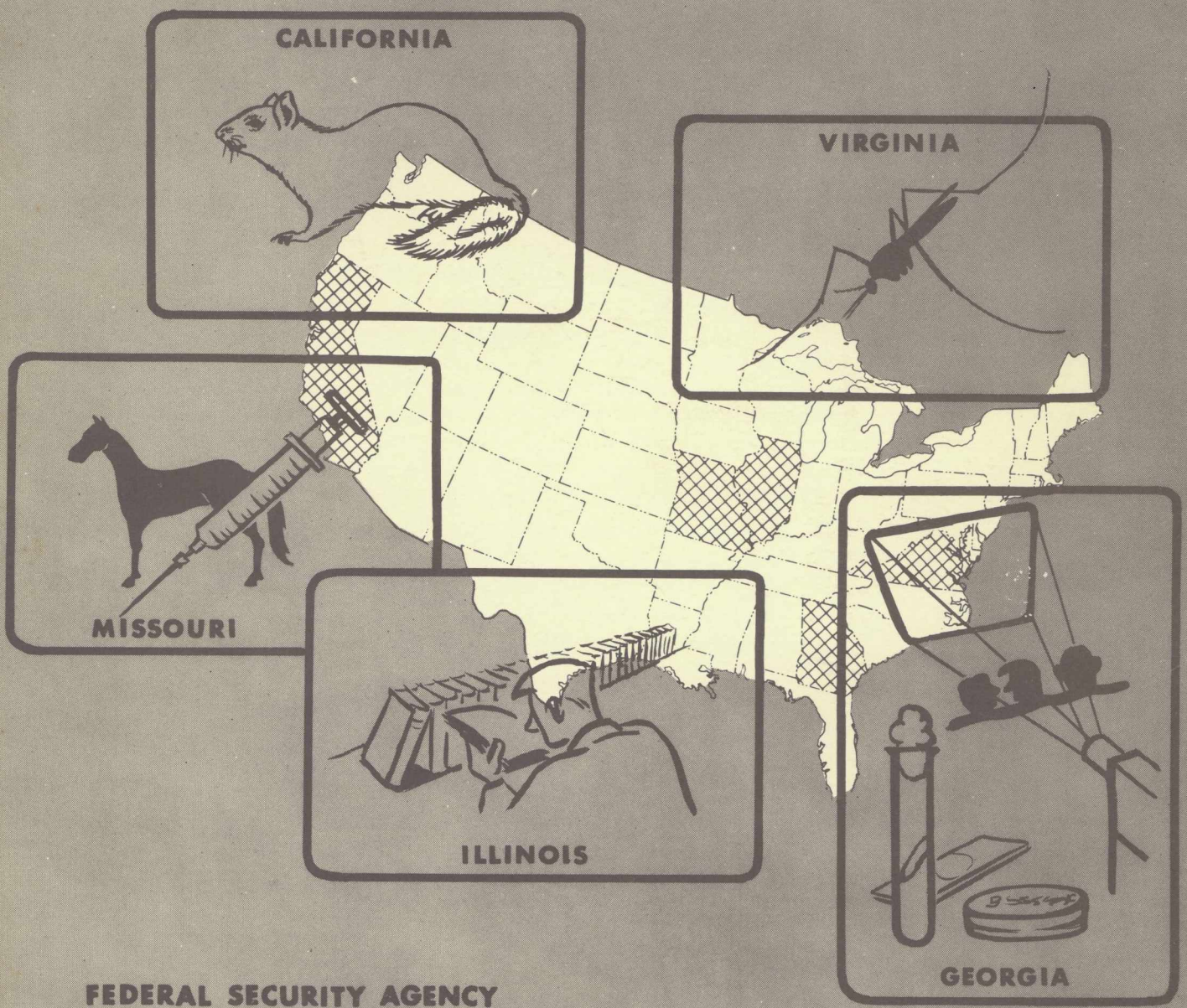
CDC BULLETIN

MAY 1951



FEDERAL SECURITY AGENCY
Public Health Service
Communicable Disease Center
Atlanta, Ga.

CDC BULLETIN
MAY 1951
Vol. X, No. 5

Contents

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The printing of this publication has been approved by the Director of the Bureau of the Budget, January 19, 1950.

Western CDC Laboratory Reorients Its Wild Rodent Plague Investigations

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The U. S. Public Health Service has been concerned with wild rodent plague since 1908 when ground squirrels (*Citellus beecheyi*) were first found plague-infected in Contra Costa County, Calif. Previous to this time, it was thought that all plague in the United States was a domestic rat disease from which human cases were derived. As long as the reservoir of this disease was rats and rats only, it could be eliminated by effective rat control measures in the few California cities on the San Francisco Bay and in Seattle, Wash., where it was known to occur. The demonstration of the infection in ground squirrels indicated that there might be a rural reservoir complimenting that produced by rats in cities. The possibility of eliminating plague through reduction or elimination of the reservoir depended on the geographic extent of the infection in ground squirrels.

To determine the scope of the problem in California, the Public Health Service in 1909 began to examine ground squirrels from Contra Costa and other Bay area counties, obtained by shooting. The infection was found to be so widespread that ground squirrels from other more interior counties were also sampled, and in 1911 the survey of the ground squirrels extended into parts of Nevada, Oregon, and Arizona, but with negative results in these three States. Surveys of ground squirrels and their control continued in California, and the results indicated that there were infected ground squirrels in most of the counties in California and that in spite of the control efforts, scattered human cases of plague (apparently of wild rodent origin) continued to occur. In 1934 such a case occurred in Lake County, Oreg., and for the first time led to evidence in the following year that ground squirrels in a State outside of California were involved in plague transmission.

The above knowledge led the Public Health Service to establish more flexible mobile survey units for the purpose of determining just how widespread plague was in the wild rodents of the West. Each unit consisted of a two-man crew with a truck containing all the necessary equipment for hunting and trapping rodents and for field dissection of the specimens. The number of this type of mobile unit eventually reached 14 and the area surveyed extended from the Pacific Coast into the Great Plains. Plague was demonstrated as far east as the Dakotas, Kansas, Oklahoma, and Texas. Furthermore, the mobile units have shown that plague is a disease of many species of wild rodents and that the elimination of the disease by attempting to control all the rodents involved in such a large area is not economically feasible. Instead, the findings of these units have led to the emphasis that is now being placed on preventing (by domestic rodent control) the possibility of wild rodent plague spreading into city rat populations where the greatest danger of human infection occurs. These preventive measures consist largely of reducing the contacts between humans and rats through city-wide rat control programs. The problem of preventing the scattered human rural cases is unsolved, though prompt medical treatment of those cases that do occur should lead to rapid and uneventful recoveries. The reduction of the number of scattered human cases and also the danger to urban populations rest on an increased knowledge of wild rodent plague.

During the past 14 years the Western CDC Laboratory (formerly the Plague Suppressive Laboratory) has had the Public Health Service's responsibility for the above-mentioned plague investigation work in Western States. Since January 1950 this laboratory has also had the Service's responsibility for promoting domestic rodent control programs in Western cities. Dr. Vernon B. Link, the present Medical Officer in Charge of the Laboratory, has recognized the need for reorienting the plague investigation functions of the Laboratory along lines that would be more productive in furnishing answers to the problems

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involved in: (1) preventing the scattered human rural cases of plague, and (2) lessening the danger of urban populations from plague of wild rodent origin. To assist in obtaining answers to these problems, an intensive ecological study of wild rodents in a single area is to be undertaken.

This study is under the supervision of a mammalian ecologist and will utilize an entomologist and four rodent survey aids. The study will be established in a known plague area and will function throughout the year. The testing of ectoparasites and rodent tissue for plague for the ecology study as well as for several cooperating agencies will, as in the past, be done at the Laboratory headquarters in San Francisco.

One of the objectives of the unit will be to illustrate fluctuations in the rodent populations and the factors responsible for them. With such information, it may be possible to predict when conditions will be ideal for epizootics. Another objective will be to determine the principal reservoir host and the principal vectors; this determination may elucidate how and when the disease spreads from one species of rodent to another. A further objective will be to learn how plague is maintained over the winter period and how and when it is practical to control rodent epizootics.

The study will be based on an extensive live-trapping program in which the captured animals will be observed while alive; each will be given a suitable permanent distinctive mark and then will be released for future recapture. The lives of known individuals will be followed to learn the length of the life span, reproductive activities, changes in ectoparasite species, and numbers of ectoparasites harbored at various times and how they are affected by such factors as changes in climate.

Immediate spectacular results undoubtedly will not be produced by the type of investigation contemplated; but sound control measures can be founded only on the type of basic information that will be provided by the proposed study of the ecological interrelationships between the various mammals and their ectoparasites. It is believed that only through such a study can the complexities of plague be solved, provided such a study is undertaken in a limited carefully chosen area and is conducted on a year-in, year-out basis.

The Development of Local Mosquito Control Districts in Virginia

R. E. DORER*

The 1940 session of the Virginia Legislature passed an act providing for the creation of mosquito control districts. Under this law, a district could be created in Tidewater Virginia, to include a town, city, or county, or any portion or combination thereof. Two members were to be appointed locally to serve on a commission that would conduct the affairs of the mosquito control district. The Virginia State Health Commissioner was designated to serve on all commissions as chairman ex officio. The State health department was empowered to contribute State funds in an amount equal to 25 percent of the funds collected locally, not to exceed $5,000. Local funds could come from a direct tax, an appropriation, or contributions. Subsequent legislatures have amended the law allowing any community in the State to create a mosquito control district and raising the maximum State contribution to $10,000. On July 1, 1940, a mosquito control district was established under this law at Virginia Beach. No doubt, more districts would have been created at that time except for the gathering war clouds.

With the advent of World War II, the Hampton Roads section of Virginia became very important from a military standpoint. The U. S. Public Health Service working in cooperation with the State health department inaugurated the Malaria Control in War Areas program. Under this program, operated largely throughout the Southeastern States,

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Federal funds were made available for malaria control in the vicinity of military and war establishments. Large sums of Federal money were expended in Virginia for control in the 1-mile zones around military establishments. In the Hampton Roads area, war establishments are so close together that the 1-mile zones intersected, resulting in control measures being carried on in the entire area. While the program was designed to control only the malaria-carrying mosquito, it was unavoidable that other species would be controlled also. The local officials, while not contributing to the Malaria Control in War Areas program, were kept fully informed of the progress being made. This was purposely done because the day could be foreseen when they would have to take over operations.

Two facts have been used in forming the policy for mosquito control in Virginia. First, the local people who receive the benefits from mosquito control must bear the burden of the cost. Second, mosquito control to be economically sound must provide protection to sufficient people so that the cost will not be prohibitive. Working on this policy and using the Malaria Control in War Areas program to further the effort, it became necessary only to create in the local citizenry the desire for mosquito control and a willingness to pay for it.

The Malaria Control in War Areas program served to demonstrate to the local people what they could expect from mosquito control. Mosquito workers were trained to take over local programs when the time came. In addition, equipment assigned to the State could in some instances be loaned for short periods to the local programs, thus allowing all of their local funds to be spent largely for labor.

With the end of the war came the end of the Malaria Control in War Areas. Federal funds were curtailed as expected. Virginia did not participate in the extended malaria control program because locally transmitted malaria had practically disappeared in the State. Now was the time to develop local mosquito control districts. Using the momentum gained through the MCWA and capitalizing on the ground work that had been done with the local authorities, it was not too difficult to sell the district idea.

To date, 12 additional districts have been created. No two operate exactly alike, a good argument for having a law flexible enough to allow for local conditions. Several methods have been used in establishing districts: public meetings have been held; public hearings have been held before boards of supervisors; and in one case, a referendum was held. An indication of how well the public had been sold was demonstrated in this election where the special tax for mosquito control was passed by a two to one majority.

Usually, the amount of money available to do mosquito control in a newly formed district has been pitifully small. However, this has not been too discouraging. Every shovel of dirt moved to drain standing water and every gallon of larvicide sprayed on mosquito breeding will do some good. Fortunately, the best results were the first results. A small effort usually was enough to demonstrate what good could be done; and larger appropriations followed. In one district, funds available the first year totaled $6,000; but within 3 years, the budget was up to $20,000. Of course, the important thing was to do a good job and to let the people know that the improvement was due to the work being done. Figure 1 illustrates the development of mosquito control in Virginia from 1942 through 1950.

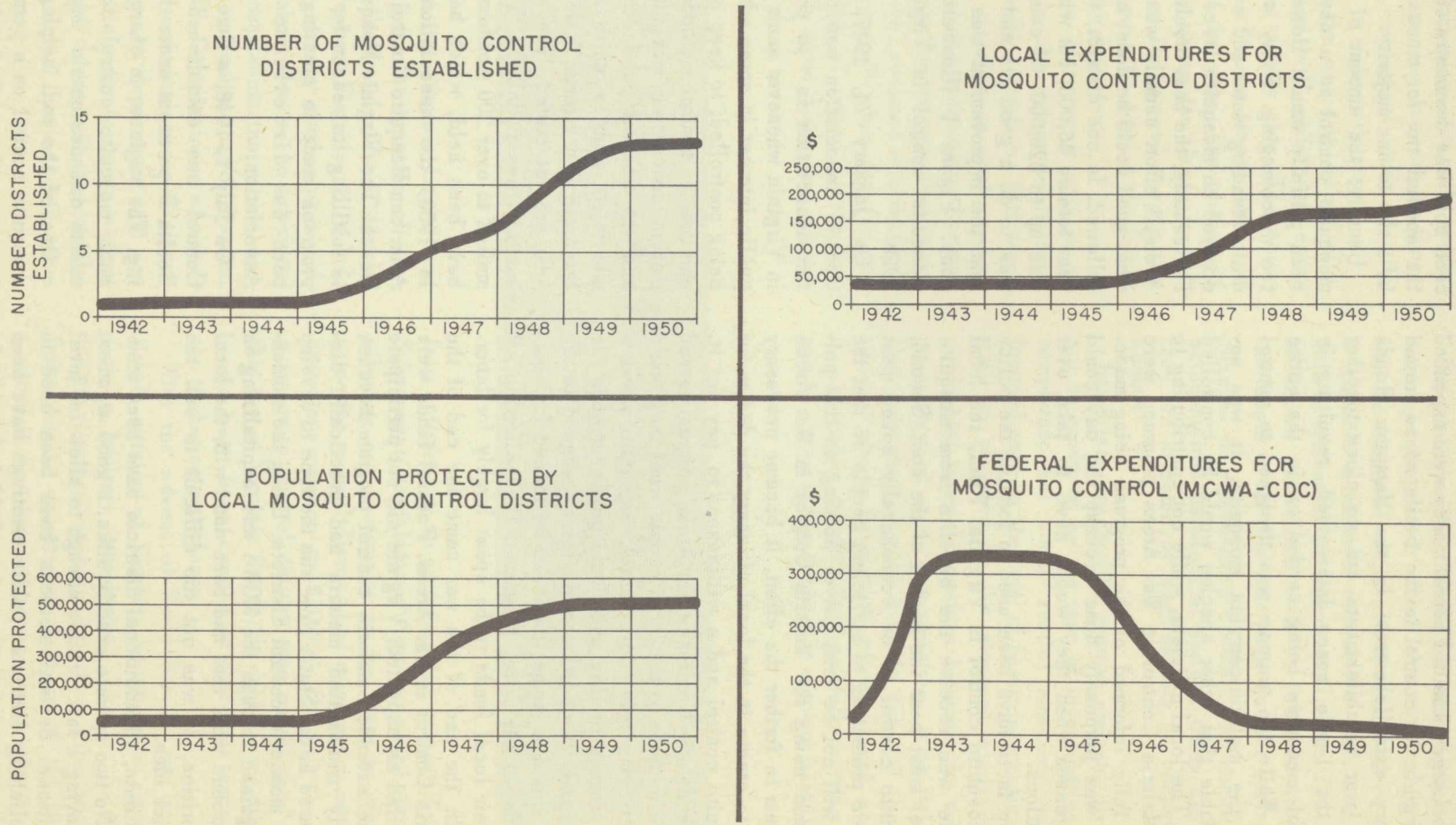
On January 24, 1947, the Virginia Mosquito Control Association was created. The purpose of the association is "to promote mosquito control in Virginia whenever same is feasible; to maintain public interest in areas where mosquitoes are now being controlled; to keep up with the latest developments in control methods; to disseminate information concerning mosquitoes to its membership and the general public through publications and meetings; and to unite and coordinate common interests and efforts." Membership is open to all who are interested. The association publishes a monthly paper called "The Skeeter," which is mailed to over 200 members. Four annual meetings have been held, which have been well attended. In 1950, the association met jointly with the American Mosquito Control Association at Virginia Beach. The Virginia Mosquito Control Association is fulfilling its reason for being; and much of the progress made in creating mosquito districts has been due directly to efforts made by the Association.

On July 1, 1948, a Bureau of Insect and Rodent Control was established in the Virginia State Health Department under the Division of Engineering. The engineer in charge serves as chairman of each mosquito control commission as the State health commissioner's deputy.

One of the real helping hands in establishing mosquito control on a permanent basis in Virginia has been the assistance provided by the Public

Figure 1

DIAGRAMMATIC DEVELOPMENT OF LOCAL MOSQUITO CONTROL IN VIRGINIA



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Health Service. In some cases trucks and equipment temporarily loaned to the newly formed districts have allowed them to use their limited local funds for labor and larvicide, thus making it possible for them to show results immediately. Another contribution has been the assistance of trained personnel to get the district off to a good start. A practical fieldman assigned for several days to work with a newly appointed local man and to check back from time to time has been the difference between success and failure. Until recently, the Communicable Disease Center furnished such personnel to Virginia, but recent curtailment of funds has required the lay-off of all the practical fieldmen; and this, no doubt, will hamper the creation of additional districts.

The Potentialities of Biological Warfare Against Man: an Epidemiological Appraisal*

ALEXANDER D. LANGMUIR**

In December 1950 the Executive Office of the President issued a defense manual*** which states categorically, "an enemy could employ..... biological warfare against us effectively." Two major forms of attack are emphasized: (1) the creation of clouds of pathogenic aerosols over cities, and (2) the contamination of water and food supplies or the air of strategic buildings by sabotage. The use of a hypothetical new agent of "super virulence" and the initiation of a "spreading epidemic" are discarded as not based on scientific fact.

The evidence supporting these conclusions may be found in the existing knowledge of the epidemiology of air-borne infections and common vehicle epidemics. These facts form a basis for developing a Theory of Biological Warfare.

Air-borne infection is a serious hazard to research workers in laboratories. Attack rates are high and many fatalities have been recorded. The notorious offenders are the agents causing brucellosis, tularemia, Q fever, typhus fever, yellow fever, psittacosis, coccidioidomycosis, and many others. Until recently, contact was generally thought to be the cause of these infections. Now it is known that many cases result from inhalation of aerial contaminants. Certain procedures such as use of the Waring blender, or the Sharples centrifuge, disperse clouds of fine particles into the air.

Serious epidemics have involved laboratory personnel having no possible contact with the infectious agents. In the Hygienic Laboratory in Washington, 11 cases of psittacosis followed the arrival of infected parrots. At the Michigan State College, 45 cases of brucellosis due to *Brucella melitensis* occurred among students and staff in one laboratory building. A Sharples centrifuge in the basement had been used approximately 1 month prior to the outbreak. Epidemics of Q fever have occurred in many laboratories with attack rates as high as 50 percent. Visitors to laboratories who stayed only a few minutes have been infected. These epidemics have occurred under circumstances that preclude other modes of spread than air-borne infection.

The new Infectious Disease Laboratory at the National Institutes of Health in Bethesda, Md., is a monument to those who have died from laboratory acquired disease. In this building specially designed hoods, controlled ventilation with incineration of exhaust air, and the utilization of properly placed ultraviolet lights indicate the extent to which the hazard of air-borne infection has been appreciated.

Important to the Theory of Biological Warfare is the fact that the respiratory tract is an extraordinarily fine filter. Only small particles less than 5 microns in diameter can reach the alveoli. Larger particles settle or impinge on the mucus overlying ciliated epithelium and are eventually swallowed.

*Abstracted from an article appearing in Public Health Reports, 66(13): 387-399 (1951).

**Chief, Epidemiologic Services, CDC.

***Health services and special weapons defense. Executive Office of the President. U. S. Government Printing Office, Washington, D.C. (Dec. 1950).

Animal experiments have shown that the infectious dose in the form of small particles is many hundreds or thousands of times smaller than the infective dose of large particles. Under natural conditions, infectious particles sufficiently small to reach the aveoli rarely get into the air. Under artificial conditions, as in laboratories, this may happen readily. Thus, disease agents which in nature are spread by insect bite or other routes may be acquired through the respiratory tract if inhaled in artificially created small particles.

Now, if the air of a whole laboratory building can be contaminated accidentally, the air of any building could be contaminated maliciously. By using appropriate disseminative devices, such as atomizers, far greater concentrations of aerosol could be created than occur in laboratories. Attack rates as high or higher than those known to occur among research workers can be anticipated.

These same principles apply on a larger scale to the use of aerosol clouds over cities. Specially designed bombs, shells, or generators discharged from enemy aircraft, or from warships offshore could create large clouds. Under appropriate weather conditions, such clouds would remain close to the ground and, like pollen, diffuse with the wind for many miles or, like smog, hang over a city for many hours.

Epidemics caused by contaminated food and water supplies have long been understood. It is easy to comprehend how a saboteur could readily create one at will by introducing a high concentration of infectious or toxic agent at the appropriate time and place. An almost unlimited variety of possibilities can be imagined. The only limitations of consequence result from the accessibility of such food and water supplies and the limited distribution of any one supply.

It may be concluded, therefore, that the epidemiology of air-borne infections and common vehicle epidemics forms a scientific basis for developing a Theory of Biological Warfare. Established scientific principles indicate that biological warfare can be used against us effectively. The planning of appropriate defense measures must not be delayed.

Bloomington Field Training Center

C. D. SPANGLER, Sanitary Engineer*

Training Services of the Communicable Disease Center, in cooperation with the Illinois State Department of Public Health and McLean County Health Department, in the fall of 1950 set up a field training station at Bloomington, Ill. This follows the previously established policy of the Public Health Service to assist the States in developing training facilities for their personnel. The Midwestern States are beginning to form a number of county health departments and there exists a need for field training of sanitation personnel for these departments. It was felt that most of the trainees would be drawn from the States of Indiana and Illinois, with possibly some from Wisconsin and Minnesota. The intention is that this station shall function until Indiana and Illinois have built up enough demand to justify a full-time field training program of their own.

The first course in the fall of 1950 was given for sanitarians employed by local health departments of Illinois and Indiana and was a standard 3-month Environmental Sanitation Course. Another similar course will be given in the spring of 1951 and another in the fall.

Illinois is one of the more important milk-producing States, since the Chicago milkshed affects the northern part of the State and the St. Louis milkshed the southern part. Due to the lack of local health departments, the sanitation program emphasis has been controlled by State health department personnel and to a considerable extent by fieldmen employed by the milk industry. Frequently, there has been a lack of uniformity in the interpretation of various ordinance requirements among the local health department personnel, State health department personnel, and the industry fieldmen.

At the request of the industry and the State

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health department, a short course in sanitation for dairy fieldmen was given from January 15 to February 9, 1951 (see table 1). This course was set up so that the fieldmen would not only learn the bare essentials of milk sanitation but also would gain a broader background and thus be supplied with reasonable arguments, which they could employ to persuade the dairy farmer to use better methods of milk production. Accordingly, considerable time was spent during the first week in the study of bacteriology with particular reference to milk bacteriology and milk-borne disease. During the next week, time was spent on rural water supplies and sewage treatment methods and on the factors affecting the mixing of good concrete, as well as the introduction to the principles of milk sanitation and the milk ordinance and code. The remainder of the course dealt with milk sanitation, with the exception of 2 days on fly control and rat control. The milk studies included 2 days in the laboratory running tests bearing on milk control, with particular emphasis on the quality control of raw milk to be pasteurized.

This course was successful, and since milk control is an important sanitation problem in the State of Illinois, it is anticipated that further courses similar to this one will be given until the dairy fieldmen and the health department sanitarians have all had similar training. If this program will result in the reduction of conflicting recommen-

Table 1

BLOOMINGTON FIELD TRAINING CENTER
DAILY SCHEDULE FOR MILK SANITARIAN COURSE
January 15 through February 9, 1951

	Week	1	2	3	4
Monday	A.M.	Registration, rooms, course schedule, operation of projectors	Rural water supplies and sewage disposal	Care, cleaning, and maintenance of milking machines	Milk
	P.M.	Introduction to bacteriology		Control of mastitis	Laboratory
Tuesday	A.M.	Bacteriology of water and sewage	Rural water supplies	Dairy plant with instructor	Milk
	P.M.	Laboratory	Sewage field trip		Laboratory
	Evening	Review, quiz	Review, quiz	Review, quiz	Review, quiz
Wednesday	A.M.	Bacteriology of milk and food	Principles of milk sanitation	Dairy farm with Instructor	Rat control
	P.M.	Laboratory	Milk ordinance and code		
Thursday	A.M.	Pathogenic bacteriology (especially milk-borne)	Milk ordinance and code	Dairy farm with instructor	Administration and records in a milk control program
	P.M.	Laboratory			Final examination
	Evening		7:30 p.m. Concrete slides		
Friday	A.M.	Epidemiology of milk-borne disease	Concrete demonstration and lecture	Fly control	Health department activities and responsibilities in a milk control program. How can health departments assist the industry? Summary and discussion of course.
	P.M.	Laboratory			

dations by the various groups interested in milk control, it will have been worth while.

It is believed by the training station personnel and the State health department that a milk sanitarian working in an official health department should know the other activities of the department as well as milk control work. Therefore it is not intended to enroll sanitarians from official health departments in the 4-week course for dairy fieldmen. Sanitarians in official departments, even though they may be working with milk control, should take the standard 3-month Environmental Sanitation Course. The short course is planned only for milk industry personnel working in the field of milk control.

Histoplasmin Sensitivity among Animals in Central Missouri

ROBERT W. MENGES*

Since 1939, when DeMonbreun (1) first described histoplasmosis in a dog, the disease has been found to involve the cat (2), house mouse (2), rat (2), skunk (2), bear (3), opossum (2), colt (4), and cow (5). Thus far, however, the prevalence of the disease in animals has not been determined. This report presents probable prevalence data in the form of histoplasmin sensitivity rates among cattle, sheep, horses, swine, and fowl for Boone County, Mo. This county is located in the central portion of the State. An analysis of the histoplasmin reactors among the various animals is presented, and a comparison of the histoplasmin sensitivity rates is given. Animal cases of histoplasmosis in Boone County also are mentioned.

MATERIALS AND METHODS

The histoplasmin sensitivity rates were determined by the use of the histoplasmin skin test. The method of testing the various animals has been described previously (6). Histoplasmin lots (KC) 3 and 4 undiluted were used as antigen for all the animals tested.

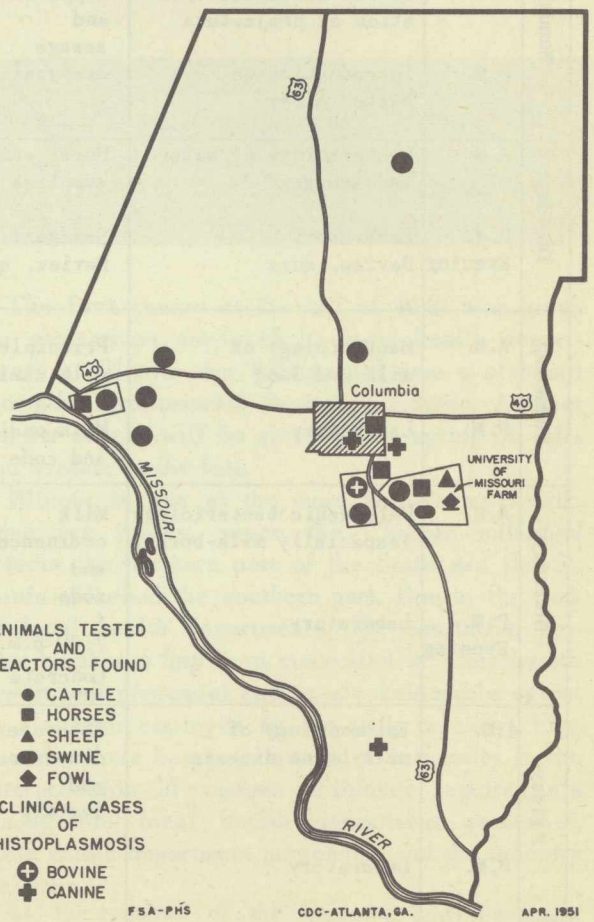
The majority of the animals tested were lifetime residents of Boone County. The location of the farms where the animals were tested is shown in figure 1. A variety of animals were skin tested at the University of Missouri farm, and in addition, cattle were tested at seven farms in the county, and horses were tested at one farm and at two riding stables.

HISTOPLASMIN SENSITIVITY RATES AMONG THE VARIOUS ANIMALS

Cattle. Early work with cattle by Furcolow and Ruhe (7) showed 4.2 percent histoplasmin reactors in the eastern third of Kansas, 1.5 percent reactors in the central third, and no reactors in the

Figure 1

LOCATION OF ANIMALS TESTED AND CASES OF HISTOPLASMOSIS
BOONE COUNTY, MISSOURI



*Midwestern CDC Services, Kansas City, Kans.

western third. In one eastern county of Kansas they found that the histoplasmin sensitivity rate increased with age. Cattle under 2 years of age showed 1.8 percent histoplasmin reactors, and cattle 6 and 7 years of age showed 12.5 percent histoplasmin reactors. Many of the reactors were dairy cattle that had been hand milked. A total of 1,909 cattle has been tested in Kansas, and 60 (3.1 percent) histoplasmin reactors found. The cattle were tested on 123 farms, and histoplasmin reactors were found on 34 (27.6 percent) of them.

In Boone County, Mo., the histoplasmin sensitivity rate among cattle was found to be much higher than in Kansas. A total of 382 cattle was tested, and 60 (15.7 percent) histoplasmin reactors found. As in Kansas, the histoplasmin sensitivity rate increased with age. Cattle under 2 years of age showed 2.9 percent histoplasmin reactors, and cattle 6 and 7 years of age showed 33.3 percent histoplasmin reactors. The youngest histoplasmin reactor was a 10-month-old Brown Swiss heifer.

Among the cattle tested there were 349 females – 106 heifers, 191 cows, and 52 calves; and 33 males – 1 steer, 11 bulls, and 21 calves. Since only a few males were tested, no conclusions regarding sex could be reached.

The breeds of cattle tested included Holstein, Jersey, Guernsey, Brown Swiss, Brahma, Aberdeen-Angus, and Hereford. In general, the dairy breeds had higher histoplasmin sensitivity rates than the beef breeds.

Sheep. The first indication that sheep might be involved occurred when six ewes and one ram associated with a proved human case of histoplasmosis were skin tested. Five (71.4 percent) of the seven sheep were histoplasmin reactors. This indicated that sheep might have a high histoplasmin sensitivity rate. In addition, among 39 blood samples from feeder lambs tested using the complement fixation test for histoplasmosis (8), one showed a four plus reaction, one a three plus reaction, and one a two plus reaction. The remaining serums were negative. The feeder lambs were from feeder yards at Omaha, Nebr.

Sheep in Boone County were found to have a high histoplasmin sensitivity rate. A total of 185 sheep was skin tested and 44 (23.7 percent) histoplasmin reactors found. As in cattle, the histoplasmin sensitivity rate increased with age. Sheep under 2 years of age showed 1.5 percent histoplasmin reactors, and sheep 6 and 7 years of age showed 44.1 percent histoplasmin reactors. The youngest histoplasmin reactor was a 6-month-old (female) lamb.

Among the sheep tested there were 163 females – 140 ewes and 23 lambs; and 22 males – 6 rams and 16 lambs. Since only a few males were tested, no conclusions regarding sex could be reached.

The breeds of sheep tested were Hampshire, Southdown, Shropshire, Dorset, and Western. At age 4 and 5 years, the rates among the Hampshire, Southdown, and Shropshire sheep were quite similar. The data concerning breed, however, were too limited to reach any definite conclusions.

In view of these findings, it appears that cases of histoplasmosis among sheep may be found.

Horse. It is interesting to report that the histoplasmin sensitivity rate among horses in Boone County was exceedingly high. Among 69 horses tested there were 45 (65.2 percent) histoplasmin reactors. As in the other animals, the rate increased with age, although only a few horses under 6 years of age were tested. Horses under 6 years of age showed 50.0 percent histoplasmin reactors, and those 8 years and over showed 73.7 percent histoplasmin reactors.

Most of the horses tested were saddle horses. In addition, some draft-type (Percheron) horses were tested, and a few mules. Among 54 saddle horses tested there were 35 (64.8 percent) histoplasmin reactors. Of 11 Percheron horses tested, 6 (54.5 percent) were histoplasmin reactors; 4 mules were tested and 4 (100 percent) were histoplasmin reactors.

Among the 69 horses, there were 30 males and 39 females. Of the 30 males, 21 (70.0 percent) were histoplasmin reactors, and of the 39 females, 24 (61.5 percent) were histoplasmin reactors.

Thus far only one case of histoplasmosis has been reported in the horse. These findings indicate that the disease is probably much more prevalent among horses than the present records would indicate.

Swine. Histoplasmin reactors also have been found among swine. Nine swine associated with a proved human case of histoplasmosis were skin tested and five (55.6 percent) were histoplasmin reactors.

In Boone County a total of 129 swine was skin tested and 2 (1.5 percent) histoplasmin reactors found. Age again was shown to be an important factor. Of the 129 swine, there were 29 (22.4 percent) under 6 months of age; 98 (76.0 percent) were 1 year old, and 2 (1.6 percent) were 2 years old. The two histoplasmin reactors were found

among 1-year-old Duroc Jersey swine. Both reactors were sows.

Among those tested were 83 sows, 16 boars, 1 stag, and 29 pigs (23 males, 6 females). The breeds included were Duroc Jersey, Hampshire, Poland China, Yorkshire, and Landrace.

Since swine are sent to slaughter at an early age, it probably will be difficult to obtain a true picture of the histoplasmin sensitivity rate according to age among swine.

Fowl. Among the fowl skin tested in Boone County were chickens and turkeys. One reactor (1.0 percent) was found among 98 chickens. Most of the chickens, 83 (84.6 percent), were under 2 years of age. The rate for this age group was 1.2 percent. The histoplasmin reactor was a 1 1/2-year-old Rhode Island Red hen.

Among the breeds of chickens tested were White Leghorn, Hampshire, White Rock, and Rhode Island Red. There were 92 females and 6 males among those tested.

The turkeys tested were 5-month-old Broad-breasted Brauns. Of the 25 tested, there were 21 females and 4 males. No histoplasmin reactors were found.

Fowl present the same problem as swine. They also are slaughtered at an early age, and it will probably be difficult to obtain histoplasmin sensitivity rates according to age.

DISCUSSION

A comparison of the histoplasmin sensitivity rates according to age of cattle, sheep, horses, swine, and fowl in Boone County, Mo., is given in table 1. The rates for horses are markedly higher than those for cattle and sheep. The rates for cattle and sheep are somewhat similar. The low rate for cattle at the ages of 4 and 5 years cannot be explained.

In the under-2-year age group, the rates are quite low, and somewhat similar for sheep, swine, and chickens. The rate for cattle, although low, is slightly higher than the rates for the other animals. The similarity of the histoplasmin sensitivity rates appears to indicate that all animals may be infected from a common source.

It is interesting to note that before the histoplasmin skin testing survey was completed, cases of histoplasmosis were found. Among these were three canine cases and one bovine case (5). The location of these cases in Boone County is shown in figure 1.

SUMMARY

Histoplasmin sensitivity rates among cattle, sheep, horses, swine, and fowl in Boone County, Mo., are presented. The rates for horses were found to be markedly higher than those for cattle and sheep, and the rates for cattle and sheep were found to be somewhat similar. In the under-2-year age group the rates for most of the animals were quite low and somewhat similar.

The findings suggest that histoplasmosis may be prevalent among domestic animals, and that cases of histoplasmosis may be found among cattle, sheep, horses, swine, and fowl.

Table 1

ANIMAL HISTOPLASMIN SENSITIVITY RATES ACCORDING TO AGE IN BOONE COUNTY, MO.

Animal	Age in Years																	
	Under 2			2 and 3			4 and 5			6 and 7			8 and Over			Total		
	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.	No.	Pos.	% Pos.
Cattle	137	4	2.9	102	21	20.6	73	9	12.3	45	15	33.3	25	11	44.0	382	60	15.7
Horse*	2	0	0	5	4	80.0	9	4	44.4	15	9	60.0	38	28	73.7	69	45	65.2
Sheep	66	1	1.5	22	4	18.1	22	5	22.7	68	30	44.1	7	4	57.1	185	44	23.7
Swine	127	2	1.6	2	0	0	0	0	0	0	0	0	0	0	0	129	2	1.5
Chicken	83	1	1.2	10	0	0	4	0	0	1	0	0	0	0	0	98	1	1.0
Turkey	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0
Totals	440	8	1.8	141	29	20.6	108	18	16.7	129	54	41.9	70	43	61.4	888	152	17.1

* Data for the horses under 6 years of age were combined due to the small number tested. The total tested under 6 years of age was 16, with 8 positive (50 percent).

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Enrichment of Loeffler's Medium with Glycerol

GERMANO BRASILIENSE BRETZ,* and
MARTIN FROBISHER, JR., Bacteriologist**

During the early years of World War II diphtheria became fairly prevalent in the high, mountainous regions near Rio de Janeiro, Brazil. Under the direction of Dr. Bretz, the Public Health Laboratory in Petropolis, some 20 km. from the capitol, was faced with the necessity of rapidly arranging laboratory facilities to aid in diagnosis, epidemiology, and control of the disease.

The preparation of Loeffler's medium presented a serious problem because there was no available source of the necessary quantities of serum. In cast about for an appropriate substitute, it occurred to Dr. Bretz that Petragnani's medium (minus the dye) might serve, as it was in good supply, made of readily available materials, and of what might be supposed to be adequate nutrient substances. A small quantity of the medium was therefore prepared without dye and, after slanting and sterilizing was inoculated with a number of different strains of *Corynebacterium diphtheriae* in pure culture. The organisms grew luxuriantly, in 18 hours at 37° C. The results of microscopic examination far exceeded expectations. The organisms, especially when stained by the Albert-Layburn method, presented all of the well-known, distinctive pleomorphism of *C. diphtheriae*, and the bars and granules were exceedingly large, distinct, and numerous. Other organisms, common in throat cultures (diphtheroids, cocci, and others), were also cultivated on the medium and found to be readily distinguishable from true diphtheria bacilli. In mixed cultures they presented no difficulty or confusion in microscopic diagnosis. This medium and the Albert-Layburn stain were, therefore, adopted for use at Petropolis in the diagnosis of diphtheria, and for some time proved very valuable. The modified Petragnani's medium appeared to be as good as Loeffler's medium.

In 1944 the senior author had an opportunity to continue his studies in Baltimore at the Johns Hopkins School of Hygiene and Public Health, Department of Bacteriology. Large numbers of cultures, both pure and "field," were available for study, as well as an abundance of patients since an epidemic was in progress in a nearby school. It soon became evident that Petragnani's medium, in conjunction with the Albert-Layburn stain, was a valuable diagnostic tool. This medium, however, is expensive and time consuming in preparation.

Because of the usually good morphological differentiation of *C. diphtheriae* on the Petragnani medium, a series of simple experiments was under-

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taken to determine which of the ingredients in Petragnani's medium might be playing the principal role in producing the excellent results observed. Difco heart-infusion agar was used as a basal medium. By itself, this induces in *C. diphtheriae* little of the distinctive morphology so useful in diphtheriology and supports only a minimal growth of the organisms. To this medium the different ingredients used in Petragnani's medium were added, each ingredient in a separate lot of medium, in the proportions used in Petragnani's formula or as nearly so as was practicable. The ingredients thus tested were whole milk, potato starch, diced potato, eggs, and glycerine (c. p.). Several lots of media were also prepared with combinations of glycerol and potatoes. The media were dispensed, autoclaved, and cooled as slants.

Groups of each were then inoculated with cultures of *C. diphtheriae* and diphtheroids (*C. xerose*, *C. pseudodiphtheriticum*). After incubation at 37° C. for 18 to 24 hours smears were prepared in duplicate from each culture for microscopic examination. One of each pair of smears was stained with methylene blue, the other by the Albert-Layburn method as given below:

Formula for Albert-Layburn Stain

Solution I

Toluidin blue	0.15 gm.
Malachite green	0.20 gm.
Glacial acetic acid	1.00 cc.
Alcohol 95 percent	2.00 cc.
Distilled water	100.00 cc.

Autoclave 15 lb. 15 minutes.
Let stand 24 hours, filter.

Solution II

Iodine crystals	2.0 gm.
Potassium iodide	3.0 gm.
Distilled water	300.0 cc.

1. Fix smear by heat.
2. Flood with solution No. 1 for 3 to 5 minutes.
3. Wash in tap water.
4. Flood with solution No. 2 for 1 minute.
5. Wash, blot dry, and examine.

It required only a short series of such experiments to show clearly that, so far as the morphology of *C. diphtheriae* was concerned, glycerol is the effective agent in Petragnani's medium. The methylene blue stained smears were, in our opinion, as effective as those stained with the Albert-Layburn stain although the latter greatly emphasized the granules. In spite of these results it was not considered desirable to adopt a glycerol-agar medium at once for routine diagnostic purposes. This possibility may be made the basis of a future, more extensive, study.

A series of tests was made in which glycerol was added to fluid Loeffler's medium in concentrations ranging from 0.5 percent to 10 percent before dispensing and sterilizing the mixture. Glycerol was also added to Pai's medium (1) in 8 percent concentration. Microscopic examination of various strains of *C. diphtheriae* and other bacteria cultivated on these mixtures showed that the extent of granule formation and distinctiveness of morphology were both directly related to the presence and quantity of glycerol, regardless of the basal medium. Both Albert-Layburn and methylene blue stains were used. The test organisms included 52 strains of *C. diphtheriae*, 25 diphtheroids, 15 strains of Group A streptococci, and 18 strains of *Staphylococcus aureus*. A portion of one of the tabulations serves to show the nature of the findings (table 1). The optimal concentration of glycerol appeared to be near 8 percent. A suggested explanation of the effect of the glycerine was that the corynebacteria metabolize it in some way. Although previous investigators (2) have shown that *C. diphtheriae* does not regularly ferment (acidify) glycerol, further tests were arranged to confirm that point in the present study. Thirty pure cultures of *C. diphtheriae* from among those used in this study were inoculated into Difco heart-infusion broth containing 1 percent glycerol and held at 37° C. The cultures showed excellent growth but only slight and varying degrees of acidity developed, and then only after several days of incubation. If the glycerol was metabolized, the end products were not markedly acid.

After the return of Dr. Bretz to Brazil, the study of glycerol-enriched Pai medium was continued in the Communicable Disease Center in Atlanta, Ga. The Diphtheria Laboratory in CDC, under the direction of Dr. Elizabeth I. Parsons, has now adopted the addition of glycerol to Pai's medium in 8 percent concentration as a routine procedure. Only methylene blue stain is used, since the glycerolized medium yields superior morphological results, obviating the necessity of using a special granule stain. The study of glycerolized Loeffler's medium for diagnostic work in this laboratory has not yet been extensive since relatively few origi-

Table 1

COMPARISON OF MORPHOLOGICAL DISTINCTIVENESS (META CHROMATIC GRANULE FORMATION) OF "C. DIPHTHERIAE" AND SOME OTHER ORGANISMS WHEN CULTIVATED ON MEDIA CONTAINING GLYCEROL.

Cultures Examined	Loeffler's Medium with Glycerol (Percent)						Pai Medium with 8 Percent Glycerol
	0	0.5	1.0	4.0	8.0	10.0	
*C. diphtheriae**							
416	+/−	+/−	+/−	++	+++	+++	++++
426	+/−	+/−	+/−	++	++++	++++	++++
973	+/−	+/−	+/−	++	++++	+++	+++
992	+/−	+	+	++	++++	++	++++
991	+/−	+	+	++	++++	++	++++
976	+/−	+	+	++	++++	++++	+++
*Streptococcus pyogenes***							
Kes.	−				−		−
Les.	−				−		−
Ro 130 b	−				+/−		+/−
Ro 127	−				+/−		+/−
*Diphtheroids***							
1	+/−	+/−	+/−	+/−	+	+	+/−
2	+/−	−	−	+/−	+/−	+/−	−
3	+/−	+	+	+	+	+	+
4	+/−	−	++	+	++	+	++
5	+/−	+	+	+	++	+	++
*Staphylococcus aureus***							
All. Me. 6	−				−		−
Aur. K 73	−				−		−
Aur. Mo. 7	−				−		−
Bel. ear	−				−		−

*Plus and plus-minus signs indicate ease with which *C. diphtheriae* is recognized and distinguished from other organisms by its morphology as compared with growth on plain Loeffler's medium.
** Plus, minus, and plus-minus signs indicate degree of granule formation and of resemblance to *C. diphtheriae*.

nal diagnostic cultures are made in this laboratory. The Pai's medium is used mainly for pure culture study.

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Dyes as an Aid in the Precipitin Test for Host Blood Meals of Mosquitoes

JOHN F. HERNDON and JOSEPH H. SCHUBERT, Scientist (R)*

In 1950 Schubert and Kelly (1) described methods currently in use by CDC in Atlanta for determining the species of host blood meal in mosquitoes. Although a number of improvements over previous procedures were discussed, one defect inherent in precipitin tests in capillary tubes was not corrected at that time. This difficulty was the problem of determining quickly and accurately the interface between antigen and antiserum and the zone where the true precipitin reaction occurred. This difficulty was enhanced by the faintest cloudiness of the glass or a cloudiness in either of the reacting fluids. After some experimentation, it was found possible to resolve this difficulty by the use of dyes. The purpose of the dye was to sharpen the definition of the reaction zone and to differentiate between antigen and antiserum, thus facilitating the reading of the results.

The antiserums were colored by adding .06 ml. of a dye solution to 10 ml. of the diluted antiserums. This solution was prepared by adding 0.25 gm. of dye to 10 ml. of ethyl alcohol and diluting to 100 ml. with distilled water. The dyes tested in these concentrations were safranine O, basic fuchsin, methylene blue, crystal violet, and brilliant green. Safranine O and basic fuchsin produced a greater contrast between antigen and antiserum than did the other dyes tested. Of the two, safranine O was the most satisfactory.

Using the improved technique of Schubert and Kelley, 167 mosquito blood meals were tested with human, equine, bovine, porcine, and avian antiserums, prepared with and without dye. Of these mosquitoes, 100 were *Anopheles quadrimaculatus*, the remainder *Anopheles crucians*. These mosquitoes were from known feedings of human, equine, bovine, porcine, and avian hosts. The test gave 100 percent accuracy in detection of the blood meals of the 167 known mosquitoes. Titer and specificity of the antiserums were not altered by the addition of dye. The dye was added fresh to each lot of newly diluted antiserums.

The effects of addition of color on the precipitin tests are physical. Striking contrast results when a colorless antigen is brought in contact with the colored antiserums. The contrast between a colored fluid layered over a colorless fluid affords a simple and rapid means of determining and controlling the desired amounts of antigen and antiserums to be drawn into the capillary tubes. Using this modification, any improper layering may be easily detected. Capillary tubes sometimes are not thoroughly dried after washing; in such cases, traces of water remain in the tubes to react with one or the other of the test reagents, thereby yielding a false precipitin ring or a cloudy zone, often not at the true interface. When antiserums containing dye are employed, correct observation of the true precipitin ring at the zone of reaction between the contrasting reagents is assured. Any false reactions elsewhere than in this zone may be readily noted.

The addition of color to antiserums may prove to be of equal value in the performance of other precipitin tests, such as those used for typing streptococci, in which colorless reagents are now being employed in capillary tubes.

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*Laboratory Services, CDC.

Suggestions for the Preparation of Biological Manuscripts for Publication

F. EARLE LYMAN, Scientist (R)*

Charles Darwin once said, "A naturalist's life would be a happy one if he had only to observe and never to write." Indeed, it is true that there are only a few persons who really enjoy writing – but there are fewer still who can write easily and well. Because good writing is a mark of the professional scientist, it behooves us to cultivate the art of clear writing as we do that of clear thinking. A piece of writing almost invariably reflects directly the amount of effort put into it.

Experience in reviewing and approving manuscripts sent to the Communicable Disease Center has indicated that in many instances authors are not following, or are not cognizant of, the fundamental principals of manuscript preparation. For this reason the following suggestions have been compiled to assist authors in preparing articles for publication.

GENERAL ORGANIZATION

The first essential is to organize your paper in such a manner that the main ideas will flow in logical and orderly sequence. The following outline will serve as a typical example of over-all organization.

I. Introduction
- A. Present problem and state objectives
- B. Give historical resume of literature
- C. Indicate range and limitation of work

II. Methods. special techniques, and equipment used.

III. Results (presentation of data)

IV. Discussion (analysis of data)

V. Conclusions

VI. Summary (Except for a very short paper, every article should contain a summary.)

VII. Bibliography or literature cited

Make the title short but informative. When generic or specific names appear in the title of a paper, always cite the higher categories, e.g.. *Anopheles crucians* Wiedemann (Diptera, Culicidae), so that a general reader or indexer will know immediately the systematic position of the genus or species under discussion. Always give an address after your name under the title, or as a footnote on the first page, so that you may be reached concerning inquiries for reprints or other information.

Acknowledgments may be given in a footnote on the first page, at the end of the introduction, or at the end of the paper just preceding the summary.

The introduction and summary of a paper are usually the most difficult to prepare. The writer will do well to put considerable effort and thought into these two sections. There should be no doubt left in the reader's mind as to the purpose for which the paper was written or as to the conclusions reached. A summary should be so written that it is complete in itself without the necessity for reference to the body of the article. Remember that many persons, especially abstracters, will read only the summary.

Be certain that all citations to literature made in the text are included in the bibliography or literature cited. In the preparation of bibliographic references, great care should be taken to give the correct year, volume, and page number. Use acceptable abbreviations for the names of the journals cited and check punctuation. Do not mix bibliographic styles. Follow the bibliographic style used in the journal of publication.

RHETORIC AND GRAMMAR

Ordinarily a paragraph should begin with a topic sentence which introduces an idea, and each subsequent sentence within the paragraph should add to the development of that same idea.

Throughout the paper it should be the author's aim to attract and hold the reader's attention and to lead him logically from one step to the next. This may be accomplished best by (a) making the paper as easy as possible for the reader to comprehend; (b) including illustrative material whereever it is appropriate for clearness; (c) using transitional words, phrases, or sentences; (d)

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omitting insignificant details and superfluous words; (e) using variation of sentence form; (f) using descriptive words and phrases; and (g) drawing comparisons.

Long and involved sentences should be avoided. The sequence of thought in sentences over 30 words in length is often difficult to follow. Variety may be obtained by changing the type of sentence structure, by using short sentences interspersed among longer sentences, and by using transitional words and phrases to connect ideas.

In order to write effectively, it will be necessary for the average author to study and refer frequently to some standard, college-level textbook (8, 9) of English composition and grammar. Given below are a few points which every writer should observe.

1. Be consistent in the use of verb tenses and voices. Maintain parallel construction within sentences and paragraphs.

2. Check your manuscript carefully for agreement in number of subjects and verbs.

3. Avoid the use of *this* or *these* as substantives.

4. Be certain that a pronoun agrees with its antecedent in person, gender, and number. The antecedent of a pronoun should be clearly apparent to the reader.

5. To avoid ambiguity always use a comma before the *and* in a series. Become thoroughly familiar with the rules of punctuation.

6. Avoid too frequent use of the same word. Use a dictionary of synonyms (6, 7).

7. Avoid using words in a restricted or colloquial sense. Colloquial usage is often confusing to the foreign reader.

8. Do not use abbreviations unnecessarily. The abbreviations for metric and English units of measurement have the same form in both singular and plural.

9. Cultivate the dictionary habit, especially for spelling and exact meaning of words. Do not capitalize unnecessarily. Study rules of capitalization.

10. Check carefully the spelling of all scientific names. It is a standard practice to cite both the complete generic name and the author of a species where the species name appears for the first time in a paper. Thereafter, the author's name may be omitted and the generic name may be abbreviated. Except in purely taxonomic papers, it is recommended that the genus name or its abbreviation always be given. Underscore scientific names of genera (including generic abbreviations) and species, but do not underscore the name of the author of a species. Capitalize, but do not underscore, names of taxonomic categories above genus.

11. When preparing a taxonomic paper, use the abbreviated style of writing for generic and specific descriptions. Reference to any good taxonomic work will furnish an example in this style.

12. No two authorities will be found who are in complete agreement on all points of grammar and rhetoric. Language is dynamic; rules of form, style, and usage are changing constantly as the language changes. For those instances where the writer finds points of difference among the authorities, he should select the best authority under the circumstances and should follow that authority consistently. Very often such questions can be resolved by following examples set forth in the journal of publication.

ILLUSTRATIVE MATERIAL

Every table or figure should be completely explicit in itself apart from the text. Therefore, each table or figure must bear a heading or legend which states clearly and concisely the significant information contained in the table or figure. As stated by Raymond Pearl (15):

"It has been emphasized earlier in this book that every statistical table should have a heading, or legend, that clearly indicates what the table is about and what categories of information it contains. The same principle applies with equal force to statistical diagrams. The labelling and legend of every diagram or chart should be comprehensively clear, so that the reader will not be compelled to study the text to find out things about the diagram that should be implicit in its own structure and labelling."

Remember, the purpose of a table is to summarize data; too much detail in a table is confusing to the reader. All illustrative material such as tables, graphs, and figures must be referred to in the text. Moreover, all essential information contained in the illustrative matter should be included in the text. The reader should not be required to interrupt his thought in order to refer to a table or figure. Tables and figures are given to furnish the reader with details for further study.

When presenting statistical data, do not carry figures beyond the point of significance. Such a practice may lead the critical reader to question the ability of the author to use a statistical approach in the analysis of data.

MECHANICAL DETAILS OF PREPARATION

Manuscripts should be typewritten double-spaced

on only one side of the sheet, leaving a margin of no less that 1 in. at the top, bottom, and both sides of the page. Never submit a carbon copy for publication. The author should always retain a carbon copy of the manuscript as submitted for publication. Such a copy is necessary for proofreading galley or page proof. Do not fold a manuscript for mailing.

Number all pages consecutively, including pages of tables and figures. Tables should be placed on separate sheets; only leader work should be interspersed with the text. All illustrative material such as tables, graphs, figures, charts, and maps should be numbered consecutively (separately from pagination) and inserted near the place of reference in the text. Tables and figures require a separate series of numbers. Be consistent in the use of Arabic or Roman numerals for tables and figures.

When illustrations larger than standard typewritten pages are included with the manuscript, a separate page should be inserted in the appropriate place in the manuscript giving the figure number and legend. When preparing a large drawing which later will be reduced to printable size, the width of the lines should be exaggerated. This practice will assure the legibility of the drawing after reduction. Lettering, especially, should be bold and sufficiently large and well-spaced so that the letters will not run together when reduced. One value of size reduction in plain-line drawings is that slightly ragged lines or letters usually emerge with clear-cut, sharp edges. A scale indicating actual size should always be given for drawings. As insurance against loss or misplacement, it is a good practice to have the figure number, the author's name, and the title of the manuscript on the reverse side of all drawings submitted as part of the manuscript. Submit drawings in suitable form for publication; do not expect the editor of a journal to remake your drawings.

Number footnotes consecutively throughout the text. Footnotes of tables should be indicated by means of symbols or letters rather than by numbers. Footnotes[2/] should be placed immediately after the full line of the text in which the reference mark occurs and should be separated from the text by two horizontal lines – one above and one below the footnote.

[2/] A footnote should appear in this manner.

If the foregoing suggestions as to organization, rhetoric and grammar, illustrations, and mechanical details are followed, a good manuscript should result; and relatively little revision should be required to bring it into conformity with the editorial style of the journal of publication.

Most journals give certain specific directions to authors for the preparation of manuscripts. To facilitate editorial work the author should prepare his manuscript according to the practices of the journal to which it is to be submitted for publication. Special attention should be given to the methods used by that particular journal for citation of literature in the text, form and numbering of footnotes, form and style of bibliography, and form of tables and figures.

ANNOTATED LIST OF USEFUL REFERENCES

1. U. S. Government Printing Office style manual (revised edition) 1945.

   An excellent reference containing rules for capitalization, punctuation, abbreviation, compounding of words, use of numbers, spelling, tabular work, and other usage. This worthwhile manual in abridged form is available for 35 cents from the Superintendent of Documents, Washington, D. C.
2. A manual of style (revised tenth edition). University of Chicago Press, Chicago, Ill., 394 pp. (1943).

   A useful reference.
3. Webster's collegiate dictionary. G. & C. Merriam Co., Springfield, Mass.

   An abridgment of Webster's new international dictionary (second edition). This handy desk copy of the larger, standard work is considered one of the best of the smaller dictionaries. It contains a summary of the rules for punctuation, compounds, capitals, and other usage, as well as a list of proofreader's marks. Use a recent edition.
4. Webster's new international dictionary (second edition). G. & C. Merriam Co., Springfield, Mass.

   This unabridged work is the outstanding authority among American dictionaries.
5. Dorland's American illustrated medical dictionary. W. B. Saunders Co., Philadelphia, Pa.

   An excellent and well-known medical dictionary. Use a recent edition.
6. Webster's dictionary of synonyms. G. & C. Merriam Co., Springfield, Mass.

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Conference of State Epidemiologists on National Morbidity Reporting *

The Conference of State Epidemiologists on National Morbidity Reporting was held at the Communicable Disease Center, Atlanta, Ga.**, April 18-20, 1951, for the purpose of revising the procedures and the lists of specific diseases to be reported by the States and Territories to the National Office of Vital Statistics***. The conference was attended by 174 persons representing 37 States, the District of Columbia, and Puerto Rico.

A Subcommittee on Morbidity Reporting was appointed by Dr. Roy L. Cleere, president of the Association of State and Territorial Health Officers, to receive the recommendations of the conference and prepare a report for presentation to the Infectious Disease Committee of the Association at its 1951 meeting. Dr. Wilton L. Halverson, chairman of the Committee on Administrative Practice of the American Public Health Association, designated the same subcommittee to present its report to this committee at the 1951 meeting of the APHA in San Francisco, Calif. This subcommittee is composed of Dr. A. C. Hollister, Jr., Chief, Acute Communicable Disease Service, California, chairman; Dr. C. R. Freeble, Jr., Chief, Division of Communicable Diseases, Ohio; Dr. A. L. Gray, Director, Preventable Disease Control, Mississippi; Dr. Robert F. Korns, Director, Bureau of Epidemiology and Communicable Disease Control, New York; and Dr. Albert S. McCown, Director, Communicable Disease Control, Virginia.

Consultants for this subcommittee include Dr. C. C. Dauer, National Office of Vital Statistics; Miss Vivian Holland, chairman, Working Group on Morbidity Statistics of Public Health Conference on Records and Statistics; and Dr. Alexander D. Langmuir, Communicable Disease Center.

The work of the conference fell into two categories: decision with respect to (1) the manner in

*Sponsored by the Communicable Disease Center and National Office of Vital Statistics, U. S. Public Health Service.
**The meetings were conducted at the Fulton County Academy of Medicine.
***See "Plan for Revising Morbidity Reporting by States," CDC Bulletin X(2): 4-12, February 1951.

which current and summary reports shall be transmitted to the National Office of Vital Statistics and (2) the diseases which shall be nationally reported.

The four working committees set up for the conference were requested to give special attention to the following questions:

1. Shall weekly reporting continue?
2. Does the conference recommend publication of corrected annual reports by the National Office of Vital Statistics?
   (a) The same list of diseases that are reported weekly?
   (b) An expanded list of diseases with greater refinement in terminology?
3. Is it feasible to break down corrected reports by laboratory confirmation?
4. Other questions concerning general reporting procedures.

The program* for the 3-day conference was as as follows:

Wednesday Morning, April 18

REGISTRATION — 9:00 to 10:00 — Academy of Medicine

FIRST GENERAL SESSION — Chairman, Dr. Charles L. Williams, Assistant Surgeon General, Bureau of State Services

10:00 Welcome — Dr. Raymond A. Vonderlehr, Medical Director in Charge, CDC; Dr. Halbert L. Dunn, Chief, National Office of Vital Statistics

10:15 Morbidity Reporting, the Basis of Communicable Disease Control — Dr. Wilson G. Smillie, Cornell University Medical College

10:45 Potentialities of Biological Warfare — Dr. Karl Habel, National Institutes of Health, Microbiological Institute

11:15 Civil Defense against Biological Warfare — Dr. Robert H. Flinn** Federal Civil Defense Administration

A kinescope recording of an actual television broadcast, "Hopkins Science Review" on Biological Warfare, was presented by Dr. Flinn. This program of The Johns Hopkins University features Dr. Victor Haas, National Institutes of Health, and Dr. Alexander Langmuir, Communicable Disease Center, discussing the various aspects of Biological Warfare. It is planned to show this film over various local television stations, in theaters, and to public health and other interested organizations.

11:45 Discussion — Opened by Dr. Justin M. Andrews, Deputy Director in Charge, CDC

Wednesday Afternoon

FIRST WORKING SESSION — Chairman, Dr. Alexander D. Langmuir, Chief, Epidemiologic Services, CDC

2:00 Presentation of Problem — Dr. Halbert L. Dunn, Chief, National Office of Vital Statistics

2:15 Organization of Committees — Dr. Robert E. Serfling, Epidemiologic Services, CDC

2:30 Committee Meetings

*Some of the papers presented at this conference will be published in future issues of the CDC Bulletin.
**Dr. Flinn presented a paper by Dr. Norvin C. Kiefer, Federal Civil Defense Administration.

Wednesday Afternoon (contd.)

SECOND GENERAL SESSION — Chairman, Dr. James H. Steele, Chief, Veterinary Public Health Services, CDC

4:00 Unsolved Problems in Communicable Disease Control — Dr. Karl F. Meyer, University of California Medical Center

6:00 Hospitality Session — Communicable Disease Center

Thursday Morning, April 19

THIRD GENERAL SESSION — Chairman, Dr. Arthur C. Hollister, Jr. Chairman of the Subcommittee on Morbidity Reporting

9:00 Recommended Immunization Procedures in Communicable Disease Control — Dr. Myron E. Wegman, Louisiana State University Medical School

10:00 Problems in Venereal Disease Reporting

Panel discussion organized by Dr. Theodore Bauer, Director, Division of Venereal Disease Control, Public Health Service. Panel consisted of: Mr. A. P. Iskrant, Division of Venereal Disease Control, Moderator; Dr. A. L. Gray, Director, Preventable Disease Control, Mississippi, speaking on "Protecting the Health of the Community Against Venereal Disease when a Case is Reported"; Dr. Leonard Schuman, Deputy Director, Illinois State Department of Health, speaking on "Cooperation between the Local Health Department and the Private Physician to Protect the Individual"; and Mr. J. F. Donohue, Division of Venereal Disease Control, Public Health Service, speaking on "The Use of Venereal Disease Morbidity Statistics."

10:30 Committee Meetings.

Thursday Afternoon

SECOND WORKING SESSION — Chairman, Dr. Arthur C. Hollister, Jr., Chairman of the Subcommittee on Morbidity Reporting

2:00 Reports by Committee Chairmen
Recommendations on general reporting procedures

3:30 Further Committee Meetings

Friday Morning, April 20

FOURTH GENERAL SESSION — Chairman, Dr. Joseph O. Dean, Assistant Surgeon General, Bureau of State Services

9:00 Antimicrobial Therapy of Acute Communicable Diseases — Dr. J. Vernon Knight, Cornell University Medical College

Discussion

10:00 Problems in Tuberculosis Reporting.

Panel discussion organized by Dr. Robert A. Anderson, Director, Division of Tuberculosis Control, Public Health Service. The panel consisted of Dr. Cyrus Sharpe, Director of Tuberculosis Control, Florida, speaking on "What Constitutes a Case of Tuberculosis?"; and Mr. Herbert I. Sauer, Division of Tuberculosis Control, Public Health Service, speaking on "Selected Characteristics of Tuberculosis Morbidity."

Friday Morning (contd.)

11:00 New Methods in Morbidity Reporting

Panel discussion organized by Dr. Halbert L. Dunn, Chief, National Office of Vital Statistics. The panel consisted of Dr. Dorland Davis, National Institutes of Health, Microbiological Institute, speaking on "Influenza Centers"; and Dr. C. C. Dauer, Medical Adviser, National Office of Vital Statistics, speaking on "(1) Epidemic Reporting, and (2) Absenteeism."

Friday Afternoon

FINAL WORKING SESSION — Chairman, Dr. Arthur C. Hollister, Jr., Chairman of the Subcommittee on Morbidity Reporting

1:15 Reports of Committees
a. Recommendations on procedures of reporting specific diseases
b. Other business

Adjournment

The conference staff was composed of Dr. Alexander D. Langmuir, Chief, Epidemiologic Services, CDC, general chairman; Dr. Robert E. Serfling, Epidemiologic Services, CDC, executive secretary; Mrs. Ida L. Sherman, Epidemiologic Services, CDC, assistant executive secretary; and Dr. C. C. Dauer, Medical Adviser, National Office of Vital Statistics, liaison officer.

The working committees which drew up the recommendations for the conference with the diseases which they considered follow:

COMMITTEE A

List of Diseases. Anthrax, botulism, brucellosis, psittacosis, rabies, tetanus, and trichinosis.

Committee.

Dr. C. R. Freeble, Jr., Ohio, chairman
Dr. L. Otis Emik, CDC, recorder
Mrs. Ruth M. Bowen, CDC, secretary
Mrs. C. F. Adams, Missouri
Mr. W. W. Benson, Idaho
Dr. Roy F. Feemster, Massachusetts
Dr. Robert Hansen, Kentucky
Dr. F. S. Leeder, Michigan
Dr. Samuel B. Osgood, Oregon
Dr. L. L. Parks, Florida
Dr. Ruth R. Puffer, Tennessee
Dr. Daniel L. Seckinger, District of Columbia
Dr. James O. Wails, Oklahoma
Dr. A. M. Washburn, Arkansas

Consultants.

Dr. Dorland Davis, National Institutes of Health
Dr. J. Vernon Knight, Cornell University
Dr. Karl F. Meyer, University of California
Dr. James H. Steele, CDC
Dr. Ernest S. Tierkel, CDC
Col. F. A. Todd, U. S. Army, Research Development, Office of the Secretary of Defense

COMMITTEE B

List of Diseases. Cholera, infectious gastroenteritis, infectious jaundice, leprosy, poliomyelitis, trachoma, and typhoid-paratyphoid.

Committee.

Dr. Robert F. Korns, New York, chairman
Dr. Mary Walton, CDC, recorder
Miss Anne Ittner, CDC, secretary
Dr. William I. Fishbein, Chicago, Ill.
Dr. Daniel J. Hurley, Nevada
Miss Elizabeth Macfarlane, Ohio
Dr. W. J. Murphy, Georgia
Dr. Andrew C. Offutt, Indiana
Dr. J. E. Peavy, Texas
Miss Sarah Shanks, Mississippi
Dr. C. B. Tucker, Tennessee
Dr. Clifford W. Wells, New Hampshire
Dr. G. E. McDaniel, South Carolina
Dr. C. E. Weigele, New Jersey

Consultants

Dr. Lucius F. Badger, CDC
Dr. Marion M. Brooke, CDC
Dr. James A. Doull, Leonard Wood Memorial
Dr. Philip R. Edwards, CDC
Dr. William McD. Hammon, University of Pittsburgh
Dr. Paul W. Kabler, Environmental Health Center
Dr. Morris Schaeffer, CDC
Dr. Franklin H. Top, University of Minnesota
Dr. Arnold Skinner, National Foundation for Infantile Paralysis

COMMITTEE C

List of Diseases. Dengue, encephalitis, malaria, plague, Rocky Mountain spotted fever, typhus, yellow fever, and tularemia.

Committee

Dr. Albert S. McCown, Virginia, chairman
Dr. M. Leo Furcolow, CDC, recorder
Mrs. Sylvia O'Rear, CDC, secretary
Dr. E. A. Belden, Missouri
Miss Phyllis Deusinger, Oklahoma
Dr. James C. Hart, Connecticut
Dr. Abel de Juan, Puerto Rico
Mr. Carl C. Kuehn, Louisiana
Dr. J. E. McCroan, Jr., Georgia
Dr. Harry A. Nevel, Florida
Mr. Paul Shipley, California
Dr. C. P. Stevick, North Carolina
Dr. A. R. Zinteck, Wisconsin
Dr. John M. Chapman, Los Angeles, Calif.
Dr. Terrell Carver, Idaho

Consultants.

Dr. Justin M. Andrews, CDC
Dr. Karl Habel, National Institutes of Health
Dr. Thomas P. Hughes, CDC
Dr. Kirk T. Mosley, University of Oklahoma
Dr. Griffith E. Quinby, CDC
Dr. Joseph H. Schubert, CDC
Dr. Wilson G. Smillie, Cornell University

COMMITTEE D

List of Diseases. Diphtheria, influenza, measles, meningitis, ophthalmia neonatorum, pertussis, pneumonia, smallpox, and streptococcal infections.

Committee.

Dr. A. L. Gray, Mississippi, chairman
Dr. Ralph Paffenbarger, CDC, recorder
Mrs. Peggy Wylie, CDC, secretary
Dr. Wendell R. Ames, Erie County, N. Y.
Dr. Alcor Browne, California
Dr. D. S. Fleming, Minnesota
Mr. Jack Hardin, Missouri
Miss Vivian Holland, Wisconsin
Dr. Emil Kotcher, Kentucky
Dr. James R. McDowell, Colorado
Dr. Dean Roberts, Maryland
Dr. William D. Schrack, Jr., Pennsylvania
Dr. Leonard Schuman, Illinois
Mr. D. E. Waggoner, Kansas
Dr. Morris Greenberg, New York City

Consultants.

Dr. Roger M. Cole, National Institutes of Health
Dr. Martin Frobisher, Jr., CDC
Dr. John E. Gordon, Harvard University
Dr. David D. Rutstein, Harvard University
Dr. Myron E. Wegman, Louisiana State University
Dr. Frederick C. Kluth, Leonard Wood Memorial, Corpus Christi, Tex.

On the last afternoon of the conference, a tentative report of the recommendations was discussed and modified by the whole group of delegates. The subcommittee of the Association of State and Territorial Health Officers was directed to consolidate the decisions reached in the form of a report to be disseminated to all State health offices prior to submission at the Annual Conference in October 1951.

Film Evaluation: How it Works at CDC

MERLE WIMMER*

(The purpose of this article is to explain in the briefest and simplest form the procedure which is being used to evaluate CDC films. An article in a later issue of the CDC Bulletin will show a summary of all data accumulated, their analyses, and the specific results obtained from collection of the data.)

*Audio-Visual Production Services, CDC.

Film evaluation, like all other evaluation, consists of weighing values, quality, and efficiency as related to intended purposes.

The very characteristics of films which make them powerful tools of instruction also make them dangerous tools if they impart wrong ideas. Wrong ideas may creep into films either through error, lack of technical information, or confusing

visualization. Prerelease evaluation reduces the margin of error to the minimum, while postrelease evaluation leads to discovery of defects which can be corrected by revision. The findings of errors or other defects in both cases lead to caution and avoidance of such pitfalls in future productions.

CDC is fortunate that it has facilities for evaluation as well as for production and distribution. The average producers have only indirect contact with films after they are released. Therefore, they do not have the advantage of having evaluation information fed back into production for future improvement. The primary objective of CDC evaluation is to improve future production by discovering undesirable practices of the past.

Inasmuch as the audio-visual method has been proved and widely accepted as a way of instructing, no effort is being wasted to reconfirm this. The training situations in public health consisting of somewhat irregular short courses preclude any possibility of carefully controlled experiments with films. The evaluation discussed here consists of postrelease evaluation and is broken down into four elements as follows:

Opinion poll (personal film rating), free voluntary response (criticism and praise), controlled response (specific questionnaire on individual subjects), and program evaluation (accumulation and analysis of all data relative to distribution, utilization, and evaluation).

Opinion Poll. An opinion poll as to the quality of films is valid only when it represents widespread opinion and is based on quantity. The information for this poll is obtained by sending a rating sheet with each print shipment. The user is asked to rate the film as excellent, good, fair, or poor (Ex, G, F, or P). These reports are tabulated and the average opinion of all types of users is established for each film. The same reports are used to determine the average rating for all motion pictures combined and all filmstrips combined. The accompanying table shows the result of combined ratings:

Motion Pictures				Filmstrip			
Ex	G	F	P	Ex	G	F	P
56%	38%	5.5%	0.5%	56%	35%	8.4%	0.6%

No definite conclusions can be based on these reports except that users have an opinion of the quality of our films averaging between "Good" and "Excellent." Since all classes of users are represented in this type of report, a film is not necessarily considered to be excellent simply because it is consistently rated as such. By the same standard, one is not considered as an inferior film simply because it is rated less than good. The greatest weight is placed on evaluations by users for whom the film was prepared. If they say it is poor, the film is marked for further scrutiny and study, sometimes in the form of a special evaluation or examination by established technical review committees. These committees have been appointed in all the Services of CDC. When they hold their meetings, all available evaluation data which have been accumulated and analyzed for the film under discussion are placed at their disposal. After the meeting, this committee makes recommendations as to what action is to be taken, if any, relative to technical changes in the film. These recommendations may or may not lead to revision or withdrawal of the film. Production cost and scope of utilization help to determine what action is taken.

Free Voluntary Response. This phase of evaluation is conducted for the purpose of obtaining open, frank criticisms primarily on the technical aspects of the film, but is not restricted to this. Users are requested to use the back of the rating sheets for these reports. Any type of criticism is invited, assuming that each person will criticize those elements which he is qualified to judge. This type of evaluation results in accumulation of vast quantities of criticisms. Some prove to be valid and some invalid. A composite of the criticisms is typed for each film. Criticisms which are reported repeatedly suggest validity. All worth while criticisms are submitted to technical review committees when they are called upon to re-examine the film.

Controlled Response. This phase of evaluation is more specific than any of the other procedures. The purpose of this evaluation is: (a) to get responses on specific items about which there may be some doubt or controversy; (b) to determine whether, or to what degree, the film helps to meet the objective; (c) to discover technical errors; (d) to discover types of presentation which are ineffective; and (e) to discover better techniques.

The method used for this evaluation is to prepare a special evaluation sheet for the subject under study. The sheet is in the nature of a questionnaire. Many of the questions require a definite "yes" or "no" response, while others allow for free response. These report forms are sent only

to the types of users for which the films were prepared.

These evaluations result in a quantity of high caliber responses from persons who should have the best answers. These reports are more likely to result in revision or withdrawal of a film than the other types of evaluation. The data from these reports are made available to technical review committees as is the case with all other information.

Program Evaluation. Program evaluation consists of all information collected, recorded, and analyzed as previously discussed, and in addition provides reliable records on distribution and utilization scope and trends. The method is simply one of accurate recording, tabulating, analyzing, and reporting of all accomplishments. These include distribution data, production and distribution of utilization materials, and monthly, semiannual, and annual reports. The information assembled is then visualized in graphic form. From the resulting charts, graphs, and other media, the scope and trends in any aspect of the program can be observed through comparison. Weak and strong points of the program are readily discovered.

Results of Combined Evaluation Efforts. Some of the results of the evaluations are intangible, and are obvious but not measurable. Others are tangible. The intangible results are:

1. All persons concerned with production are becoming more conscious of what makes a good film. They are learning what types of films are acceptable by users.

2. Technical advisers are becoming more conscious of their responsibilities to the audiences.

3. Users are learning how to present constructive criticisms of films.

4. Utilization materials have improved the attitude toward films and have obviously stimulated better use.

The tangible results are:

1. Films are constantly receiving higher ratings.

2. Certain types of footage and visual presentation have been shown to be unacceptable by the audiences. Such types of footage have been practically eliminated from recent productions.

3. A number of films have been withdrawn from circulation due to evaluation data.

4. A number of films have been recommended for revision due to evaluation data. Some are being revised and some are on schedule for revision.

5. Many other films have been spotted for re-examination as rapidly as technical review committees can get to them.

6. An accumulated audience of over 6 million professional people had seen CDC films up to January 1951.

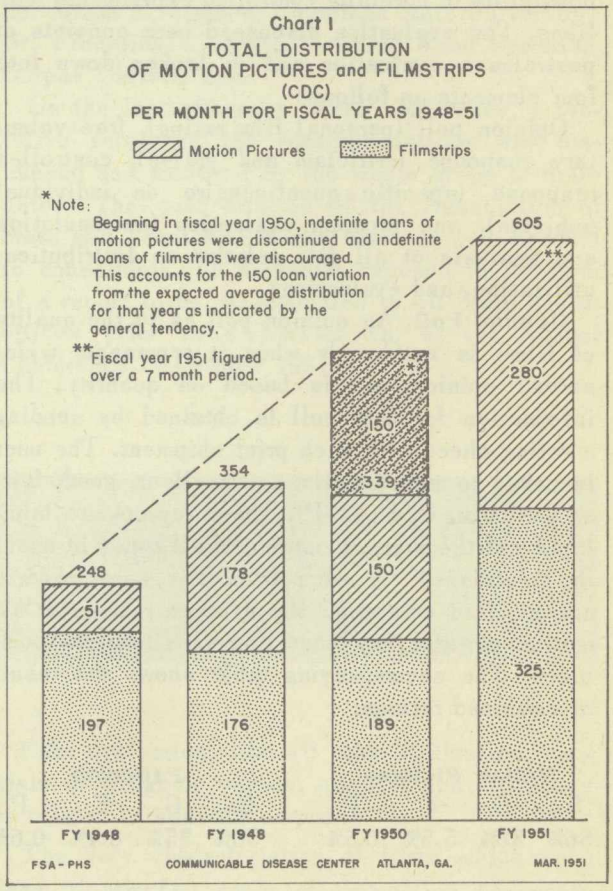
7. There is a constant increase in distribution as indicated by chart 1.

8. There is a constant increase in new users.

9. Many previous users are increasing their use of CDC films.

10. Film reviews in professional journals have materially increased distribution.

Conclusion. Sufficient evaluation data have been accumulated, analyzed, and put to work to show results in present productions and will no doubt reflect in all future productions.



PICTORIAL REVIEW

ISOLATION AND IDENTIFICATION OF SALMONELLA AND SHIGELLA CULTURES (SERIES)

Part I. ISOLATION AND PRELIMINARY IDENTIFICATION OF CULTURES

PRODUCTION NO.: CDC 5-169.0, released 1951

DATA: Filmstrip; sound, color, 13½ minutes, 85 frames

PURPOSE

To depict the method of isolating and identifying pathogenic Enterobacteriaceae by cultural, biochemical, and serologic methods.

AUDIENCE

Medical bacteriologists, public health laboratory personnel, medical personnel, laboratory technicians, and students of medicine, nursing, and bacteriology.

CONTENT

For successful isolation and identification of *Salmonella* and *Shigella* organisms in the laboratory diagnosis of enteric diseases, collect specimens during the acute stage of the disease and culture them as soon as possible after their collection. Use any of four types of specimens (rectal swabs, solid stools, fresh liquid feces, and feces shipped in preservative solution) to inoculate each of four recommended media: McConkey's agar and *Shigella-Salmonella* agar, both general purpose media; bismuth sulfite agar, for the detection of typhoid bacilli; and brilliant green agar, a one-purpose medium for isolating *Salmonella* organisms.

For enrichment purposes, inoculate a tube of tetrathionate broth when looking for *Salmonella*, or selenite broth for general laboratory routine.

Incubate the four inoculated primary plates and the two enrichment media for each specimen for 16 to 18 hours. After incubation examine the primary plates, recording and discarding all of the negative ones except the bismuth sulfite, which should be reincubated for 24 hours because *Salmonella typhi* may grow slowly.

Inoculate secondary plates of SS and bismuth sulfite agar with a loopful of the incubated selenite enrichment broth, and secondary plates of bismuth sulfite and brilliant green agars with tetrathionate broth. Incubate these plates for 16 to 18 hours, and in the meantime fish suspicious colonies from the positive primary plates and transfer them to triple sugar iron agar (TSI) slants.

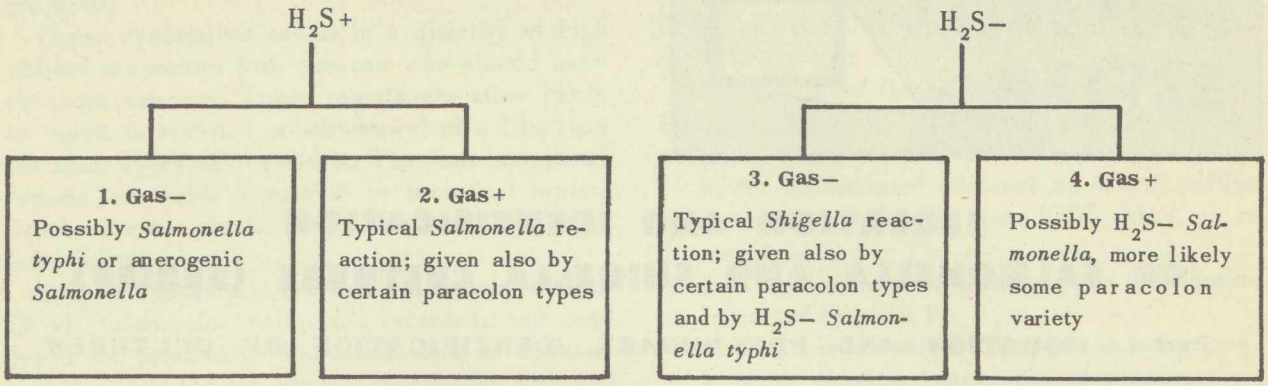
Incubate the TSI agar cultures overnight. Then discard those that are acid or alkaline throughout. For the detection of *Proteus* cultures, streak over the surface of tubes of Christensen's urea medium liberal portions of all tubes having acid butts in combination with alkaline slants.

Incubate these urea slants for 2 to 6 hours and then make a preliminary reading. Record slants that are positive (alkaline) at this reading as *Proteus*. The frank coliform and *Proteus* cultures thus are eliminated and the tubes of TSI cultures corresponding to the negative urea slants are ready to be tested in *Salmonella* and *Shigella* antiserum by the slide agglutination method.

Because some paracolon bacteria produce a delayed reaction, reincubate for at least 48 hours all of the urea slants which are not alkaline at the preliminary reading. If after this additional incubation they are alkaline, they are probably certain paracolon organisms of the Bethesda or Ballerup groups which are difficult to distinguish from *Salmonella* except by prolonged incubation of fermentation tests.

Group the retained TSI cultures (corresponding to the urea slants which were negative at the preliminary reading) according to whether or not they produce H_2S and gas; and test in *Salmonella* and/or

Shigella antiserum by the slide agglutination method followed by confirmation by biochemical tests:



Test 1 and 3 for *Salmonella typhi* in Vi antiserum and after heating, in Group D somatic antiserum.

Test 1, 2, and 4 for *Salmonella* other than *Salmonella typhi*.

Test 3 for *Shigella*.

If serologically positive, confirm biochemically. If serologically negative, eliminate from *Shigella* and *Salmonella* genera by biochemical tests.

Note. These serologic and biochemical tests are depicted in this filmstrip and also in more detail in Part II and Part III of this Series.

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Part II. SIMPLIFIED SEROLOGIC IDENTIFICATION OF SHIGELLA CULTURES

PRODUCTION NO.: CDC 5-170.0, released 1951

DATA: Filmstrip; sound, color, 6 minutes, 29 frames

PURPOSE

To show how *Shigella* cultures are grouped serologically and confirmed biochemically.

AUDIENCE

Medical bacteriologists, public health laboratory personnel, medical personnel, laboratory technicians, and students of medicine, nursing, and bacteriology.

CONTENT

The various groups of the genus *Shigella* and their component types may be identified by simple serologic tests and confirmed biochemically.

The groups concerned are:

"A", composed of seven types of *Shigella dysenteriae*, none of which characteristically form acid from mannitol.

"B", composed of six types of *Shigella flexneri*, most of which ferment mannitol within 24 hours.

"C", composed of *Shigella boydii* types 1 to 7.

"D", or *Shigella sonnei*, utilizes lactose after continued incubation.

Alkalescens-Dispar group consists of eight O groups of which the most common four are shown.

Preliminary grouping of *Shigella* types is accomplished by picking a loopful of growth from each suspected TSI slant and emulsifying it in ½ ml. of normal saline solution in a tube. Distribute seven drops of this suspension on a glass plate. Add one loopful of Groups A, B, C, D, and Alkalescens-Dispar grouping antiserums respectively to the first six drops of suspension and use the seventh drop as a control. Tilt the glass plate forward and back a few times, then check for agglutination reactions.

Several *Shigella* types, notably *S. flexneri* 6, and Alkalescens-Dispar cultures may contain thermolabile antigens that inhibit O agglutination. Therefore, cultures which appear to be *Shigella* but which do not react in any of the typing serums should be suspended in plain saline and heated to 100° C. for ½ hour, then cooled and retested with

the same antiserums for agglutination.

Having learned from the results of the grouping serums tests the group to which an unknown *Shigella* culture belongs, confirm the serologic findings by testing the culture biochemically by means of the nine tests in table 1.

Shigella cultures are variable in indol production and mannitol formation. However, to be classified as *Shigella*, a culture must be methyl red positive, Voges-Proskauer negative, Simmon's citrate negative, salicin negative, and must produce acid from glucose. *S. sonnei* is the only *Shigella* type which ferments lactose and sucrose, and then only after 48 hours or more.

Cultures that agglutinate in *Shigella* grouping antiserums and fulfill the requirements of these nine biochemical tests may be reported as *Shigella*.

Table 1

Reagent:	Reaction:
Indol	Variable
Mannitol	Variable
Methyl Red	Positive
Voges-Proskauer	Negative
Simmon's Citrate	Negative
Salicin	Negative
Lactose	Variable
Sucrose	Variable
Glucose	Acid

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Part III. SIMPLIFIED SEROLOGIC IDENTIFICATION OF SALMONELLA CULTURES

PRODUCTION NO.: CDC 5-171.0, released 1951

DATA: Filmstrip; sound, color, 6 minutes, 32 frames

PURPOSE

To show how *Salmonella* cultures are identified by grouping them serologically and confirming them biochemically.

AUDIENCE

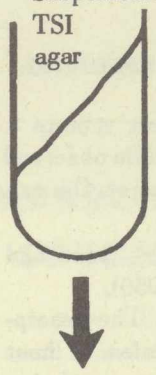
Medical bacteriologists, public health laboratory personnel, medical personnel, laboratory technicians, and students of medicine, nursing, and bacteriology.

CONTENT

The growing multiplicity of *Salmonella* types and the numerous diagnostic serums needed for their recognition necessitate simplified methods for grouping them in the average laboratory.

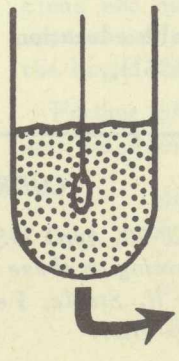
This film begins at the point in Part I of this series just after the preliminary reading of Christensen's urea tubes has eliminated TSI slants which are frankly *Proteus* or paracolon types. As explained in Part I, it is reiterated that the suspicious TSI slants will each fit into one of four classifications (H_2S+, gas$-$; H_2S+, gas$+$; H_2S-, gas$+$; H_2S-, gas$-$), which gives a clue as to whether they are *Salmonella typhi*, other *Salmonella*, or *Shigella*. The tests for *Shigella* are shown in Part II of the Series. For identifying *Salmonella* proceed as follows:

Figure 1



Pick sufficient growth from each of the suspected TSI slants to make a dense suspension of bacteria by emulsification in tubes containing ½ ml. of saline solution.

Figure 2



Distribute three droplets on marked sections of a glass plate.

Figure 3

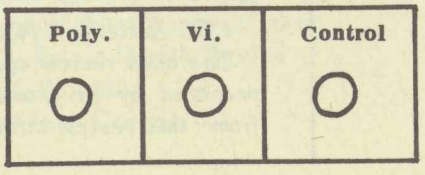
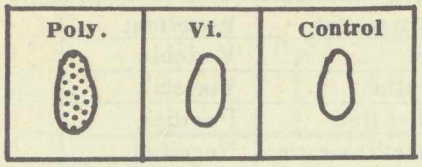
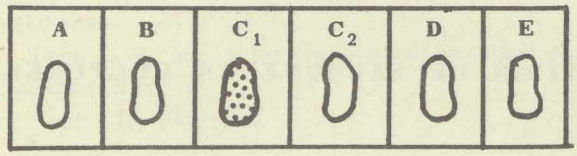


Figure 3 (contd.)



Add small droplets of diluted *Salmonella* polyvalent antiserum to one of the droplets and Vi antiserum to the other. Use a *Salmonella* polyvalent antiserum containing agglutinins for Groups A, B, C, D, and E because more than 99 percent of the *Salmonella* strains isolated from man are members of these groups. Tilt plate back and forth a few times and then check agglutination.

Figure 4



If positive in *Salmonella* polyvalent antiserum, place six droplets of the suspension on a marked slide and mix with droplets of O serums for Groups A, B, C_1, C_2, D, and E, respectively. The serum that reacts indicates to which O group the specimen belongs. Reaction of the C_1 group is indicated here.

TSI slants which do not produce gas and which react to Vi antiserum probably are *Salmonella typhi*. When a culture reacts in Vi antiserum, heat a portion of the suspension in boiling water for 10 minutes and retest. Positive reaction now in Group D antiserum indicates it to be *Salmonella typhi*, although to complete its identity the H antigens should be identified and the serology confirmed by biochemical tests.

These biochemical tests also must be used to eliminate from the *Salmonella* genus TSI agar slants which are suspected of being *S. typhi* or other types of *Salmonella*, but which agglutinate in neither *Salmonella* polyvalent antiserum nor in Vi antiserum.

The film shows these various biochemical tests in detail.

★ ★ ★

RECENT PUBLICATIONS BY CDC PERSONNEL

Ajello, Libero: Preliminary and short reports – the nature of the so-called macroconidia observed on microsporum-infected hairs. J. Invest. Dermat. 16(1): 3-6 (1951).

Menges, Robert W.: Meat inspection – past and present. Modern Sanitation 2(11): (1950).

Schubert, J. H., and Kelley, Mary H.: The precipitin technique for determining species of host blood in mosquitoes – modifications and improvements. J. Nat. Malaria Soc. 9(4): 341-348 (1950).

Sumner, Ruth: Field training for health education. Am. J. Pub. Health 41(1): 73-75 (1951).

FOREIGN VISITORS TO CDC

During the month of March the following public health officials of foreign countries were visitors to Training Services, CDC:

Dr. Ignace Vincke, Director, Service Study and Research on Antimalarials, Elisabethville, Belgian Congo.

Mr. T. L. Mackie, Senior Inspector, Port of London Health Authority, London, England.

CORRECTION

CDC Bulletin X (4), 28-30, April 1951:

The book review appearing on these pages of the April 1951 CDC Bulletin was prepared by Dr. James H. Steele, Veterinary Director. His name was omitted from this review through error.

☆U. S. GOVERNMENT PRINTING OFFICE : 1951 O—916833

CDC REPRESENTED AT WORLD HEALTH ASSEMBLY

CDC Executive Officer Wesley E. Gilbertson is attending the Fourth Annual World Health Assembly of the World Health Organization being held May 7-25 at Geneva, Switzerland, in the capacity of Sanitary Engineering Technical Adviser.

This assembly is held to determine broad policies for WHO, to decide on programs and the budget, and to adopt such international health regulations as may be necessary. The purposes of WHO, an organization of the United Nations, are to foster the exchange of health information between countries of the world and to assist in the establishment and operation of good health practices in the public health field.

Following the Assembly, Mr. Gilbertson, at the request of the ECA Health Mission to Greece, will advise on proposed changes on the Malaria Control Program there.

On the return trip to the United States, he will stop in England for a meeting of the Congress of the International Union of Local Authorities. One of the subjects for discussion at this meeting is Water and Sewage.

VENEREAL DISEASE RESEARCH LABORATORY TRAINING COURSES

Laboratory diagnosis of Syphilis. Three 2-week refresher training courses on the Laboratory Diagnosis of Syphilis will be held during the remainder of calendar year 1951 at the Venereal Disease Research Laboratory, Chamblee, Ga. Courses are scheduled to begin on June 4, September 10, and October 22, 1951.

These are designed as refresher, rather than basic training courses, and cover most of the accepted American testing procedures, both in theory and practice.

Preparation and Standardization of Serologic Reagents Used in the Laboratory Diagnosis of Syphilis. A 3-week course in this subject will be held during the period November 5-23, 1951. This course will include instruction in the preparation and standardization of serologic antigens, control serums, and other reagents used in serologic tests for syphilis. It is designed for serology technicians who have had some experience in the preparation and standardization of these reagents in the larger testing laboratories.

Further information pertaining to these courses may be obtained from:

Medical Director in Charge
Communicable Disease Center
U. S. Public Health Service
P. O. Box 185
Chamblee, Georgia

MORBIDITY TOTALS FOR THE UNITED STATES *
MALARIA, POLIOMYELITIS, TYPHUS

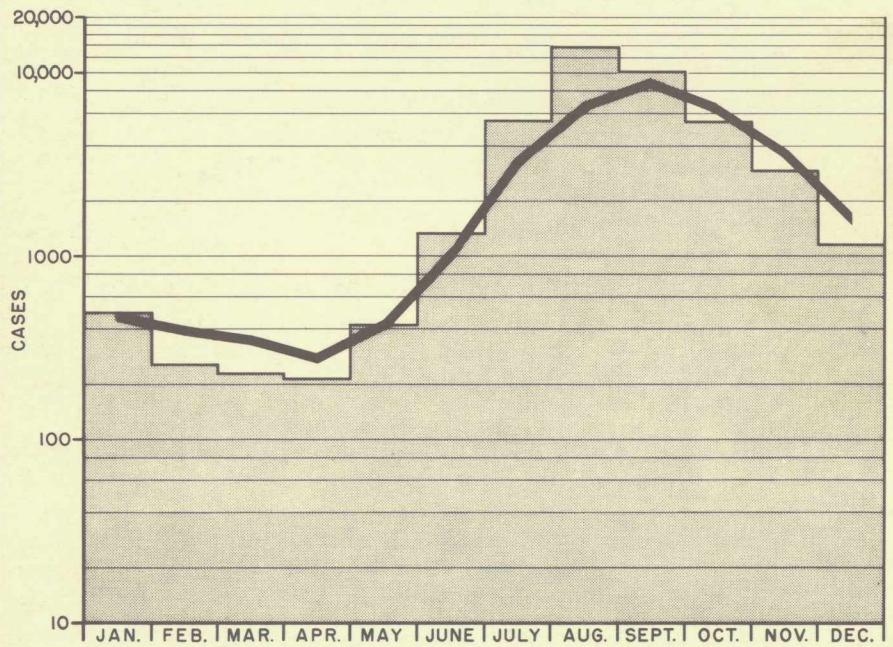
1949 - COMPLETE 1950 - AS REPORTED

TOTAL INCIDENCE THROUGH DEC. 1950 2,214

MALARIA
(TENTATIVE DATA)

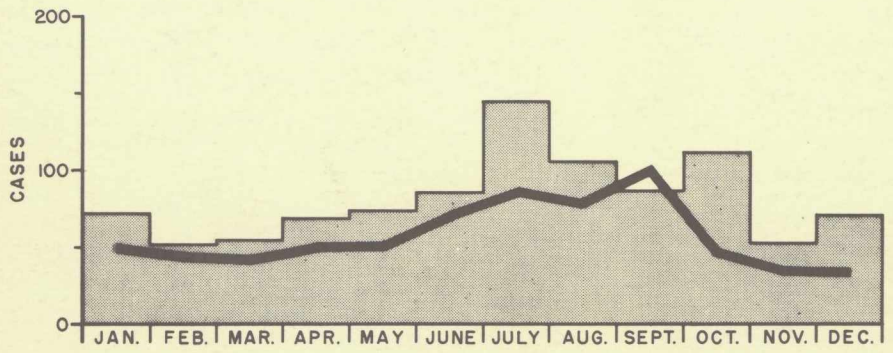
TOTAL INCIDENCE THROUGH DEC. 1950 33,195

POLIOMYELITIS



TOTAL INCIDENCE THROUGH DEC. 1950 687

TYPHUS



FSA-PHS-CDC ATLANTA, GA.

* SOURCE OF DATA: NATIONAL OFFICE OF VITAL STATISTICS