lymphatic systems, respiratory system, digestive system, the endocrine glands, urogenital system, osteology, arthrology and syndesmology, teeth, muscular system and integument, nervous system and sense organs. Physiology and pharmacology: blood and circulation—respiration, digestion nutrition and metabolism, kidney and water balance, endocrine glands, animal heat, reproduction and development, muscles and skin, nervous system and sense organs, pharmacology. Psychobiology: receptive capacities, the action system, maturation of behavior, motivation of behavior, modifiability of behavior, intelligence and behavior—insight—ideation, reproductive and social behavior, miscellaneous, observational psychobiology.

There are 4,630 entries, a list of miscellaneous bibliographies and an index of authors' names of 27 pages. The book is a beautifully prepared volume of double column format, with bold-faced headings to each entry, which makes it easy of consultation. Classification is largely by subject, with items arranged by author, but in the case of literature up to the nineteenth century it is chronological. Where an entry covers two subjects it is entered under the principal one and cross indexed under the other. The effort is always to make the bibliography practical. Thus under "Habits in Nature and Captivity" the classification is taxonomic, the author believing that "Whatever the initial zeal, the discomforts of Procrustean categories soon convinced us of the folly of attempting to divide a literature where definite lines of cleavage do not exist."

Separate publications are distinguished by having the titles printed in italics. The use of capital letters is reduced to a minimum. Total pagination is given in every case. In order to make the reference as exact as possible, a system of markings is adopted which indicates the extent to which an article presents primate material. As a further means to exact determination the character of the publication is indicated—abstract, review, lecture, etc. Finally the name of the animals treated is given in abbreviation.

C. E. McCLUNG

SPECIAL ARTICLES

OBSERVATIONS ON AN EPIDEMIC OF POLIOMYELITIS[1]

AN epidemic of poliomyelitis was observed in which the transmission of the disease seemed largely limited to the late incubation and early prodromal periods, and the spread from neighborhood to neighborhood and community to community greatly influenced by human travel. The place was Walker County (population 65,000), a mountainous and mining region in north central Alabama. The epidemic began in the last week in June, reached a peak early in August, and was virtually ended by the last week in September, 1941.

Along with controlled studies of certain age groups the families of 101 of the 121 reported cases of all ages were interviewed between August 8 and November 8 in a systematic manner by the same investigator, and in 91 instances most of the families of neighbors, friends and reported contacts of the case. Unreported cases of poliomyelitis were uncovered, and many acute febrile illnesses compatible in the broadest sense with abortive poliomyelitis. No epidemic of any disease except poliomyelitis was recognized in the areas between June 15 and September 15, and the isolated cases of mumps, measles, pertussis, etc., did not exceed 10 per cent. of the frank poliomyelitis cases observed. Of the 101 individuals studied 87 had paralytic and 13 abortive poliomyelitis with myelitic or meningitic signs, and one had an acute febrile illness compatible with abortive poliomyelitis (in a like twin whose brother had paralytic poliomyelitis); five died; 85 were under six years of age.[2]

Although the residences of many of the 101 patients were among the most isolated in the eastern United States, not one patient had been isolated during the month preceding the illness. Visits were generally among relatives or church workers (the contact was frequently at the premises of a neighbor of the family visited). Of the 101 patients 81 had experienced within 34 days of onset prolonged direct contact with a prior acute febrile illness compatible with poliomyelitis (in 67 instances it was frank poliomyelitis, 38 of which had been reported and 29 unreported; 5 of the remaining 14 children had in turn been exposed 4 to 18 days prior to onset to frank poliomyelitis, and 6 others resided in or had visited an epidemic neighborhood in the same period). In 72 of the 81 instances the children played together for more than an hour, the least interval being a child's "ten minutes"; in perhaps every instance a portion of the visit was in the daytime; in many it was limited to this period and to the premises outside of the house.

In 45 instances the contact with prior poliomyelitis

[1] The work was supported by the National Foundation for Infantile Paralysis and the Alabama Department of Public Health.

[2] Valued assistance in the clinical study of this epidemic was received from Dr. A. M. Waldrop and staff of the Walker County Health Department; Dr. B. M. Beach, associate director of child hygiene, Alabama Department of Public Health; Dr. Earle Conwell and staff of the State Crippled Children's Bureau; Dr. A. G. Gilliam, U. S. Public Health Service; and Drs. J. D. Trask, J. R. Paul and H. A. Wenner, Yale University School of Medicine.

was multiple, frequently because of small mining camps with numerous pre-school children in daily communication with each other (most of whom developed an acute febrile illness after exposure to poliomyelitis). The virus of poliomyelitis was recovered from flies trapped near a privy used by families of four acute cases in such a camp.[3] In 37 instances of multiple contact the children lived within 300 yards of each other.

In 36 instances the contact with prior poliomyelitis was single, and took place in 30 (83 per cent.) before the contacted child or the victim became ill. In 18 of the 30 it occurred on the day of onset and in the remainder during the 3 days before the onset of the prodromal period in the contacted child. Among the 30 single contacts on or before the day of onset 16 of the visits were made by the child about to become ill (average distance covered was 7 miles) and 14 by the victim (average distance covered was 10 miles). The group represented for the most part the first cases in their respective neighborhoods and the most severe instances of poliomyelitis in the epidemic. Four of the 5 deaths among the 121 reported cases (and the only death among the unreported prior contacts) were in this 30; in 27 instances both contacted child and victim developed paralytic or myelitic poliomyelitis. For the 30 victims there were 20 different places of contact (and 20 different contacted children) separated by an average distance of 4.5 miles from the nearest prior poliomyelitis, reported or unreported. The prodromal period in the 30 victims began 3 to 21 days after the exposure to the contacted child (the average incubation period was 12.3 days) (Fig. 1).

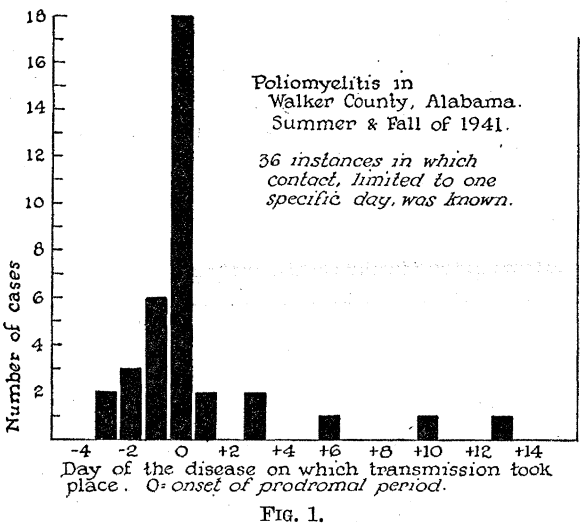

FIG. 1.

It was improbable that infected insects or other agents[3, 4, 5] traveled the average distance of seven miles and selected the same 16 victims out of a pre-school child population of over 3,000 as were visited by the 16 incipient poliomyelitis patients. If a mobile human reservoir was responsible in the 16 instances where the about-to-be-ill child did the visiting, it was equally true in the reverse, since only 14 instances were recorded of the victim visiting the incipient patient under the same circumstances. The mobile human reservoir was also a transient one, since half of the children who developed the disease visited with the patient on the day of onset (in the 36 instances where there was a single visit). It was unlikely that 50 of each clinically non-infected visitors who came from distant neighborhoods would do so on the day of onset in the incipient patient. How the virus was spread from one child to the other was not attacked in the study. The premise of insect transmission to be compatible with the present findings would require the insect to have acquired the virus from the blood, secretions or excreta of an incipient poliomyelitis patient and to have transferred it within 24 to 72 hours to a second child generally on or near the premises where the visit took place. For the premise of direct transmission of the virus from the secretions or excreta of one child to the nose, eye or mouth of the other the histories are also compatible.

Summary and Conclusions: An epidemic of poliomyelitis was observed in which human travel was a major factor in the spread of the disease from neighborhood to neighborhood and from person to person. Eighty per cent. of the poliomyelitis patients had probably visited or been visited by a prior poliomyelitis patient who was in the late incubation or early prodromal period. The effective reservoir of the virus was seemingly a patient within three days before or three days after the onset of the first prodromal symptom. Whether the effective virus was present in the blood, the secretions or the excreta of the patient at this critical period and how the transfer was accomplished was not determined.

ALBERT E. CASEY

SCHOOL OF MEDICINE,
LOUISIANA STATE UNIVERSITY

THE INTRAVENOUS DRIP AND OTHER INTENSIVE METHODS FOR THE TREATMENT OF EARLY SYPHILIS[1]

THE finding[2] that early syphilis may be effectively treated, and in most cases definitively cured, within 5

[3] J. R. Paul, J. D. Trask, M. B. Bishop, J. L. Melnick and A. E. Casey, SCIENCE, 94: 395, 1941.

[4] A. B. Sabin and R. Ward, SCIENCE, 94: 590, 1941.

[5] J. A. Toomey, W. S. Takacs and L. A. Tischer, *Proc. Soc. Exp. Biol.*, 48: 637, 1941.

[1] From the U. S. Public Health Service, Washington, D. C., and the Syphilis Division of the Department of Medicine, the Johns Hopkins Medical School, Baltimore, Md.

[2] George Baehr, William Leifer, Louis Chargin, H. T. Hyman, *et al.*, *Arch. Derm. and Syph.*, 42: 239, 1940.