Invited Commentary: Snippets from the Past: Seventy Years Ago in the Journal

George W. Comstock

The fifth volume of the *American Journal of Hygiene* was a large one, with 840 pages for 50 articles and seven for the *Proceedings of the Society of Hygiene*. In keeping with the interests of the time, most dealt with parasitology, entomology, and laboratory procedures. Those dealing with communicable diseases will seem more relevant to today’s readers.

Charles V. Chapin, the epidemiologically oriented health officer of Providence, Rhode Island, made a thorough analysis of measles cases reported in his city from 1858 through 1923 (1). During the most recent 7-year period, a total of 14,376 cases were reported, with 85 percent of them occurring in individuals less than 9 years old. Among infants less than 1 year of age who were exposed to measles, the attack rate was 56 percent. Among children 1–8 years of age, the attack rate ranged from 91 to 96 percent and was highest among the 7 year olds. In that same age range, secondary attack rates varied from 77 to 90 percent, with the highest secondary attack rate among 4-year-old children.

Aycock and Eaton also used data from Providence to compare the behavior of measles, scarlet fever, and infantile paralysis in families (2). Following introduction of measles or scarlet fever into a family, multiple secondary cases were likely to occur. In contrast, introduction of a case of infantile paralysis (poliomyelitis) into a family rarely resulted in more than a single secondary case.

However, multiple cases of infantile paralysis did occur in families (3). When Aycock and Eaton examined the time intervals between 576 cases in 253 families, they concluded that a large proportion of the cases resulted from the same extra-household exposure and that the “much smaller proportion of secondary paralytic cases” occurred 10–18 days after the first reported case, with an average interval of 14 days.

In an effort to ascertain how measles was transmitted, Scott and Simon gave rabbits injections of a variety of materials (4). The virus was demonstrable in nasal secretions and remained infectious for 48 hours. Virus could not be demonstrated in the dust from the sick room, from the skin of a child in the desquamating phase of the disease, nor in samples of air drawn from the vicinity of the heads of two patients. However, the air samples were collected on the third day after the appearance of the rash, a time when communicability is now considered to be minimal (5).

An unprecedented number of cases of scarlet fever in July, a time when scarlet fever is uncommon, prompted a special investigation (6). The large number (116 cases) suggested milk as a possible source. A check of the local dairies revealed that an individual who made ice cream was under quarantine for scarlet fever but had continued to work for the first 3 days of his illness. Histories from 94 cases and 88 normal persons showed that 77 cases and only 17 controls had eaten ice cream made by the ill employee (odds ratio 18.9, 95 percent confidence interval 9.0–39.8). No other common exposure could be identified, and inspection of the ice cream making process showed numerous opportunities for respiratory contamination.

Although it was recognized in 1925 that apparently healthy carriers of diphtheria bacilli were responsible for many cases of diphtheria, the relative infectiousness of cases and carriers was uncertain. Using data from the Baltimore City Health Department, Doull and Lara showed that cases were on average approximately 10 times as infectious as carriers (7). They could find no difference in infectivity between carriers of “virulent” or “avirulent” bacilli.

In a continuation of his studies on experimental epidemiology, Webster (8) reviewed the data on the three major determinants of an epidemic—host susceptibility, microbic dosage, and microbic virulence. He concluded that “after the epidemic wave has passed, when all available susceptible material is exhausted, the virulent micro-organisms, finding no suitable nourishment, are reduced in numbers and tend to dissociate into non-virulent types which are better suited to a saprophytic existence” (8, p. 341).

The relation of fatigue and susceptibility to infection continued to intrigue investigators. In contrast to re-
ports in volume 2 of the *Journal* (9, 10), Bailey found that acutely fatigued rabbits had increased susceptibility to injections of pneumococci, especially if the injection preceded fatigue (11). In contrast, animals who had been well trained to exercise showed increased resistance when inoculated with pneumococci.

In continuing studies of how best to kill mosquito larvae, Barnes suggested a mixture of crude petroleum oil and pine oil as being better than either one alone because "pine oil has a powerful soporific or paralyzing effect upon mosquito larvae," resulting in their death "apparently by drowning while under the effects of the drug" (12, p. 328).

Previous volumes of the *Journal* have had numerous reports of hookworm investigations by the Department of Medical Zoology of The Johns Hopkins University School of Hygiene and Public Health and the International Health Board of the Rockefeller Foundation. Volume 5 contains a summary of the investigators’ findings (13) dealing with many aspects of human infestation, soil pollution, and the biology of *Necator americanus*. The final article of the series concludes as follows: "Realizing the difficulties involved we have all tried to carry out our experiments as carefully as possible, to record the results fully, to limit the inferences drawn to the particular sets of conditions investigated and to avoid as far as possible sweeping generalizations" (13, p. 89).

Somewhat related is a report from Peking Union Medical College on the bacteriologic status of fruits and vegetables and on ways to sterilize them (14). Uninjured fruits and vegetables did not contain living bacteria, although these organisms did penetrate decayed and injured portions to a very limited extent, including the cut ends of vegetables. Chlorination killed surface bacteria but not ova. Dipping fruit and vegetables into water kept for 10 seconds at temperatures greater than 80°C killed all pathogenic bacteria, protozoan cysts, and helminth eggs.

Finally, volume 5 contains an extensive review of infant mortality among blacks and whites and among infants born to mothers who had come to the United States from many countries (15). During the 6-year period under review, 1916–1921, infant mortality declined in all groups. Most of the differences in infant mortality among groups was due to gastrointestinal or respiratory causes, suggesting that preventable environmental conditions were responsible. Less change with time was noted for deaths at ages less than 1 month, which were thought to have been brought about by causes little understood at that time.

**ACKNOWLEDGMENTS**

This review was supported in part by Career Research Award HL21670 from the National Heart, Lung, and Blood Institute and by Research Grant CA 36390 from the National Cancer Institute.

**REFERENCES**