1968 (available in 8 languages from WFSA, PO Box 430, Bronxville, New York)

24. Ambulance Attendants' Training Manual. Harrisburg, Pennsylvania Department of Health, 1964

25. Emergency Rescue Squad Manual — Ohio. Trade and Industrial Education Service. Columbus, Ohio State University Press, 1959

26. Emergency Care, A Manual. Committee on Trauma, American College of Surgeons. Edited by RH Kennedy. Philadelphia, WB Saunders Company, 1966

27. Safar P: Report of Medical Committee, International Convention on Life-Saving Techniques, Sydney, Australia, March 1960. Anesthesiology 21: 570-571, 1961

28. Safar P: Current status of resuscitation practices in Prague and Moscow, Cardiopulmonary Resuscitation Techniques: Perspectives in Training and Application. Proceedings of a Symposium on Cardiac Arrest. U.S. Department of Health, Education and Welfare, Public Health Service, 1965, p 21

29. Safar P: Community-wide emergency care for acutely life-threatening conditions. Proceedings of the Second Congress of the International Association for Accident and Traffic Medicine, Malmo, Sweden. Edited by HB Wulff. 1966, pp 9-17

30. Waller JA, Garner R, Lawrence R: Utilization of ambulance services in a rural community. Amer J Public Health 56:513-520, 1966

31. (a) Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and During Transportation. (Level I), March 1968. (b) Advanced Training for EMTs—Ambulance (Level II), September 1970. National Academy of Sciences/National Research Council, Washington, D.C.

32. Medical Requirements for Ambulance Design and Equipment. National Academy of Sciences/ National Research Council, September 1968

33. Bethesda Conference on Early Care for the Acute Coronary Suspect. Amer J Cardiol 23:603-618, 1969

34. Safar P: Recommendations for Emergency Medical Services in Life-Threatening Conditions. Proceedings of Health & Welfare Association of Allegheny County, Pittsburgh, Pennsylvania, April 1964

35. Benson DM, Esposito G, Dorsch J, et al: (a) Mobile intensive care by "unemployable" blacks trained as emergency medical technicians (EMTs). J Trauma (in press). (b) Proceeding abstracts, ASA *Meeting San Francisco, Oct.* 1969, pp 42-43.

36. Safar P, Esposito G, Benson DM: Ambulance design and equipment for mobile intensive care. Arch Surg 102:163-171, 1971

37. Waters JM: The Efficient City Emergency Medical System—Myths and Reality. Airlie Conference Proceedings, American College of Surgeons, 1969

38. (a) Nagel EL, Hirschman JC, Mayer PW, et al: Telemetry of physiologic data: an aid to fire rescue personnel in a metropolitan area. Southern Med J 61:598-601, 1968; (b) Nagel EL, Hirschman JC, Nussenfeld SR, et al: Telemetry—medical command in coronary and other mobile emergency care systems. JAMA 214:332-338, 1970

39. Farrington JD, Hampton OP: A curriculum for training emergency medical technicians. Bull Amer Coll Surg 54:1-4, 1969

40. Basic Training Program for Emergency Medical Technician—Ambulance. Course Guide and Course Coordinator Orientation Program. Prepared by Dunlap & Associates, Inc., Darien, Connecticut for the National Highway Safety Bureau, U.S. Department of Transportation, Federal Highway Administration, U.S. Government Printing Office, Washington, DC, October 1969

41. Committee on Injuries, American Academy of Orthopedic Surgeons: Emergency Care and Transportation of the Sick and Injured. AAOS, Chicago, Illinois, 1971

42. Kirimli B, Safar P: Training methods in cardiopulmonary resuscitation, Handbook of Coronary Care. Excerpta Medica (in press)

43. Safar P: Registration, Certification and Recertification of Ambulance Attendants. Airlie Conference Procedings, American College of Surgeons, 1969

44. Pantridge JF, Geddes JS: A mobile intensive care unit in the management of myocardial infarction. Lancet 2:271-273, 1967

Historian Charles A. Beard was once asked if he could summarize the lessons of history in a short book. He replied that he didn't need a book—he could do it in four sentences: 1) Whom the gods would destroy, they first make mad with power; 2) The mills of God grind slowly, but they grind exceedingly fine; 3) The bee fertilizes the flower it robs; 4) When it is dark, you can see the stars.