Evidence that the content and emphasis of a syphilis control program has a greater influence over the number of cases reported than does the rise and fall in the rate of infection is adduced by one State's experience. In Montana, State board of health field work and central office efforts materially increased the number of current cases reported.

Syphilis Morbidity Reporting in Montana, 1950–54

By ARCH B. CLARK, G. D. CARLYLE THOMPSON, M.D., M.P.H., and FLORENCE KEHR, M.A.

THE MOST commonly employed measure of the incidence of syphilis within each reporting jurisdiction is the number of cases reported for the first time to State health departments. While morbidity reports comprise the principal State-by-State criterion for determining trends in the incidence of disease and evaluating public health programs, there is ample evidence that the number of cases of syphilis reported over a given period oftentimes is influenced more by the content and emphasis of the control program than by a rise or fall in the rate of infection. A classic example of this is the abrupt rise in reported cases of early latent syphilis during mobilization for World War II. The results of serologic tests for syphilis performed as part of selective service examination were directly responsible for the increased reporting of this disease.

Dramatic swings in reported morbidity such as those resulting from selective service examinations are easy to detect and interpret. It is the subtle influence of local changes in program content and emphasis upon morbidity reporting which is difficult or impossible to detect through the routine analysis of morbidity reports. Because of the unknown factors, reported morbidity is, at best, only a crude index of trends in the control of syphilis within an individual State. Consequently, by themselves, these data may not be considered a reliable index upon which to base the program needs of a single jurisdiction.

No qualified observer will question that real progress has been made, particularly in the past 10 years, in the control of syphilis in the United States. However, just how much of the recent downward trend in reported morbidity reflects declining incidence, "underreporting" of known cases, and case-finding failures is still a matter of speculation.

A decline in reported morbidity may result from one or more of the following factors:

1. An absolute drop in incidence or prevalence, or both.
2. A reduction in the number of infected persons seeking a diagnosis.
3. A drop in the number of diagnosed cases reported.
4. A reduction in the direct epidemiological efforts to detect suspects.

Mr. Clark is health program representative and Mrs. Kehr is records adviser with the Public Health Service, Region 8. Dr. Thompson is executive officer and secretary, Montana State Board of Health, Helena.

A decline in the incidence of the venereal diseases would demonstrate effective control measures.

A reduction in the number of persons voluntarily seeking diagnosis for a venereal disease would indicate a decline in the index of suspicion on the part of the public. Such a decline might result from the conviction that venereal disease is no longer a problem.

A drop in the number of diagnosed cases reported and a reduction in direct epidemiological efforts to find suspects could result from reduced emphasis by health departments on all phases of the control programs. Reduced program content and emphasis, furthermore, may be measured by the amount or proportion of funds available to State and local health departments for venereal disease control. An analysis of the Montana central registry records demonstrated that this State's decline reflected incomplete reporting rather than true incidence. Renewed program emphasis, which included (*a*) the resumption of the former practice of mailing a confidential report form with all of the positive serologic reports and (*b*) resumption of visits to physicians to determine the diagnostic status of persons with positive serologic tests, resulted in an immedate increase in the number of reported cases.

In Montana, in July 1946, the venereal disease control program was given special emphasis under the direction of an epidemiologist trained in venereal disease control. The growing importance of this phase of the work of State and local health units was reflected by the amount of State and local funds directed toward venereal disease control. From $43,285 in the fiscal year 1947, funds increased to $52,823 in 1949. Beginning in fiscal year 1950, the total amount of funds from all sources for venereal disease control declined rapidly, and by 1954 the total amount expended was only $20,608, a decrease of 61 percent.

Table 1. Source and amount of funds budgeted for venereal disease control and number of cases of syphilis reported in Montana, fiscal years 1947–54

Fiscal year	Funds for venereal disease control			Number of cases of syphilis reported
	Federal grant	Estimated value of generalized services contributed at State and local levels	Total	
1947	$29, 300	$13, 985	$43, 285	489
1948	28, 400	20, 279	48, 679	682
1949	29, 300	23, 523	52, 823	494
1950	25, 600	25, 232	50, 832	291
1951	17, 900	32, 717	50, 617	187
1952	17, 300	26, 598	43, 898	185
1953	17, 300	21, 551	38, 851	125
1954	0	20, 608	20, 608	44

Table 2. Amount of funds from all sources available for support of State and local health departments and percentage budgeted for venereal disease control, Montana, fiscal years 1950–54

Fiscal year	Total funds all sources [1]	Amount allocated for venereal disease control
1950	$645, 115. 23	$50, 832
1951	730, 881. 71	50, 617
1952	767, 183. 83	43, 898
1953	839, 440. 05	38, 851
1954	836, 340. 39	20, 608

[1] Mental health excluded.

The number of reported cases of syphilis decreased from 291 in the fiscal year 1950 to 44 in fiscal year 1954, a decline of 84.9 percent. The amount and source of funds available for venereal disease control and the number of reported syphilis cases for fiscal years 1947–54 are shown in table 1. Table 2 shows the amount of all funds available to State and local health departments and the amount allocated to venereal disease control. The relation between the reduction in program emphasis and content as shown by the expenditure of funds and the decline in the number of syphilis cases reported is shown in figure 1.

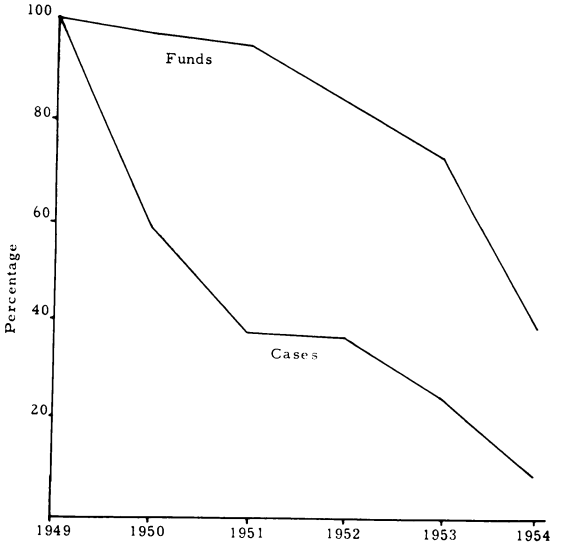
If nothing more were known about the number of persons in Montana who had positive diagnostic tests for syphilis, it could be assumed that the State health authorities were merely exercising good judgment in reducing the amount of funds devoted to this program in about the same proportion that the disease was declining within the State. However, other data accumulated by the Montana State Board

of Health demonstrate that the decline in reported morbidity of syphilis is more the result of under-reporting and case-holding failures—"suspects" who failed to remain under observation until a diagnosis had been established—than of a decrease in prevalence of this disease. Analysis of the State's morbidity reports and records of positive serologic tests for syphilis in the State laboratory demonstrates the amount of presumptive syphilis in Montana.

Central Registry

Since July 1, 1947, the Montana State Board of Health has required that all cases of syphilis be reported by name and address of the patient. Prior to this date, the regulations were satisfied by reporting cases by initials or case numbers. However, for many years it has been the practice of Montana physicians, clinics, or institutions, when sending specimens to the State laboratory for a serologic test for syphilis, to identify the donor of the specimen by full name and frequently by address and other identifying information. These two means—reporting cases by name and address and laboratory report forms which identify the person under observation by name and address—were used to prepare the "central registry" of syphilis

Figure 1. Ratio between funds budgeted for venereal disease control in fiscal year 1949 and number of cases of syphilis reported in Montana during 1950–54.



"cases." This file was set up in July 1947 and was prepared from lists of all known cases of syphilis previously reported by name, to which were added the names of all individuals for whom positive serologic tests had been reported. New names were added routinely from incoming morbidity and laboratory reports.

Forms provided by the State laboratory to accompany specimens sent in for serologic tests requested, in addition to the name and address of the person, the "reason for test," that is, whether "premarital," "prenatal," "diagnostic," or "control of treatment." Whenever this information was supplied, it was also entered on the central registry card.

Once a central registry card was prepared, all subsequent information pertaining to the case was recorded on that card. For example, if the first information was a positive blood test, and a morbidity report was received later from a physician, the date of the morbidity report and the identification of the reporting physician were added to the card. Other information added from time to time over the last 7 years included such items as requests from physicians for shipment of antiluetic drugs, abstracts of correspondence relating to the case, and epidemiological information. Since central registry cards are prepared for named individuals only, duplicate cards are limited to those resulting from (*a*) gross differences in spelling of the same name on two or more original documents, or (*b*) changes in surnames of women upon marriage. The first source of error is probably a minor one because supplementary information, such as a city and street address, attending physician, and clinic or institution, was checked with the central registry card for phonetically similar names. Since the caseload is heavily weighted by males, the second source of error may also be minor.

Data for this paper were obtained by an analysis of all material on file in the State board of health as of April 30, 1954. A total of 3,521 central registry cards, all of which had been active since December 31, 1949, were tabulated. Cards which were active only during the period 1947–49 were excluded in order to reduce to a minimum the error resulting from the inability to collate cards for named individuals who had positive serologic tests

with cards for cases which had been reported by number or initials in 1946 or previous years. Undoubtedly there are a few Smiths and Joneses who actually were reported as cases by initials or number, 4 or more years ago, who are still receiving post-treatment serologic checks. However, since the average post-treatment observation period is probably considerably less than 3 years, the actual number of post-treatment cases taken into this study will not materially affect the overall results.

The 3,521 cases active during the period January 1, 1950–April 31, 1954, were classified as follows:

Diagnostic status	*Number*	*Percent*
A. Diagnosed cases reported by name on State confidential morbidity report card	671	19.1
By private physician	509	
By clinic, hospital, or institution	162	
B. Cases for which central registry cards showed that a positive diagnosis of syphilis had been made but case was otherwise unreported [1]	440	12.5
C. Two or more specimens examined, all tests positive	523	14.9
D. Single specimen examined, all tests of a battery positive	1,168	33.1
E. Single specimen examined with positive results and with at least one of battery of routine tests negative	561	15.9
F. Two or more specimens examined with both positive and negative results from combined battery of tests	158	4.5
Total	3,521	100.0

[1] Cards for this group included those marked "control of treatment," showing that drugs had been ordered or consultation regarding treatment had been recorded, or those indicating epidemiological evidence of infection. "Epidemiological evidence of infection" involved:

(*A*) Central registry cards noting that the person with a positive blood test had been named as a contact of a case of primary or secondary syphilis. This was considered "epidemiological evidence" provided (*a*) the person was in the sexually active age group and (*b*) the positive blood test was subsequent to the contact report.

(*B*) A central registry card identified a young person with a positive test for syphilis as the child of a syphilitic mother.

The distribution of these cases by calendar year is shown in table 3.

The data in table 3 fall into three major categories of two groups each: (*a*) "known" cases of syphilis, groups A and B; (*b*) probable cases, groups C and D; and (*c*) equivocal cases, groups E and F. The known cases include those for which a morbidity report has been received and those for which there is definite evidence of a diagnosis having been made. The probable cases include persons who have had one or more specimens examined for syphilis, with all tests of a battery positive and with no negative results. The equivocal cases include individuals whose serologic tests for syphilis, in addition to one or more positive reactions, resulted in one or more negative reactions. It is recognized that cases with false-positive results may be included in the probable group. On the other hand, the equivocal group, particularly group F, those with multiple STS, also must contain a significant percentage of treated but unreported cases.

It is impossible from the original data to determine the exact number of cases actually included in each of the last four categories. In order to take into consideration compensating errors in the data, when discussing morbidity reporting and case holding, the entire equivocal group has been dropped from the final analysis. It is assumed that the number of individuals with false-positive tests appearing in the "probable" group was no greater than the number of "cases" in the equivocal group. This seems to be a reasonable assumption inasmuch as the equivocal group comprises 20 percent of the total.

The total number of cases in the "known" (diagnosed) and probable categories are shown, as they occurred each year, in table 4. Also included is the number and percentage of cases within each group of these two categories. The percentage of cases in each one of these groups compared with the total cases in all groups is shown in table 5. It is evident that, had full advantage been taken of all diagnostic opportunities and had all cases been reported, some 3,050 cases of syphilis would have been reported during the 5-year period rather than 691 (table 4), a more than fourfold increase. The relationship between the cases actually reported and the potential number in the "known" group which might have been reported is shown in figure 2.

In 1950, more than 70 percent of the total

Table 3. Analysis of Montana syphilis central registry, by diagnostic status and date of latest information, January 1, 1950–April 30, 1954

Diagnostic status	Date of last information					
	1950	1951	1952	1953	January–April 1954	Total
Known:						
Group A—Morbidity report received	228	172	167	93	11	671
Group B—Morbidity report not received	95	127	85	97	36	440
Probable:						
Group C—2 or more STS [1] positive	130	115	87	130	61	523
Group D—Single STS positive	373	246	229	240	80	1, 168
Equivocal, positive, and negative STS:						
Group E—Single STS	191	114	144	84	28	561
Group F—Multiple STS	64	18	33	34	9	158
Total	1, 081	792	745	678	225	3, 521

[1] Serologic test for syphilis.

"known" cases, had actually been reported on a State confidential report form but this proportion rapidly decreased to 22.3 percent in early 1954 (table 4). When the total number of "known" cases is taken into consideration, the decline in syphilis in Montana since 1950 is much more moderate than is indicated by the State's morbidity reports. Comparative trends are shown in figure 3.

Case-Holding Failures

The "probable" group of syphilis cases is divided into two categories (table 4) those individuals who have two or more STS (classified as presumptive); and those who have had only a single specimen examined (classified as suspected). The number of individuals with a positive STS on a single specimen comprises approximately 70 percent of the entire probable group over the entire period. However, in 1950, 74.2 percent of the probable cases had a single specimen tested. In 1954, the percentage of probable cases having a single positive test was 62.9.

Although there has been a moderate decline in the proportion of cases in the probable group having only a single specimen tested for

Table 4. Number and percentage of persons observed for syphilis in Montana, according to known or probable syphilis status, 1950–54

Year	All groups	Known cases					Probable cases				
		Total	Group A (cases reported)		Group B (cases not reported)		Total	Group C (2 or more positive STS)[1]		Group D (single positive STS)[1]	
			Number	Percent	Number	Percent		Number	Percent	Number	Percent
1950	826	323	228	70. 6	95	29. 4	503	130	25. 8	373	74. 2
1951	660	299	172	57. 5	127	42. 5	361	115	31. 9	246	68. 1
1952	568	252	167	66. 3	85	33. 7	316	87	27. 5	229	72. 5
1953	560	190	93	48. 9	97	51. 1	370	130	35. 1	240	64. 9
1954	430	[2] 139	31	22. 3	[2] 108	77. 7	[2] 291	[2] 108	37. 1	[2] 183	62. 9
Total	3, 044	1, 203	691	57. 4	512	42. 6	1, 841	570	31. 0	1, 271	69. 0

[1] Serologic test for syphilis.
[2] Estimate for calendar year based on 4 months' experience.

NOTE: For full definitions of groupings, see text, page 197.

syphilis, particularly in the past 2 years, it is apparent that many of the 1,271 persons in this group simply failed to return to the physician for results of the first test or failed to keep appointments for subsequent evaluation. It is also assumed that very few of this group received therapy for syphilis. It is reasonably certain that some of these 1,271 individuals will develop syphilitic psychoses. They will continue to populate the State mental hospitals. Others will become cardiac invalids. These are the tragedies of late untreated syphilis.

Table 5 also shows the percentage of the total known and probable cases of syphilis made up by each of the above groups. The reported cases decline from a high of 29.4 percent in 1952 to 5.9 percent in 1954. The unreported diagnosed cases do not vary significantly from the 15.7 percent average. The probable cases with two or more specimen examinations average 18.7 percent of the entire probable group. This percentage varies from 15.3 percent in 1952 to 32.4 percent in 1954. The suspected cases with a single observation comprise 41.7 percent of the probable cases. This percentage does not vary significantly throughout the entire 4⅓ years.

It is a matter of public concern that the State health department has no knowledge of the final diagnoses for individuals in the probable group. It may be assumed that many of the rather constant number of individuals who have had two or more specimens examined with positive results have received a definitive diagnosis and have been placed under treatment. However, with such strong indications of infection, it is essential for the protection of each individual that he continue under medical observation until a diagnosis is completed. Furthermore, for the protection of the public health, persons who may be in the potentially infectious stages of syphilis should be interviewed for source of infection and names of contacts.

The total number of specimens examined in

Figure 2. Reported cases and known cases of syphilis in Montana, 1950–54.

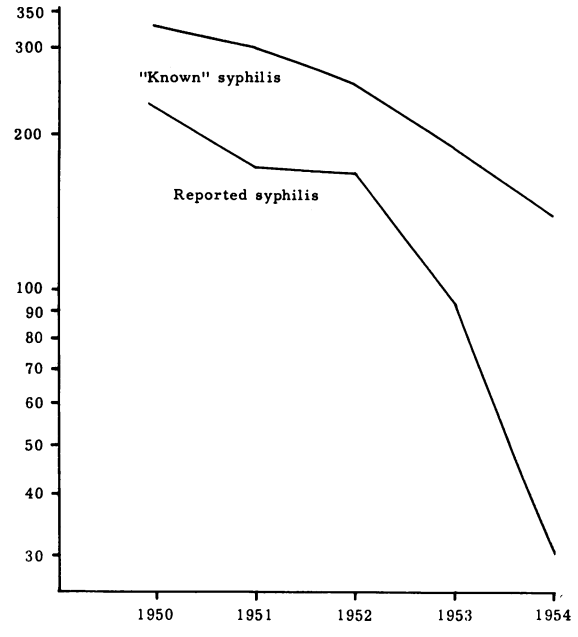


Table 5. Distribution of diagnosed and probable cases of syphilis, January 1, 1950–April 30, 1954

Year	Total number diagnosed and probable cases	Known cases: Percentage of total cases			Probable cases: Percentage of total cases		
		Group A (cases reported)	Group B (cases not reported)	Both	Group C (2 or more examinations)	Group D (single examination)	Both
1950	826	27. 6	11. 5	39. 1	15. 7	45. 2	60. 9
1951	660	26. 1	19. 2	45. 3	17. 4	37. 3	54. 7
1952	568	29. 4	15. 0	44. 4	15. 3	40. 3	55. 6
1953	560	16. 6	17. 3	33. 9	23. 2	42. 9	66. 1
1954 [1]	188	5. 9	19. 1	25. 0	32. 4	42. 6	75. 0
1950–54	2, 802	23. 9	15. 7	39. 6	18. 7	41. 7	60. 4

[1] 4 months, January–April 1954.

NOTE: For full definitions of groupings, see text, page 197.

the State laboratory is heavily weighted by the legally required premarital and prenatal tests. This epidemiologically important group will therefore comprise the most significant portion of those persons having a single test.

Some individuals who, according to the State's record, have had a single positive STS may have a previous history of syphilis infection and will have been placed under treatment. However, those in this group who fail to remain under medical observation for sufficient time for a definite diagnosis to be made should, for their own protection and for the protection of the public, be returned to medical observation until a definitive diagnosis is established.

It is apparent that there is need not only to improve morbidity reporting in Montana but also to insure the followup and diagnosis of individuals known to have a positive serologic reaction to syphilis.

Postanalysis Activity

Upon completion of the analysis of the central registry data, plans were made, as far as limited staff and budget would permit, to utilize the information:

1. To encourage more complete day-to-day reporting.
2. To increase physicians' index of suspicion of syphilis.
3. To promote better followup of suspects.
4. To provide additional data to determine the validity of the assumptions derived from the analysis of the central office statistics and to amend the State syphilis morbidity records for each of the study years (1950–54).

These objectives were to be accomplished by staff interviews with all physicians, including medical directors of hospitals and institutions, who had submitted positive serologic specimens:

1. To procure a morbidity report attributable to the year of diagnosis for all unreported cases of syphilis.
2. To determine the number of negative cases in the study group.
3. To learn the disposition made of unresolved cases.
4. To provide a list of suspects for future followup.

The names of persons in groups B, C, and D (table 3) were listed by city of residence, each list being subdivided into those under observation for the last time in 1950–52 and those observed in 1953 or later. Information entered on the list from the central registry cards included name, date last seen, total number of serologic specimens examined, result of latest test, and group classification. Space was provided on the forms for information gained from the interviewer's visit to the physician, including diagnosis, date of diagnosis, or other disposition if no diagnosis had been made.

Responsibility for securing the information in the field was placed with the directors of the local health districts for those cases residing within their jurisdictions. Responsibility for obtaining information from State institutions, the medical services of the Indian reservations, Veterans Administration, the hospitals, and

Figure 3. Syphilis morbidity reporting in Montana, 1950–54.

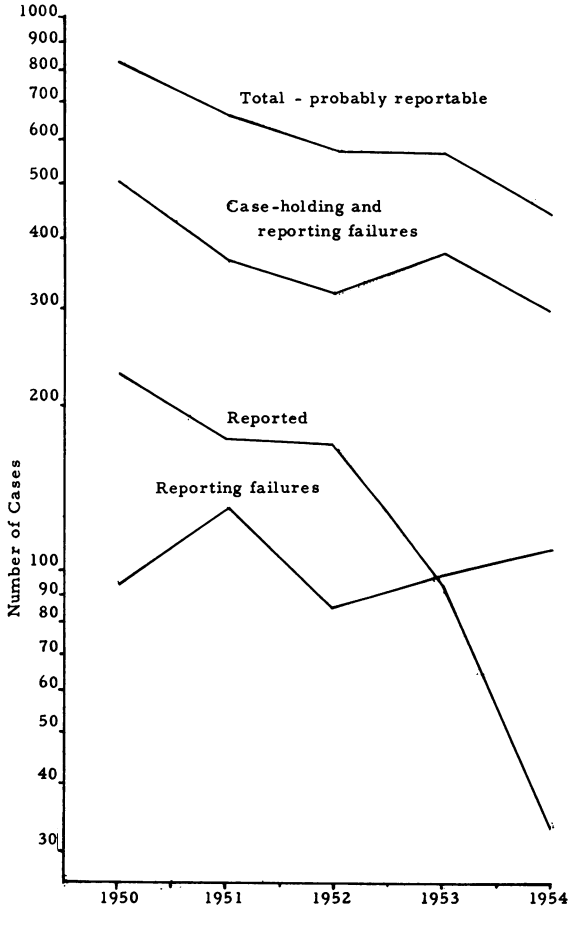
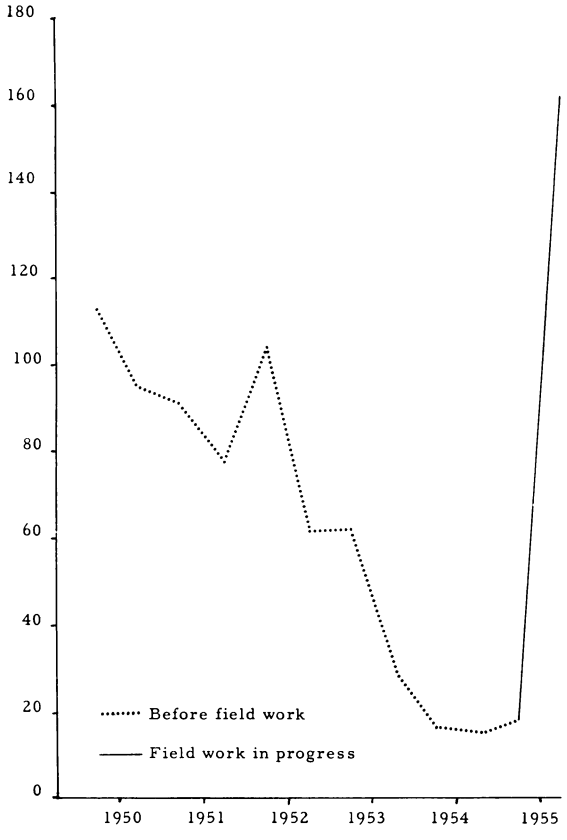


Figure 4. Number of reported syphilis cases in Montana before and after field study, 1950–55.



physicians and hospitals in unorganized counties was delegated to a records adviser loaned to the State board of health by the Public Health Service.

Prior to the visit of State or local personnel to any area, letters from the State or local health officer were sent to all physicians to be interviewed, outlining the nature of the study and information which would be requested.

The field phases of the study began in August 1955 and, because of the vast size of the State and the limited time both State and local personnel have to devote to this work, field investigations are still continuing. By the first of January 1956, all State institutions, three of the five Indian reservations, and approximately three-fourths of the physicians and hospitals had been visited. While detailed reports on the disposition of the cases on which information was gained will not be available until the completion of the field work, the field visits and central office activities have already had a dramatic effect upon reporting of current cases of syphilis.

For the first 6 months of 1955, the number of cases reported week by week was close to the number reported in 1954. Immediately after instituting the procedure of mailing confidential report forms with all positive laboratory reports, and following the visit of the records adviser to the first area, the number of reports of current cases of syphilis began to increase (fig. 4). By the last of October, the 43d reporting week of the year, the number of cases reported was five times that for the same period in 1954. By the end of 1955, 179 cases had been reported as compared with 31 cases in 1954, a ratio of about 6 : 1. The geographic distribution of reported cases indicates that, while there was a statewide increase in reporting, beginning with the inclusion of morbidity report cards with serologic reports, the greatest reporting gains were made in those areas visited by the records adviser.

In addition to achieving more complete reporting for syphilis, there has been a gain in the number of cases of gonorrhea and other communicable diseases reported.

Preliminary tabulations of data for 1955 would seem to substantiate the conclusions drawn from the central registry study that the major influence in the decline in number of syphilis cases reported was the result of underreporting rather than of an absolute drop in current infections.

Summary

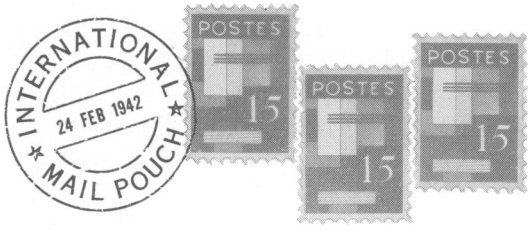
The number of syphilis cases reported annually in Montana has declined much more rapidly than would seem to be justified by the number of known reactors to serologic tests for syphilis.

The decline in the number of cases of syphilis reported from all sources more nearly parallels the trend in expenditures for venereal disease control by local and State health departments than it does the probable rate of infection as determined by a study of the State's central registry of reports of cases of syphilis.

During the period January 1950–April 30, 1954, 3,521 individuals with positive serologic

tests for syphilis were under treatment or observation. Of these, 2,802 probably had syphilis. Of this "probable" group, only 23.9 percent were so reported by physicians, clinics, and institutions while 15.7 percent were known to have been treated for syphilis but were not reported as cases. An additional 18.7 percent had had two or more positive serologic tests for syphilis. The largest group of reactors (41.7 percent) with unknown diagnostic status had had a single test.

Field work and central office efforts by the State board of health to determine the diagnostic status of reactors, although only partially completed, have already resulted in a sixfold increase in reporting of current cases.



Bricks for Peru's Houses

Encouraged by the Peruvian Government's interest in housing, we have met with housing and planning officials of the newly formed Housing and Land Reform Commission and with representatives of the Inter-American Housing Center of the Pan American Union. We have been working with a local engineer on producing and marketing "sand-lime" brick in the Lima area. The project has been negotiated, and the plant, financed by Peruvian capital, is under construction.

—ELOY A. BARREDA, *sanitary engineer, United States Operations Mission, Peru.*

Water, But None to Drink

Sudden, heavy rains, over a large part of Iran, especially on the vast plains where the central desert approaches the Zarqan Mountain, badly damaged roads and other communication facilities. After road repairs permitted us to reach remote localities, we learned that the worst health problems had developed in the flat regions, some distance from the mountain, where flood waters had completely destroyed the villages.

Water was the most urgent need. The villagers have no natural water supply but depend on *ghanats,* underground water canals laboriously and hazardously constructed by hand, sometimes extending for many kilometers and often reaching several hundred feet in depth. The floods had filled the *ghanats* with dirt or otherwise ruined them. Water for the villages had to be carried over long distances by man and beast.

The public health department, in the emergency, dispatched 13 teams supplied with perchloron, drugs, and typhoid vaccine.

—GLEN W. MCDONALD, M.D., M.P.H., *chief, Public Health Division, United States Operations Mission, Iran.*

Hospital Lottery in Iraq

In Iraq, the Mutsariff of Basrah Liwa, who recently contributed 300 dinars ($840) toward the building of two subhealth centers, has requested a food-handlers course. Lottery funds will finance the construction of the 130–140 bed maternity hospital in Baghdad. Health films shown in the evening, twice a week, on Baghdad street corners are attracting crowds of people. The health exhibit at the agricultural fair in Sulaimaniyah was highly original: It included two mud dwellings in miniature, one sanitary and the other insanitary.

—JOHN LEWIS, M.D., *chief, Health and Sanitation Division, United States Operations Mission, Iraq.*