Variola Minor in a Primary School

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THE SPREAD of communicable diseases in schools has been studied repeatedly because personal contacts in schools have distinctive characteristics. This paper records the flow of variola minor (alastrim) through a primary day school during an epidemic in a school district of São Paulo, Brazil. This epidemic comprised 54 cases. It had a very limited spread in the general environment of the district despite deficient or a complete lack of preventive measures (*1*), but its spread was rather wide in most households where infection was introduced. Virus isolations, antibody titrations and epidemiologic data (*1*) definitely identified the disease while clinical findings (*2*) were typical of variola minor.

The Locale and Population

The district school of Vila Guarani is a public institution for free teaching of elementary education. No pupil or teacher resided there. The school is composed of five wooden barracks each housing two classrooms, except for a barrack with only one classroom, and a small masonry barrack with two privies. The six barracks were clustered around a central yard.

The enrollment consisted of 1,111 pupils, 610 boys and 501 girls. Ages ranged from 7 to 14 years. Because there were only 9 classrooms, pupils were divided into 27 groups, of which 9 groups attended classes from 7:45 to 10:45 (first period), 9 others from 10:45 to 13:45 (second period), and the remaining 9 from 13:45 to 16:45 (third period). There was an average attendance of 41 children of a single sex per class.

In 5 of the 27 groups of children which composed the student body, at least one case of variola was recorded. These affected classes are identified by Arabic numbers corresponding to the order of occurrence of illness onset in the earliest case in each class (fig. 1). Class 3, the third affected, was the only class with cases attending school during the first period; class 4, the fourth affected, was the only class with cases attending in the second period; classes 1, 2, and 5 attended school in the third period in different classrooms.

Children played or chatted in small groups in the central yard for about half an hour before entering the classrooms. This interval provided an opportunity for personal contact among children in the nine classes composing one-third of the school enrollment. The students gathered by pairs in lines without any predetermined order, a line for each class, to enter classrooms. Because the class periods were short there was no rest intermission.

A few children had previously had variola, usually in other states, but none in Vila Guarani, the school district. Vaccination of school children was compulsory but was conducted in alternate years; in a given year, the first- and fourth-grade classes were vaccinated, and the next year the second- and third-grade classes were vaccinated. Thus, children finishing their fourth and last year of instruction had been vaccinated twice. Children who joined the school after the beginning of the class term were not vaccinated, nor were they in the next year if they did not pass the yearly examination and were in a class that had been vaccinated the

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previous year. There were also children whose inoculation had been unsuccessful, and a few who had been successfully vaccinated before joining the school.

Flow of the Epidemic Through School

The epidemic in the district reached the school population when a 9-year-old Japanese girl, patient II–2, introduced the infection by attending school on April 29, 1956, the second day of her exanthem and perhaps on later days when her attendance was not being recorded. (Attendance was not recorded because a certain number of absences would bar students from taking the yearly examination.) Onset of illness in patient II–2, occurred on April 26, 17 days after a preschool sister and 1 day before two preschool brothers became ill. Neither she nor any other school-child patient attended school during the prodromic period because of the intensity and sudden onset of systemic manifestations. At least three other children are known to have attended during the exanthem stage. This action was motivated by ignorance of the epidemic potentialities of the disease, the desire to avoid absences, and by the coincidence of the onset of exanthem with abrupt disappearance of the general malaise characterizing the prodromic period. Children attending school during their exanthem did so until teachers noticed it and sent them back home.

Although some cases occurred during May among the children attending school, it was not until early June that the visiting nurse and some teachers noticed the disease and notified the health officials of the city of São Paulo. These officials decided upon a mass vaccination of the school population which was initiated on June 5 and ended on June 20. Most class members were vaccinated on the same day.

The last case observed among school children had its onset on June 21, but it is not known whether patient XX–2, a home-infected school child whose illness onset occurred about August 28, had attended school during illness. His name was not known and his family moved to an unknown address just before the study team visited the previous home. For these reasons, this patient is excluded from the present study as was patient XIII–5, a class 5 child showing the first manifestations of variola on June 17. However, as will be explained later, this class

Table 1. Characteristics of cases of variola minor in school children, São Paulo, Brazil, 1956

School class, case number, and race	Age (years)	Immunity status [1]	Clinical type of variola [2]	Date of illness onset	Role in the epidemic's flow through the school population
Class 1 (girls):					
II–2 Japanese	9	7-year-old scar	6	Apr. 26	Class 1 index case.
V–1 Negro	8	No scar	6	May 9	Class 1 secondary case.
Class 2 (girls):					
VRJ [3]	(3)	do	(3)	May 9	Case secondary to class 1 index case.
Class 3 (boys):					
VI–1 white	7	do	6	May 11	Class 3 index case.
VII–1 white	7	do	4	May 30	Class 3 secondary case (1st generation).
VIII–1 Negro	8	do	6	June 1	Do.
PCB [3]	(3)	do	(3)	June 1	Do.
X–1 Negro	12	do	6	June 1	Do.
XIII–1 white	7	do	6	June 3	Do.
XIV–1 white	8	do	6	June 4	Do.
XV–1 Negro	7	do	6	June 5	Do.
XVII–1 white	7	do	6	June 21	Class 3 secondary case (2d generation).
Class 4 (girls):					
IV–2 white	9	do	6	May 13	Class 4 index case.
Class 5 (boys):					
IX–1 white	9	do	4	June 1	Case secondary to class 4 index case.

[1] Vaccination scar. No patient previously had had variola.

[2] According to Dixon's classification (reference 3), type 4 is "benign confluent" variola and type 6 is "discrete" variola.

[3] Information not available.

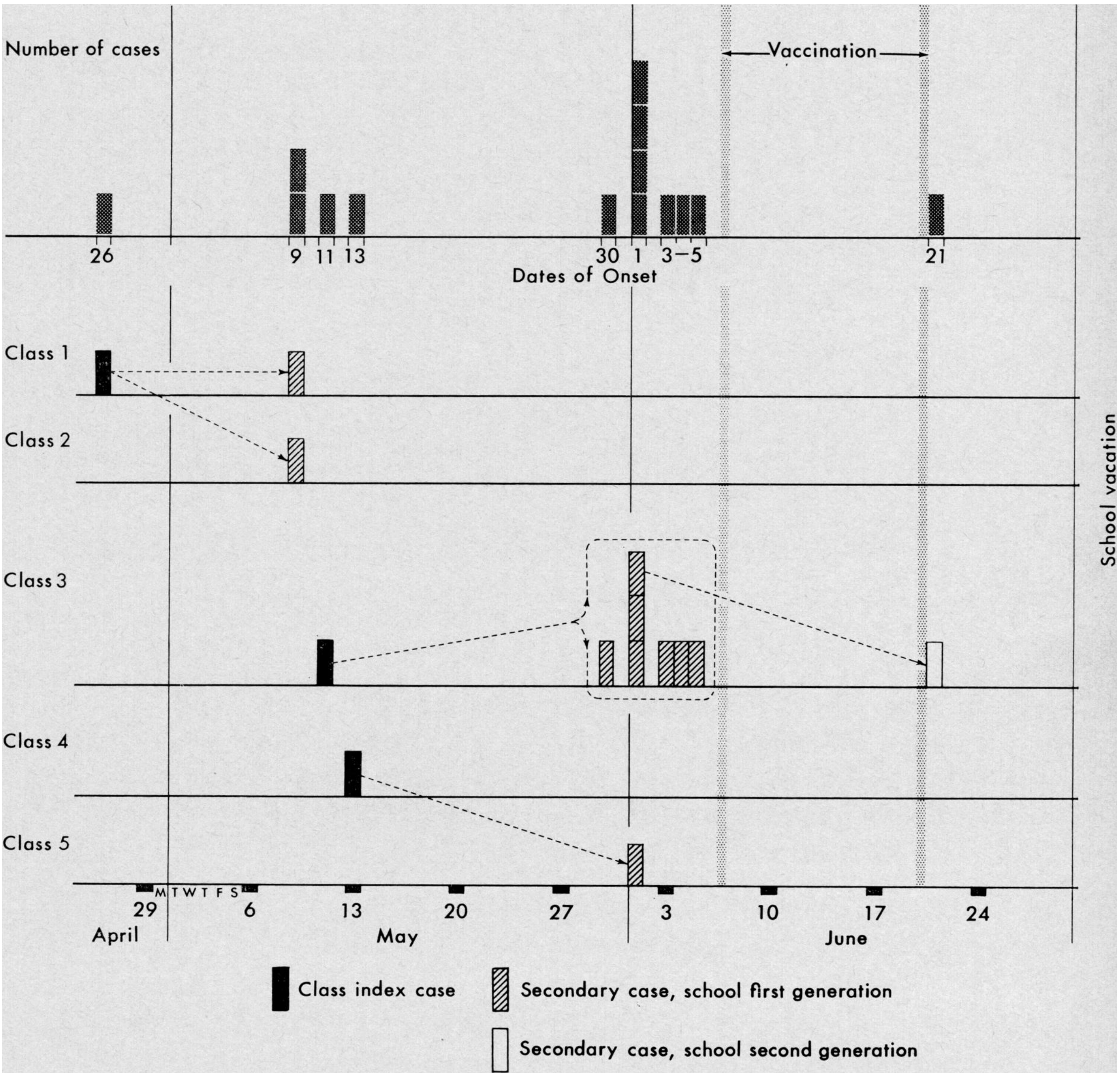
NOTE: Excluded are one case occurring in a child who was not infected at school and did not infect schoolmates and one case with onset in late August with an unknown role in the epidemic's flow in the school.

5 child was neither infected at school nor did he infect schoolmates. Table 1 gives the characteristics of the 14 cases seemingly involved in the flow of infection through the school population. Three school children were isolated in the Isolation Hospital of the city of São Paulo when they were in the exanthem stage.

No case occurred in the school staff, not even of *variola sine eruptione.* However, at least one child had inapparent variola; blood tests of 1 of 18 classroom contacts showed a positive complement fixation, a 1:64 titer, and this contact had neither a vaccination scar nor previous variola.

The term lasting from February to June 30 was followed by the vacation month of July. Apparently no case other than the one mentioned previously appeared in August, when classes were resumed, or in September, when the casefinding survey was finished. The chronology of illness onset in the 14 school children is shown in figure 1 as well as the time relationships of the epidemic curve with vaccination

Figure 1. Onset of cases and chain of contagion in classes during an outbreak of variola minor in a São Paulo school

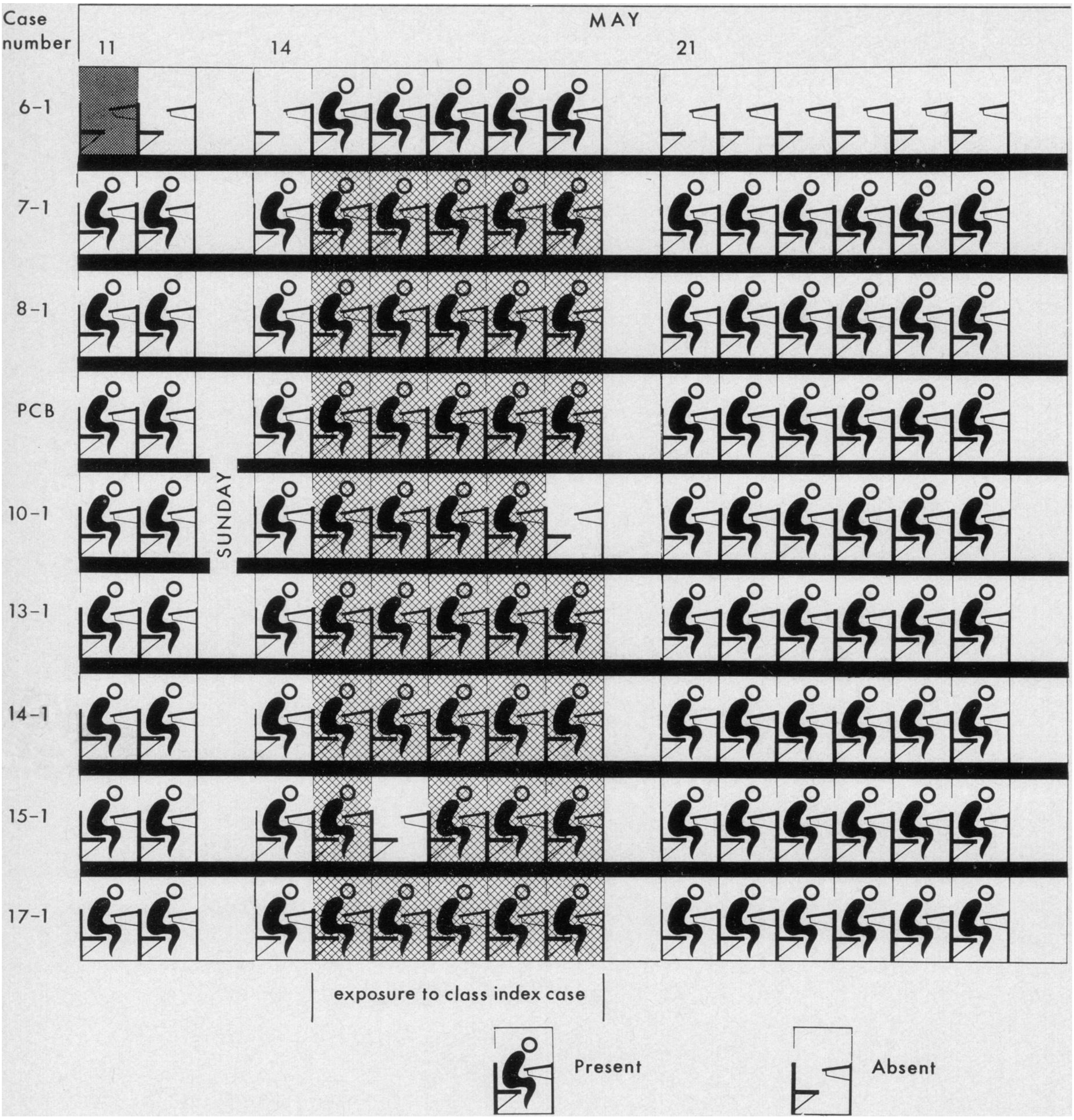


and vacation. Cases are sharply grouped, with comparatively long caseless intervals between the neat waves of cases which are typical of person-to-person transmission.

Method of Investigation and Results

A casefinding survey was conducted in all classes, although those with known cases were surveyed first and complementary information obtained. Repeated personal interviews with teachers and pupils and clinical examinations disclosed the cases that had occurred in each class. The addresses of children with variola and of their unvaccinated classroom contacts were obtained to search for further cases at homes and to check the information collected at the school. Clinical characteristics, dates of onset of the prodromic period and the exanthem, and demographic data were recorded. The im-

Figure 2. School attendance of

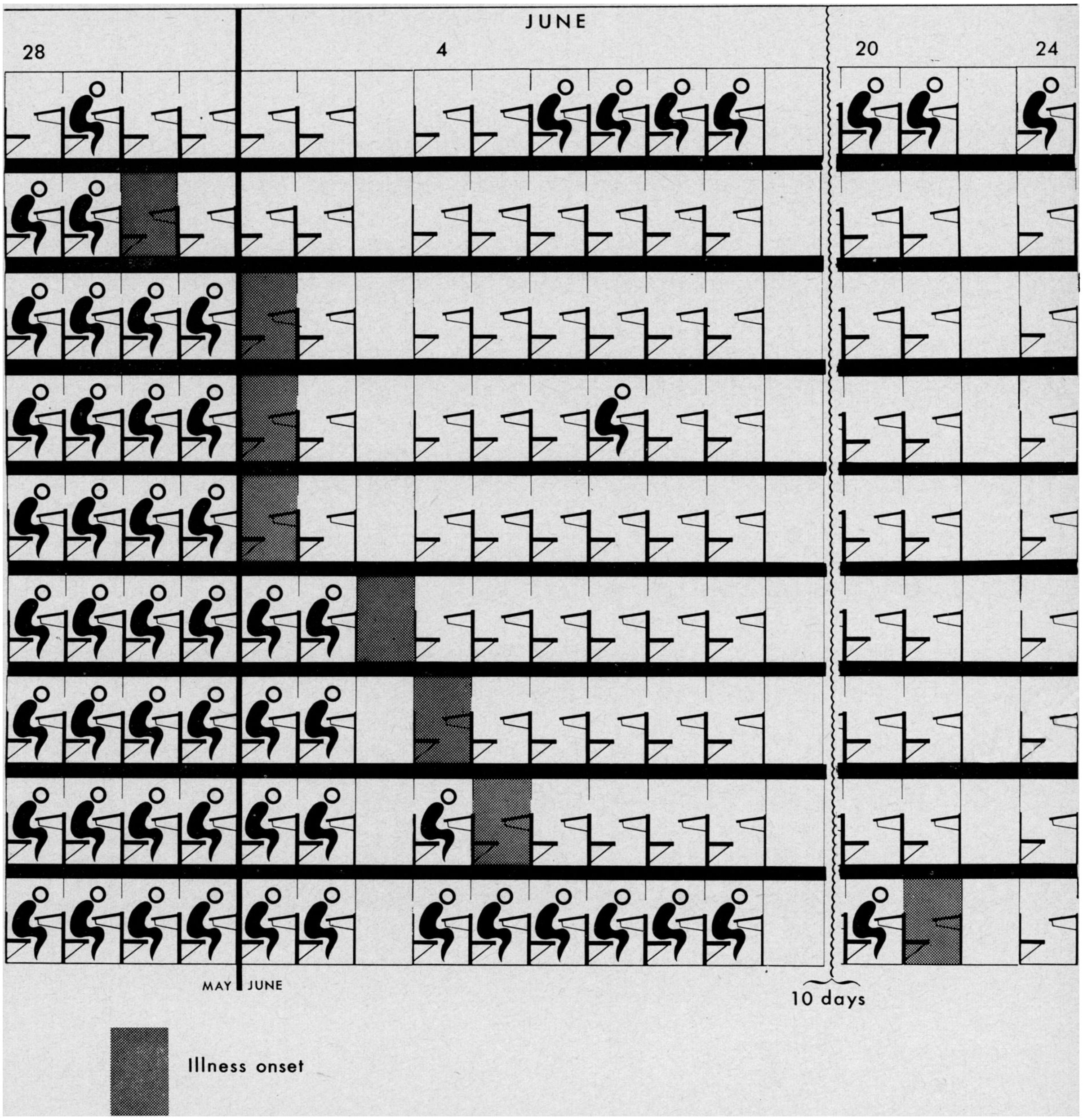


munity status of patients and of the classes with cases was emphasized, but this information was not obtained in the classes without cases because of lack of time.

Immunity status was determined through questioning and inspection of the usual vaccination sites and inquiry about previous variola and varicella. Varicella was investigated because of the possibility that lay persons might confuse it with benign cases of variola. Absenteeism during the epidemic period was recorded and checked with the information obtained at the homes.

Since it became clear early in the casefinding survey that person-to-person contact was the mode of infection transmission, spatial relations among patients and contacts were studied in an environmental survey of the school, and maps of the classrooms where cases occurred were prepared. Particularly emphasized in the in-

children in class 3 during outbreak



vestigation were the school population's habits of personal contact inside the classrooms as well as before entering and after leaving them. The type and duration of these associations were carefully elicited from the patients and their known contacts, and this information was checked with classmates and, when advisable, with teachers. A serologic survey of a small number of patients and classroom contacts of patients was also carried out. The techniques employed in the serologic tests have been reported (*1*).

Transmission of infection. The flow of infection through the school population depicted in figure 1 is believed to be the reconstitution closest to the actual events because of the following findings and arguments.

1. The introducer of infection in class 1 who had the earliest case among school children could not infect, at school, the introducer of infection in class 3 because the class 3 child attended school during the first period and the class 1 child during the third period. Since the introducer of infection in class 3 was not infected at the school but elsewhere, he should be considered as a reintroducer of infection in the school.

2. The introducer of infection in class 4 was a secondary case in her household, and it is therefore probable that she was infected at home. This child might also be considered as a reintroducer of infection in the school.

3. The introducer of infection in class 4 attended school during the second period, and she may have infected the child who had the first case in class 5 who attended school during the third period. Also, the class 4 girl is known to have attended school on May 17, the second day of her exanthem and, 15 days later, illness onset occurred in the first case in class 5. The class 5 boy was the first case in his home, which strengthens the supposition that the source of his infection was a schoolmate.

4. Patient XIII–5, another class 5 child (not shown in fig. 1) was probably infected at home since four household members developed variola before him, including one whose illness began 14 days before onset of his illness. Also, although the child who had the first case in class 5 developed variola before patient XIII–5, neither attended school during illness. These findings seem to exclude patient XIII–5 from the school chain of transmission.

5. The interval between illness onset in the first case in class 3 and onset of the earliest subsequent case in this class was 19 days, a longer period than other case-to-case intervals in the school. However, figure 2 shows that the child who had the class 3 first case attended school on the second through the sixth day of exanthem. The interval between this 5-day period and onset of any of the secondary cases in the first generation is consistent with the incubation period of variola. Assuming that the incubation period was fixed, the children who had first-generation secondary cases were infected on different days of the period of exposure. This assumption is suggested by the fact that the span of dates of onset in these first generation cases was 6 days.

6. Only one boy who had a first-generation secondary case in class 3 attended school during illness, and 14 days after he attended for a single day, onset of the second-generation case occurred (fig. 2). These findings and the fact that he was the first case in his household strongly suggest that the child who had the only second-generation case was infected at school.

7. One of the three school-children patients whose homes could not be included in the survey was apparently infected at home and became patient XX–2, as mentioned previously, while the other two were seemingly infected at school. Illness onset in VRJ, the class-2 first case, occurred simultaneously with onset in a classmate of the introducer of infection in class 1, and these patients, seemingly infected at the school, had onset after an interval suggestive of infection by the child who had the class 1 index case. Also, all three patients being girls, they attended school during the same period and thus had ample opportunity for personal contact, although VRJ attended classes in another classroom.

The other patient whose home could not be found, PCB, belonged to class 3 and had illness onset on June 1 (fig. 2), the same date as two other class 3 patients and 2 days after another classmate. In addition, the intervals between onset of these cases and the school attendance during illness by the introducer of infection in class 3 were suggestive.

Immunity status. Table 1 lists the immunity status of the 14 school children with variola who were involved in the flow of the epidemic through the school population. No case occurred among school children who had previously suffered from variola, not even of *variola sine eruptione.* A clear indication that a successful vaccination protected school children and teachers against overt variola resulting from transmission of infection at school is the fact that no patient infected at the school was found among the 120 persons who were known to have a vaccination scar in the affected classes, while 11 out of the 56 known to be unvaccinated in the same classes seemed to be infected at the school and developed cases.

Another manner of determining the influence of previous successful vaccination upon occurrence of overt variola is to examine attack rates in the population of the affected classes. A class 5 child, patient XIII–5 who was involved only in his home outbreak, the three patients infected at home but who introduced infection in the school, and the five teachers are included in the population groups in table 2. With the reservations necessary because of the unknown immunity status of several children, it was found that less than 2 percent of those known to be vaccinated in the five classes had variola minor and they seemed to have acquired their infection at home, while 23 percent of those known to be unvaccinated were attacked, and infection seemingly occurred at school for 11 of these 13 patients.

The immunity status of the classes at the time of introduction of infection or of onset of the class's first case is presented in table 2. When data from class 1, with only one secondary case, were compared with data from class 3, where there were eight, it was found that the vaccination level of class 3 is markedly lower and its ratio of immunes to susceptibles is reversed. Less than half of class 3 had been successfully vaccinated, while immunes outnumbered susceptibles in the four other classes with cases.

Spatial relations between patients and contacts. Three of the five barracks with classrooms were spared and, in one of the two barracks affected, a classroom was spared. Four classes were spared among the nine classes using the three classrooms where cases were recorded, and in no room were all three classes affected, not even in that with a total of 10 cases. Furthermore, classes 2 and 4 used the same room and desks as did classes 3 and 5, and yet no two patients from classes using the same room sat at the same desk. These findings do not support the hypothesis of transmission of variola through contaminated desks. No schoolroom was subjected to current or terminal disinfection, and four patients attended school while in the exanthem stage, at times for more than 1 day. No evidence of the operation of fomites

Table 2. Immunity status of affected classes [1] at introduction of infection or onset of class's first case

Class	Previous variola	Interval since last successful vaccination (years)			No scar	Immune to susceptible ratio [2]	Vaccination level [3] (percent)	Secondary cases
		1–2	2–3	4 or more				
1. (Girls)	0	31	--------	2	16	33:16	67	1
2. (Girls)	([4])	--------	31	4	6	35:6 (*6*)	74	0
3. (Boys)	[5] 1	14	--------	1	21	16:21 (*2*)	41	8
4. (Girls)	([4])	--------	3	2	3	5:3 (*31*)	([4])	0
5. (Boys)	0	--------	29	2	10	31:10	75	0

[1] Includes teacher and the introducer of infection or child with first case.
[2] Immune=vaccination scar or previous variola; susceptible=no vaccination scar or previous variola; number in parentheses are children with unknown immunity status.
[3] Approximate value because of unknown status of some children.
[4] Information not available.
[5] This child had no vaccination scar.

was obtained in the school or elsewhere in the district.

The spatial distribution of infecting children and their contacts in the classrooms used by classes 3 and 4 is shown in figure 3. The class 1 map was lost and class 2 and 5 patients did not attend school during illness.

In class 3, 13 of the 20 susceptible children were spared, although these 13 were exposed for 5 days. One of the 13 sat next to the child with index case in the class outbreak (fig. 3). Surprisingly, patients were not concentrated around the introducer of infection who sat in the center of the classroom. Five of the seven patients in the first generation of secondary cases sat at the periphery of the area occupied by the desks. Only one of the three susceptibles sitting in the immediate neighborhood of the introducer of infection acquired the disease, and another child sitting at an intermediate distance was affected. This suggests that factors other than immunity status were also operating.

All longitudinal desk rows had one or more cases while three of the eight transversal rows were spared. Desks touched each other in the longitudinal rows determining the traffic inside the room. Desks in the transversal rows were separated by a 0.7-meter aisle, and there was little transversal traffic because of classroom discipline. The figure shows that the spatial distribution of patients was neither uniform nor focal. The spatial relation between the only patient with a second generation secondary case and the patient from the first generation who seemingly infected him was not recorded.

At least two fully susceptible children sat close to the introducer of infection in class 4 (fig. 3) who attended school on the second and tenth days of her exanthem, and yet these two known susceptibles and other possibly susceptible children in this class were spared. Because of the position of her desk, the introducer of infection had to pass close to these two susceptibles when entering and leaving the room or when going to the teacher's table or to the blackboard.

Discussion

One feature of the flow of variola through the school population, its marked narrowness, needs explanation. In effect, many susceptibles were spared despite close physical proximity in classrooms and lack of measures aimed at preventing transmission of infection. Striking as it may appear, this frequent escape from variola is in full agreement with other observations (*3–7*). Dixon (*3*) found a strikingly narrow spread of variola in a military quarter with the same lack of preventive measures. Even in countries where compulsory vaccination has long been abandoned, spread of either variola minor or variola major was not wide in instances where preventive measures were applied too late to prevent transmission to many susceptible contacts (*4, 5, 7*).

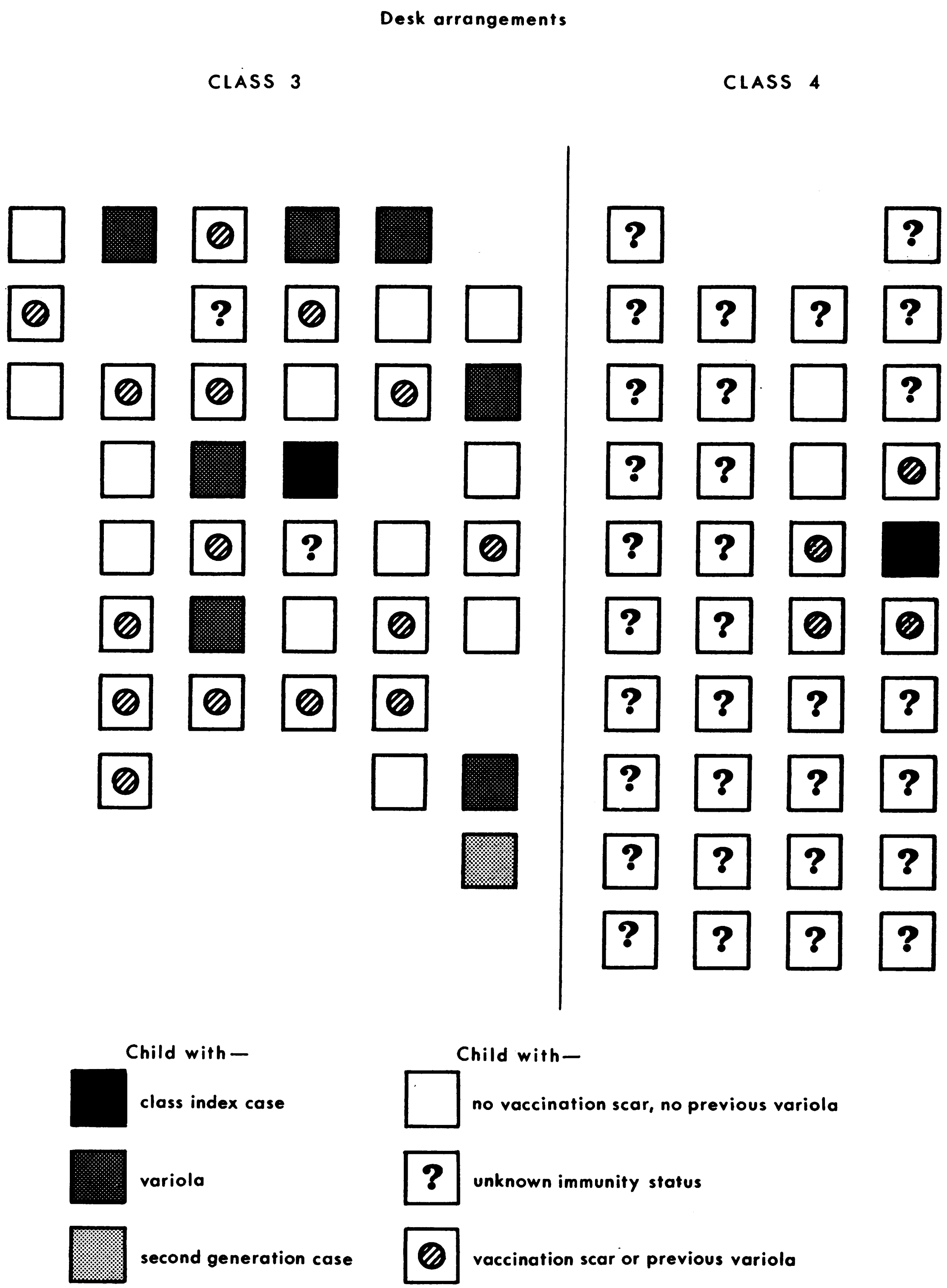
The lack of influence of physical proximity on spread of infection which was observed in the whole school area is closely reproduced in the classrooms, although here it is more significant because the regular distribution of the desks would help make any eventual effect more evident. The most reasonable explanation for the spatial distribution of the class 3 outbreak is friendship or playing associations, since person-to-person transmission was the apparent mode of spread. Furthermore, the distribution suggests that, at least in most instances, transmission did not occur in the classroom.

The period when children waited to enter the classrooms was probably the occasion for many transmissions of infection. Evidently, personal associations were closer among children from the same class, and this might explain why so many classes were spared. Such an explanation is supported by the fact that second-period classes were the least affected despite children from these classes generally having more opportunities for contact with children from classes attending school in both the first and third periods.

Analysis of the transmission of infection discloses that there was no continuous chain of transmission but rather three separate chains arising from three separate introductions in the school. These chains were short, probably because there was no school attendance during illness in the later stage of the flow of the epidemic through the school.

Of particular interest was the lack of secondary cases in classes 2 and 5, where patients did not attend school during illness, while secondary cases appeared in classes 1 and 3, where

Figure 3. Spatial relations between cases and contacts in classes 3 and 4



some attended during their exanthem. This occurrence agrees with existing biological concepts and is supported by the finding of the largest number of cases in the class with longest attendance by patients during exanthem. However, there was no secondary case in class 4 despite the introducer of infection, patient IV–2, having attended school on the second and tenth days of her exanthem and at least two fully susceptible children being seated close to her desk. Anyway, it seems reasonable to infer that transmission of infection would not have occurred if children had not attended school during illness.

The evidence shows a clear and definite influence of previous successful vaccination in preventing clinically manifest variola minor, but it does not show that this protection was the only factor involved, since numerous susceptibles were spared despite their classroom exposure to infecting classmates. Perhaps a threshold of susceptibles was needed for a class outbreak to occur in classes where infection was introduced. Such a requisite was postulated for epidemics occurring in the general population by Kermack and McKendrick (*8*). In this regard it should be remarked that the numbers of exposed susceptibles in classes 3 and 1 were similar, 20 and 16 respectively, and yet there was an outbreak in class 3 and only one secondary case in class 1. It thus seems that it was not the number of susceptibles that determined occurrence of the class 3 outbreak, a hypothesis which is in line with the findings of Cheeseman (*9*) and Hope-Simpson (*10*). Cheeseman (*9*) did not find data supporting the thesis that a specific critical proportion of susceptibles was needed for an outbreak of an infectious disease to start, although he felt that a proportion of susceptibles was a factor in the spread of infection through school populations. The 5-day period of exposure to the class 3 index case perhaps was equivalent to increasing the number of infective children, and this might ultimately be responsible for the excess number of cases in this class.

School attendance during illness, immunity status, and selection of personal associations seem to be the factors responsible for the observed distributions. Since none of these factors operates alone, the joint operation of two or three of them is postulated, although the relative magnitude of each factor's influence cannot be determined because of small numbers. The class apparently was the epidemiologic unit patterning the flow of the epidemic through the school population.

The mass vaccination conducted from June 5 to 20, 1956, does not seem to have influenced spread of infection for the following reasons.

1. In class 1 the secondary case appeared 27 days before the first members of the class were vaccinated and, therefore, vaccination prevented neither additional secondary cases in the first generation nor a second generation of secondary cases. The same number of susceptibles existed when infection was introduced, when the only secondary case appeared, and when vaccination of the class was started 27 days later.

2. Vaccination of class 2 was conducted on June 20, or 42 days after onset of the first and only case.

3. Class 3 was vaccinated on June 7, or 27 days after onset of the class index case and, thus, vaccination could not prevent the seven cases composing the first generation of secondary cases which appeared 19 to 25 days after the index case or more cases in this generation. In the single second-generation case, illness onset occurred 14 days after the class was vaccinated. It is felt that vaccination of the class did not prevent more cases in the second generation because (*a*) vaccination did not prevent occurrence of the single case composing the second generation; (*b*) there was no second generation of secondary cases, not even a first generation, in classes 2, 4, and 5, each with several susceptibles who were vaccinated too late to prevent secondary cases; (*c*) only one patient from the class-3 first generation of secondary cases attended school during illness and this occurred for only 1 day, while the introducer of infection in the class attended school for 5 consecutive days and gave rise to seven cases; and (*d*) after vaccination of class 3 there still remained six children without successful vaccination or previous variola.

4. Vaccination of class 4 was initiated on June 5, or 23 days after onset of the class index case.

5. Vaccination of class 5 was initiated on June 8, or 7 days after illness onset in the class's first case, and thus there was ample opportunity for the first patient to transmit infection to several of 10 fully susceptible classmates, and yet no secondary case occurred.

The data on school attendance during illness are strong evidence that infection was transmitted during the eruption stage, thus documenting the thesis of transmissibility of variola during the exanthem which was advanced as early as 1910 by Ricketts (*11*) and supported by others (*12*), but strongly opposed by Dixon (*3*). Our evidence, however, does not show whether transmission can also occur during the prodromic period since patients did not attend school then. If attendance during the prodromic period had occurred, perhaps infection spread might have been wider; at least Dixon's experience (*3*) suggests so. Another factor to consider is that in studies on transmission of infection in the households, the interval between illness onset or exanthem onset is generally employed as an indication of the incubation period, but such an interval may be confusing or meaningless in studies of spread of variola in day schools.

Summary

Sixteen cases of variola minor (alastrim) occurred among the 1,111 children attending a primary day school during a 54-case epidemic in a school district of São Paulo, Brazil. Only 14 school children were infected or infected others at the school. The earliest introduction of infection in the school was not followed by a continuous chain of person-to-person transmission; instead three separate chains began from three introductions. All 11 patients presumably infected at school were unvaccinated.

Numerous unvaccinated children were spared despite close physical proximity with four patients who attended school during exanthem. Only 5 of the 27 classes were affected, and cases occurred in 2 of the 5 barracks housing the school's 9 classrooms. Four classes were spared among the nine classes using the three classrooms where cases occurred, and in no room were all three classes affected.

The class apparently was the epidemiologic unit patterning the flow of the epidemic through the school population. No evidence was found that a threshold of susceptibles was needed for a class outbreak to occur. Contaminated desks did not seem to influence the spread of infection; immunity status, class attendance during illness, and personal associations apparently were the factors responsible for the observed distribution, although none of these factors was found to operate alone.

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Program Notes

Maternal and Child Health

Copies of a "Study of Trainees in Maternal and Child Health in Schools of Public Health," prepared by the Program Area Committee on Child Health of the American Public Health Association, can be obtained by writing Dr. Helen M. Wallace, Professor, Maternal and Child Health, School of Public Health, University of California, Berkeley.

Teenage Nutrition Exhibit

"The Countdown on Teenage Nutrition" is the title of a new exhibit, consisting of 10 illuminated questions on nutrition, prepared by the New York State Department of Health for loan within the State. Teenagers enter answers on questionnaires placed on a table in front of the exhibit.

Reintegrating Mental Patients

A 12-week, intensive "homecoming program" conducted by the Metropolitan Baltimore Association for Mental Health aims to encourage selected chronic mental patients to leave the hospital. Patients (with an average stay of 14½ years in institutions) are given a 3-month opportunity, with volunteer aid, to become acquainted with places and activities in the Baltimore community. They are selected on the grounds that their chief handicap is no longer their original illness but their extreme dependency on hospital living. (*NAMH Reporter*, September 1963.)

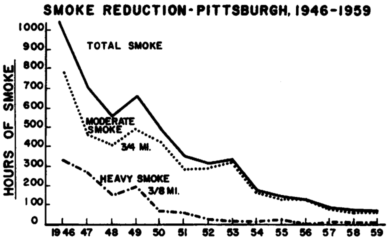
Water Quality Criteria

The State of California has published a second edition of "Water Quality Criteria," edited by Jack E. McKee, California Institute of Technology, and George W. Burke, Jr., Division of Water Supply and Pollution Control, Public Health Service. The California State Water Pollution Control Board, the California Institute of Technology, and the Public Health Service provided the data.

Smoke Control in Pittsburgh

Initiated by the health department and backed by law, control measures reduced smoke in Pittsburgh by more than 90 percent between 1946 and 1955, but control efforts continue. A 1962 agreement between the health department and the steel industry established a schedule for future smoke and dust control activities calling for elimination of 95 percent of the air pollution from the steel industry by 1971. (Allegheny County's *Public Health Bulletin*, summer 1963.)

SMOKE REDUCTION-PITTSBURGH, 1946-1959



Lung Cancer Mortality

The rate of increase of total lung cancer mortality in Seattle-King County, Wash., has slackened during the last 5 years, according to data obtained in this community. Changes in total and age-specific mortality trends suggest that the 20th century lung cancer epidemic may be nearing its crest in Seattle-Kings County or at least approaching a plateau.

However, during the last 70 years, the data indicate that only about 3 percent of all lung cancer patients in Seattle survived 5 years after onset of symptoms. The average lung cancer patient dying in 1955 lived 10.1 months after onset of symptoms, slightly longer than the 9.2-month survival of the average patient dying in the early 1930's.

Dr. Reimert T. Ravenholt and Dr. William H. Foege conclude that social measures aimed at abatement of lung cancer must be directed toward prevention, which, they say, "can largely be accomplished by avoidance of smoking." (*Diseases of the Chest*, August 1963.)

Telephone Buddy System for Aged

For $1 a month people living alone in the Miami, Fla., area can subscribe to a nonprofit telephone answering service. A daily call is made at a specified time to each subscriber. If the call is not answered, an immediate investigation is made. Handicapped persons are employed to do the phoning. Originated in Saginaw, Mich., such services now serve more than 300 communities.

ABC's of Home Fire Safety

Arrange for a dependable baby sitter to stay with little children while you are out.

Bottles should never be used to store flammable liquids.

Clamp down on smoking in bed! These are 3 of 24 "ABC's of Home Fire Safety" listed with sketches on a small placard issued by the Continental National Insurance Group, Chicago.

Continuous Suicide Alert

A pilot project at Kings County Psychiatric Hospital (Brooklyn, N.Y.) provides a telephone service manned by a psychiatrist 24 hours a day, to speak with persons who threaten suicide and to arrange for further ambulatory treatment or, if advisable, hospitalization.

Poultry Rolls

The Philadelphia Department of Public Health has ordered all poultry rolls manufactured or sold in the city to be cooked so that the product reaches an internal temperature of at least 160° F. Investigations showed turkey rolls to be contaminated with *Salmonella* organisms, and at least three outbreaks of food poisoning were traced to rolls.

PUBLICATION ANNOUNCEMENTS

Address inquiries to publisher or sponsoring agency.

Health Projects for Migrant Farm Families. California's experience. By Florence Wyckoff. 1963; 34 pages. National Consumers Committee for Research and Education, Inc., 1029 Vermont Ave. NW., Washington, D.C.

1962 Statistical Report. 1963; 178 pages. Hawaii State Department of Health, Honolulu 1, Hawaii.

1962 Annual Report. Pennsylvania Department of Health. 1963; 132 pages. Commonwealth of Pennsylvania Department of Health, Harrisburg, Pa.

Tampa Bay Area Arbovirus Investigations, 1959–1961. A symposium. Monograph Series No. 5. 1963; 79 pages. Florida State Board of Health, Division of Health Education, P.O. Box 210, Jacksonville, Fla., 32201.

New Ideas on Rehabilitation. Report of a study day on facilities for education, rehabilitation and care services held in London, June 1963. 1963; 102 pages; $2.50. The Chest and Heart Association for Prevention, Research, Education, Tavistock House North, Tavistock Square, London, W.C. 1.

How to Serve Food at the Fair. 1963; 112 pages; single copies, 10 cents, 50 copies, $4. The Paper Cup and Container Institute, Inc., 250 Park Ave., New York, N.Y., 10017.

The Organization of the Hospital for Optimal Patient Care. Report of a conference on mental health, Salem, Oregon, December 7–9, 1961. Edited by Jerome Levy and Roma K. McNickle. 1962; 60 pages. Western Interstate Commission for Higher Education, Fleming Law Building, Boulder, Colo.

Estimating Space Needs and Costs in General Hospital Construction. By James J. Souder, B.Arch., AIA. 1963; 32 pages; $2.50. American Hospital Association, 840 North Lake Shore Drive, Chicago, Ill.

Meeting the Treatment Needs of Children. Conference on mental health, Berkeley, California, November 29–December 1, 1962. Edited by Jerome Levy and Roma K. McNickle. 1963; 177 pages. Western Interstate Commission for Higher Education, Fleming Law Building, Boulder, Colo.

Social Welfare and Health Expenditures, New York City: 1958–59. A comparison of expenditures for income-maintenance programs and welfare and health services, and of the financing sources: 1958–59 with 1954. By Florence E. Cuttrell and Miriam P. Suchow. June 1963; 250 pages. Bureau of Community Statistical Services, Research Department, Community Council of Greater New York, 345 East 45th St., New York, N.Y.

Processes of Aging. Edited by Richard H. Williams, Clark Tibbitts, and Wilma Donahue. 1963; 2 volumes, 1199 pages; $25. Atherton Press, 70 Fifth Ave., New York, N.Y.

Medical Care and Family Security: Norway, England, USA. By Karl Evang, M.D., D. Stark Murray, M.D., and Walter J. Lear, M.D. 1963; 344 pages; $6.50. Prentice-Hall, Inc., Englewood Cliffs, N.J.

Planning for Change. Report of a conference on mental health, Pomona, California, December 10–13, 1962. Edited by Jerome Levy and Roma K. McNickle. 1963; 68 pages. Western Interstate Commission for Higher Education, Fleming Law Building, Boulder, Colo.

Right From the Start. The importance of early immunization. Public Affairs Pamphlet No. 350. By Judy Graves. 1963; 27 pages; 25 cents. Public Affairs Pamphlets, 22 East 38th Street, New York, N.Y.

Interdisciplinary Communication in Psychiatric Mental Health Programs. Bibliography and selected references, annotated. 1963; 5 pages (limited supply). Comeback, Inc., 16 West 46th Street, New York, N.Y.

New Opportunities for Depressed Areas. Public Affairs Pamphlet No. 351. By John D. Pomfret. 1963; 27 pages; 25 cents. Public Affairs Pamphlets, 22 East 38th Street, New York, N.Y.

Serious Mental Illness in Children. Public Affairs Pamphlet No. 352. By Harry Milt. 1963; 28 pages; 25 cents. Public Affairs Pamphlets, 22 East 38th Street, New York, N.Y.

Guides to Psychiatric Rehabilitation. A cooperative program with a State mental hospital. Edited by Bertram J. Black. 1963; 96 pages; $2.50. Altro Health and Rehabilitation Services, Inc., 373 Park Ave. South, New York, N.Y., 10016.

World Health Organization

WHO publications may be obtained from the Columbia University Press, International Documents Service, 2960 Broadway, New York, N.Y.

WHO Expert Committee on Gonococcal Infections. First report. WHO Technical Report Series No. 262. 1963; 70 pages; $1; Geneva.

Measles Vaccines. Report of a WHO Scientific Group. WHO Technical Report Series No. 263. 1963; 37 pages; 60 cents; Geneva.

Insecticide Resistance and Vector Control. Thirteenth report of the WHO Expert Committee on Insecticides. WHO Technical Report Series No. 265. 1963; 227 pages; $2.25; Geneva.

The Staffing of Public Health and Outpatient Nursing Services. Methods of study. Public Health Papers No. 21. By Doris E. Roberts, R.N., M.P.H. 1963; 101 pages; $1.25; Geneva.

Urban Water Supply Conditions and Needs in Seventy-Five Developing Countries. Public Health Papers No. 23. By Bernd H. Dieterich and John M. Henderson. 1963; $1; Geneva.

Annual Epidemiological and Vital Statistics, 1960. 1963; 873 pages; $1; Geneva.

Federal Publications

Bibliography of World Literature on Mental Retardation. *1963; 564 pages; $4 (sale copies only).* This publication, designed to aid students, scientists, and other professional persons working in the field of mental retardation, lists more than 16,000 scientific and technical articles. The bibliography is divided into two sections. The first lists publications alphabetically by author, and the second is a joint author-subject index. Entries are arranged in categories considered most functional for the majority of users.

Water Pollution Control, Sewage Treatment, Water Treatment: Selected biological references. *PHS Publication No. 1053 (Public Health Bibliography Series No. 8); 1963; by William M. Ingram and Kenneth M. Mackenthun; 142 pages; 70 cents.* Prepared for use by sanitary engineers, chemists, and other scientists working in the water field. References are listed under subcategories within its three major categories.

Guide to United States Life Tables 1900–1959. *PHS Publication No. 1086 (Public Health Bibliography Series No. 42); by Monroe G. Sirken, Leona L. Bachrach, and Gustav A. Carlson; 1963; 63 pages; 30 cents.*

Presents information about life tables published by the Federal Government or prepared in response to special requests.

Part I gives the history, general coverage, and current status of the Federal Government life table program and describes life tables not indexed in the guide, including those prepared before 1900. Part II contains an annotated bibliography of published life tables and a bibliography of unpublished life tables. It also contains two indexes to the life tables, one according to the calendar period and another according to the geographic and demographic subgroupings for which the life tables were constructed.

The guide includes only standard life tables showing at least two life table functions in addition to values of expectation of life. No attempt is made to evaluate accuracy or comparability of any of the tables or to discuss methodology used in their construction.

Report of Public Health Service Technical Committee on Plumbing Standards. *PHS Publication No. 1038; 1963; 147 pages; 45 cents.*

The American Standards Association's National Plumbing Code issued in 1955 has been revised by the committee. The revision recognizes research findings since that time in both materials and practices. Principal emphasis has been placed on the public health aspects of plumbing systems, and criteria have been developed to result in durable plumbing systems which provide maximum serviceability.

Cystic Fibrosis. *PHS Publication No. 1077 (Health Information Series No. 111); 1963; pamphlet; 5 cents, $3.25 per 100.* In lay terms, pamphlet describes cystic fibrosis. It also discusses prevalence, symptoms, diagnosis, treatment, and current outlook for affected patients. Studies of the disease at Federal and leading non-governmental research centers are noted, as well as the contributions of nonprofit organizations which support research and promote public education on the disease.

The Food You Eat and Heart Disease. *PHS Publication No. 537 (Health Information Series No. 89); revised; 12 pages; 10 cents, $7.50 per 100.* Describes, for laymen, the association of diet and the cardiovascular diseases. Stresses diet as specific therapy in some forms of heart disease. Cautions patients that diet, like drugs and all special treatments, should be prescribed by a physician. This warning is followed by simple descriptions of the major cardiovascular diseases with discussions of how they are known to be affected by food and drink. Explores the relationship between atherosclerosis, blood cholesterol level, and dietary fats, and between sodium and hypertension and the edema of congestive heart failure. Diet information is also given for other major heart conditions, such as rheumatic heart disease, stroke, and congenital heart disease. Good nutrition and weight control are emphasized as cardinal rules for heart patients.

Congestive Heart Failure. *A guide for the patient. PHS Publication No. 1056 (Health Information Series No. 108); 1963; 11 pages; 10 cents, $5 per 100.* Describes the causes, process, treatment, and management of congestive heart failure. Includes a list of eight ways in which the congestive heart failure patient can help himself to stay well and seven danger signals of a recurrence.

Rabies. *PHS Publication No. 97 (Health Information Series No. 30); revised 1963; pamphlet; 5 cents, $2.50 per 100.* Gives cause and method of transmission of rabies, occurrence, incubation period, symptoms, and treatment. Discusses handling of animals that have inflicted bites. Warns against self-diagnosis or self-treatment.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington, D.C., 20201.

The Public Health Service does not supply publications other than its own.
