

(8) Schlesinger and Holst's modification is the best benzidin test for clinical work. It has all the clinical value of the guaiac test, with somewhat greater delicacy, greater clearness and much simpler technic, and as carried out acts as a control on the cleanliness of the reagents and glassware.

(9) Good results with the benzidin test depend on careful technic, the exclusion of oxidizing ferments in raw food, fresh material for examination, clean glassware and the quality, strength and proportion of the reagents used.

(10) A negative benzidin test has greater value than a negative guaiac test in ruling out hemorrhage, and if both tests are used as a control much time will be saved by using the benzidin test first, which takes only two minutes, and if negative, renders any further tests for blood unnecessary.

(11) It is wise to control the benzidin test with the guaiac test when positive results are found until the technic is learned and tested individually.

LITERATURE.

The literature of the subject up to 1907 will be found in a previous paper by the author on the "Value of Tests for Invisible Hemorrhage in Diagnosis and Treatment of Diseases of the Digestive Organs," published in the *Journal of the American Medical Association*, 1907, vol. xlviii, pp. 506-515. These references are chiefly to articles which have appeared since then.

Assanelli, D.: Sulla ricerca di minime tracce di sangue sulle feci. *Bull. d. re. med. di Bologna*, 1907, 8. s., vii, 228-230; *Policlin.*, Roma, 1907, xiv, sez. frat., 737-741.

Benedict, A. L.: The Benedict Modification of the Boas Test for Occult Blood in the Feces. *Jour. Am. Med. Asso.*, Chicago, 1907, xlviii, 139, and N. Y. State Jour. of Med., 1906, vi, 204.

Carletti: La ricerca di minime tracce di sangue nelle feci degli ammalati di tubercolosi polmonare. *Gazz. d. osp.*, 1907, nr. 51; *Zentralbl. für inn. Med.*, Leipzig, 1907, xxviii, 1053.

Cestan, R., et Sacareaux: Recherche du sang dans les selles au moyen de la benzidine. *Toulouse méd.*, 1907, 2. s., ix, 181-186.

Giovini, M.: Sulla ricerca del tracciato di sangue nelle feci e nelle urine a scopo clinico. *Clin. med. ital.*, Milano, 1907, xvi, 58-68.

Citron, H.: Technische und diagnostische Beiträge zur Blutanalyse der Faeces. *Deut. med. Wochenschr.*, 1908, xxxiv, 190-192.

Cowie, D. M.: A Comparative Study of the Occult Blood Tests; A New Modification of the Guaiac Reaction; Its Value in Legal Medicine. *Am. Jour. Med. Sc.*, Phila., 1907, cxxxiii, 408-423.

Dewis, J. W.: Comparative Tests for Occult Blood in Gastric Contents and Feces, with Especial Reference to the Benzidine Test. *Boston Med. and Surg. Jour.*, 1907, clvii, 169-181.

Einhorn, M.: Ueber eine neue Blutprobe. *Deut. med. Wochenschr.*, 1907, xxxiii, 2, 1089. *Ibid.*: A New Blood Test. *Med. Rec.*, June, 1907.

Fraenkel, M.: Vergleichende Untersuchungen über den Nachweis von Blut in den Fäzes mittels des Spektroskops und der modifizierten Weberschen Probe. *Münch. med. Wochenschr.*, 1907, liv, 1638-1640.

Friedenwald and Rosenthal: Some Observations of the Significance of the So-Called "Occult Hemorrhages" in the Diagnosis of Ulcer and Carcinoma of the Stomach. *Maryland Med. Jour.*, 1907, i, 66-68.

Girault, S.: Les hemorrhagies occultes du tube digestif, 150 pp. Paris, 1906.

Goodman, E. H.: The Examination of the Feces for Occult Blood, with Special Reference to the Value of the Benzidine Test. *Am. Jour. Med. Sc.*, Phila., 1907, n. s., ccxiv, 506-517.

Grünwald, J. W.: Zur Frage des Blutnachweises in den Faeces. *Zentralbl. für inn. Med.*, Leipzig, 1907, xxviii, 105-111.

Hirschmann, L. J.: The Diagnostic Importance of Blood in the Stools. *Jour. Mich. Med. Soc.*, Detroit, 1907, vi, 453-457.

Holland, J. W.: Improved Methods for the Guaiac Test for Blood and the Oxidation Test for Indican. *Jour. Am. Med. Asso.*, Chicago, 1907, xlviii, 1942.

Isler, Leopold: Der Nachweis geringer Blutmengen in den Fäzes und im Mageninhalt und ihre Bedeutung für die Frühdiagnose organischer Magen-Darmerkrankungen. *Centralbl. für d. Grenzgebiet der Med. und Chir.*, 1908, xi, p. 289.

Juul, L.: Om Blodum dergesler i Faeces. *Ugesk. für Læger*, København, 1907, 5. r., xiv, 145-153.

Leech, E. B.: Occult Hemorrhage in the Gastro-Intestinal Tract. *Med. Chron.*, Manchester, 1907, xvi, 281-305; 349.

Lévy, Fernand: Les hemorrhagies occultes du tube digestif. *Gaz des Hôp.*, 1908, lxxxi, p. 1455.

Oettinger et Girault: De la valeur semeiologique des hemorrhagies occultes dans les affections de l'estomac. *La Semaine Med.*, 1906, xxvi, p. 325.

Reed, B.: Occult Blood in the Stomach Contents and Feces; Its Diagnosis and Treatment. *Med. Notes and Queries*, Lancaster, 1907, iii, 121-123; *So. Calif. Pract.*, 1907, xxi, 208-215.

Rothschild, J.: Untersuchungen über die Guaiacblutprobe. *Berl. klin. Wochenschr.*, 1908, xiv, 883-885.

Rutimeyer, L.: Ueber die geographische Verbreitung des Ulcus Ventriculi Rotundum mit besonderer Berücksichtigung des chemischen Verhaltens und der occulten Blutungen. Pp. 120, 8°, Wiesb., 1906.

Sacareaux, C.: Essai sur la benzidine et son application dans la recherche des hemorrhagies occultes du tube digestif. Pp. 106, 8°, Toulouse, 1907.

Schlesinger, E., u. Holst, F.: Vergleichende Untersuchungen über den Nachweis von Minimal Blutungen in den Faeces nebst einer neuen Modification der Benzidinprobe. *Deut. Med. Wochenschr.*, 1906, xxxii, 2, 1444. Ueber den Wert der Benzidinprobe für den Nachweis von Minimalblutungen aus den Verdauungs- und Harnorganen. *Münch. med. Wochenschr.*, 1907, liv, 460-462.

Schroeder, K.: Untersuchungen über die Guajakprobe für Blut van Deen und Weber's probe. *Berl. klin. Wochenschr.*, 1904, xlv, 1379-1383.

Schumm, O.: Zur Kenntniss des Guajakblutprobe, etc. *Zeitschr. für physiol. chem.*, 1906-7, i, 374.

Schumm, O.: Zur Kenntniss der Benzidinprobe. *Deut. med. Wochenschr.*, 1907, xxxiii, 1741.

Schumm, O.: Ueber den Nachweis von Blut in den Fäces. *Münch. med. Wochenschr.*, 1907, liv, 258.

Starck, J. A.: The Detection and Significance of Occult Blood in the Feces and Stomach Contents, with Special Reference to the Value of the Adler's Benzidine Test. *N. Orl. Med. and Surg. Jour.*, 1907-8, ix, 133-145.

THE RELATION OF THE SPLEEN TO RESISTANCE AGAINST INFECTION.*

BY J. C. HUBBARD, M.D.

(From the Laboratory of Surgical Research, Harvard Medical School.)

THE incentive to carry out the following experiments and to go over the literature of the subject came from the following case:

E. B., seventeen, single. Admitted to Boston City Hospital, Aug. 9, 1908. Grocery clerk.

Family history. — Negative.

Past history. — For five years under care of Dr. Larrabee for splenic anemia. Last month spleen removed by Dr. Hugh Cabot at Baptist Hospital. Well since.

Present illness. — Obscure abdominal pain for past week. Last night, at 11 p.m., after a day's work, was taken with severe pain in right iliac fossa. Vomited several times. Seen by a physician to-day, who advised immediate transfer to hospital.

Local examination. — Abdomen spastic, particularly over McBurney's point. Tenderness well marked. Tumor mass easily felt.

Patient was operated upon as soon as possible. Ether. Incision through the right rectus. A number of enlarged glands about the cecum removed. An acutely inflamed and perforated appendix removed. Appendix found lying in a small abscess. Incision closed in layers, leaving room for wick. Dry sterile dressing. Swathe.

Aug. 11, 1908. Patient comfortable since operation, though temperature this morning became somewhat elevated, rapidly rising to 103°. Pulse became weak and rapid and respiration became 60 per minute. Right back showed dullness and signs of consolidation of right lower lobe. Patient given head rest and vigorous cardiac stimulation. This apparently had no effect. Wound examined and found to be draining freely. Abdomen spastic and distended. High turpentine enema given. Bowels moved copiously twice. In spite of all treatment, patient became delirious, pulse became more rapid, and patient died at 8.15 a.m.

Pathological report by Dr. Mallory: Gangrenous appendix. Hyperplasia of lymph node.

I do not report the autopsy in full as Dr. Larrabee will, without doubt, report the case as one of splenic anemia, and the autopsy findings will be of more interest in that connection. I, therefore, mention in detail only those that have direct bearing on the question of infection.

Autopsy, Aug. 11, 1908. Extract from autopsy records:

* Read by invitation, April 5, 1909, before the Boston Society for Medical Improvement.

† Much advice and assistance was received from Drs. Perry, Frothingham and Page of the Department of Bacteriology.

Peritoneal cavity surfaces are sticky and very red, and there is much yellowish free fluid in the dependent portions. Sticking to the surface are many stringy pieces of whitish-yellow material. In some areas the peritoneum is adherent. Immediately beneath the wound the peritoneum is adherent and shows a marked greenish discoloration. The appendix has been removed at operation. The mesenteric lymph glands are enlarged and firm; some of them quite perceptibly redder than others. The serosa of the intestines and colon are very red and in many places are adherent and have strings of white material adherent. In the right iliac region they are glued together and a small hole is made in the ileum when separating the adhesions. This portion of the intestine is greatly reddened and friable. In section Peyer's patches are reddened, but to little extent greater than the surrounding mucosa.

Anatomical diagnosis. — Acute peritonitis (generalized); chronic pleurisy; bronchopneumonia; absence of spleen; increased connective tissue and fatty infiltration of liver; persistence of thymus; edema of pia; congestion of superficial vessels.

The condition of the appendix was no worse than that in many cases where the patient recovers. The interesting question then arises as to the importance in this case of the absence of the spleen. Was the ability to withstand infection decreased in any way by the splenectomy? Many of the books on pathology and physiology state in a few words that one of the functions of the spleen is to aid in withstanding infection. No proofs, however, of this are cited. Some authors, again, make no mention of this function. To determine, if possible, the truth of this statement, the following experiments were undertaken in the laboratory of surgical research in the Harvard Medical School. The plan of the experiment was as follows: A normal guinea pig was splenectomized under ether. When the animal had recovered from the operation, after an interval of several days it was given an injection of staphylococcus pyogenes aureus. At the same time a control was injected. The attempt was made to regulate the dose so that it would not be large enough to kill a normal pig. A record was kept at first of the weights and temperatures, but as neither of them appeared to vary in any definite manner, it was soon given up. When an animal died (either the experimental animal or a control) it was autopsied, and in addition to the macroscopic appearances, cultures were taken from the liver and heart's blood in such a manner as to avoid outside infection. The other animal of the pair was usually killed at the same time and autopsied in a similar manner.

Male guinea pig, 600 gm., Nov. 19, splenectomy. Dec. 3, inoculated one-day-old bullion culture 2 ccm. staphylococcus pyogenes aureus. Appeared sick, but by Dec. 10 seemed normal again. Dec. 15, great dyspnea and weakness. Dec. 17, found dead. Autopsy: No local infection at site of inoculation. Liver contained small white areas. Right chest full of bloody fluid. Lung solidified and collapsed; adhesions. White necrotic area on edge of one lobe. Left lung normal. Diaphragm edematous. Bacteriology: Cultures from heart's blood almost pure aureus, from blood of liver almost pure aureus, from fluid in chest aureus and albus. Control pig, female, 550 gm., inoculated Dec. 3

with similar quantity same culture, developed a local infection which healed. Killed with strychnia Dec. 17. Autopsy negative macroscopically.

Female pig, 600 gm., Dec. 11, splenectomy. Dec. 15, inoculated 2 ccm. one-day-old bullion culture, staphylococcus pyogenes aureus under abdominal skin. Dec. 18, induration at point of inoculation. Dec. 20, found dead. Autopsy: Necrotic mass at site of inoculation. Few white areas in liver. Otherwise macroscopically negative. Bacteriology: Culture from liver, no growth; from heart's blood, few golden-yellow cocci, many pale yellow and few pearly white. Control female, 300 gm. inoculated with same dose. Killed Dec. 22 by strychnia. Autopsy: Negative macroscopically aside from an ulcer of the abdominal wall at the site of inoculation.

Female guinea pig, 650 gm., Dec. 23, splenectomy. Found dead Dec. 28. Intestines filled for some distance with dark colored fluid (blood?). Cultures from the liver and heart's blood gave an almost pure growth of a spore-bearing short bacillus.

The first two of these experiments seemed to prove that a splenectomized animal acquired more easily a general infection from a local inoculation than a normal animal. The third case was operated upon the same day with several others and all were treated exactly alike. This particular one became generally infected and died. Ford's experiment¹ showed that bacteria could be found in the organs of his laboratory animals. Although in his hands special methods of nice technic were necessary to demonstrate them, and my methods were comparatively crude, to be sure that bacteria were not present in my laboratory animals a normal well pig was killed by strychnia and cultures were taken from the liver and heart. The tubes remained free from any growth. To determine, then, whether the bacteria found in this pig entered his system after death, a well pig was killed one evening, left in the animal room over night, and then kept in a cool place till autopsied. The conditions were made to simulate those of this splenectomized pig that died from a general infection before it had been artificially inoculated. Cultures from its liver and heart remained sterile. From these two tests it might seem fair to consider that the death of the splenectomized pig from general infection was more than a coincidence.

Male guinea pig, 575 gm., Dec. 23, splenectomy. Jan. 5, inoculated intra-abdominally 3 ccm. eighteen-hour-old bullion culture staphylococcus pyogenes aureus. A few days before death developed lump on jaw. Found dead Feb. 2. Tumor contained pus. Culture micrococci growing gray-white on agar. Cultures from heart and liver gave no growth.

Control female, 450 gm., inoculated Jan. 5. Found dead Jan. 6. Autopsy: Turbid fluid in abdominal cavity much like bullion culture. Culture micrococci growing on agar as pale yellow colonies. Cultures from liver and heart's blood gave similar cocci. Fluid in both chests.

Male pig, 700 gm., Dec. 23, splenectomy. Jan. 5, inoculated 4 ccm. eighteen-hour-old bullion culture staphylococcus pyogenes aureus intra-abdominally. Killed by illuminating gas on Feb. 17. Macroscopically autopsy negative. No growth from cultures from liver and heart's blood.

¹Transactions of the Association of American Physicians, 1909.

Control female, 700 gm., inoculated in the same manner. Jan. 8, so sick that it was killed. Autopsy, Jan. 9. Fluid in chest. Cultures from liver, heart's blood and fluid in thorax gave a coccus. Growth on agar, both pale and golden-yellow.

In these cases there appears to be no decrease in the ability of the spleenless animal to withstand infection. There is, of course, the possibility that in my experiments the dose of bacteria might have been large enough to make an animal sick but yet not kill it. The remaining splenectomized animals and controls were, therefore, killed and examined.

Pig, 600 gm., Dec. 11, splenectomy. Jan. 2, intra-abdominal inoculation 2 cem. eighteen-hour-old bullion staphylococcus pyogenes aureus. Jan. 14 seemed sick and was killed by strychnia. Autopsy macroscopically and bacteriologically negative aside from the congestion caused by the strychnia.

Male pig, 650 gm., Nov. 11, splenectomy. Dec. 9, inoculation 3 cem. eighteen-hour-old bullion staphylococcus pyogenes aureus under the skin. Appeared sick and developed a local infection. Killed by strychnia Feb. 3. Macroscopically autopsy negative, except for white area in liver. Cultures from liver and heart gave no growth.

Control female, 650 gm., similar inoculation. Developed a local infection. Found dead Feb. 1. Autopsy Feb. 3. Tumor left half of uterus, 2½ inches long, size three fingers, filled with yellow, putty-like material, probably pus. Intestines adherent. No culture through mistake. Cultures from liver and heart gave no growth.

Male pig, Dec. 11, splenectomy. Dec. 23, inoculation 2 cem. one-day-old bullion culture staphylococcus pyogenes aureus under abdominal skin. Developed local infection. Killed by strychnia Jan. 14. Autopsy: Aside from pus, locally negative on inspection and bacteriologically.

Control female, 650 gm., similar inoculation. Killed by strychnia Jan. 14. Autopsy: Intestines adherent to edge of liver where liver contained some white spots. Otherwise negative. Cultures gave no growth except from the liver, where pure culture of aureus. Needle evidently had penetrated abdominal wall and made local abscess in liver.

SUMMARY OF RESULTS.

Two splenectomized pigs died of general infection, the controls surviving. One splenectomized pig died of general infection, there being no control. A splenectomized pig died of a local infection, not at the point of inoculation, some time after its control died of a general infection. A control died of a general infection, while the splenectomized pig lived until killed. Both the splenectomized pig and the control lived until killed.

From a perusal of these few experiments it appears that there is no marked difference in the ability of splenectomized and normal guinea pigs to withstand infection artificially produced by the staphylococcus pyogenes aureus.

Scattered through literature are a few reports of experiments undertaken to determine the function of the spleen in relation to infection. None of the pieces of work has been sufficiently extensive to settle the question. By combining them, however, a fairly good estimate can be formed. Bardach² injected anthrax into the circulation

of 25 splenectomized dogs. Nineteen died. Only five of the controls died. He used adult and large dogs. When young and small dogs were used, more of the controls died than of the splenectomized dogs. Later he injected three of the splenectomized animals that had lived after the first injection, together with three of the controls, and of these only one died. Kourloff, quoted in Bardach's article, has done 11 experiments with rabbits, using various germs. His results were variable, sometimes the splenectomized animals dying, sometimes the controls, sometimes both living or both dying. Blumreich and Jacoby³ feel that as anthrax has special effect on the spleen in dogs, the results of Bardach's experiments cannot be applied too freely to other germs. They, as well as Martinotti and Brabacci, made use of guinea pigs in their experiments with anthrax and found that both the spleenless animals and the controls died. They also lay stress on the fact that Bardach's results were entirely reversed when he used young and small dogs. In their experiments with guinea pigs they used chloroform in preference to ether because of the latter's effect on the lungs of the experimental animal. Six guinea pigs, eleven to sixteen days after splenectomy, inoculated with diphtheria bacillus lived a few hours longer than the controls. The splenectomized animals lived 47½ hours, and the normal ones 34½ hours. When anthrax was used, the splenectomized guinea pigs died on the average in fifty-one hours and the controls in fifty hours. With pyocyaneus, 14 guinea pigs inoculated, 1 died. Twelve controls, 8 died. Bacillus of cholera, 18 splenectomized guinea pigs inoculated, 4 died. Fifteen controls, 13 died. When the toxins of diphtheria and pyocyaneus were used, both spleenless animals and the controls acted practically in the same manner.

Courmont and Duffau⁴ consider that there is a multiplicity of factors which determines the results of inoculation experiments in splenectomized and control animals. They found in their experiments that the results varied, depending on the time elapsed since splenectomy. Recent splenectomy favored infection by staphylococcus pyogenes, while when the splenectomy was of long standing the reverse was found. When the toxins alone of the staphylococcus were injected, the spleenless animals resisted much better than the controls. With the streptococcus, the findings were just the opposite. The more recent the splenectomy, the better the resistance. The number of their experiments, it seems to me, is too few to warrant one in depending much on their deductions.

Dumoulin⁵ did work principally with the blood in splenectomized animals subjected to artificial infection. Among his conclusions are some that have an interesting bearing on the subject of the question under consideration. Splenectomy appeared to have no effect on the course of rabies.

³ Zeitschr. für Hyg., xxix, 1898.

⁴ Mem. Soc. de Biol., 1896.

⁵ A Contribution: L'Étude du Rôle de la Rate dans les Infections, 1900.

² Ann. de l'Inst. Pasteur, 1889.

Animals inoculated with the vaccine of Jenner ran the same course whether with or without spleens. The course of an intoxication with diphtheria toxin was not retarded by the splenectomy done one day previous to the inoculation. An animal, however, that was splenectomized eight days before inoculation survived two days longer than the control.

Combining, then, all the experimental work, one finds results and deductions at great variance, and it can be said fairly that no work has yet shown that the spleen alone plays a very important rôle in fortifying the individual against infection. While it may be one of several organs for this purpose, its removal causes no constant change in the resistance. It is probable that the question is far from being simple and is, without doubt, an exceedingly complicated one. The best conception of its complicity may be gained from the following quotation from Sajous:

"The spleno-pancreatic secretion is represented by the trypsin which reaches the portal vein by way of the splenic vein, and which continues in the blood stream the cleavage processes begun in the intestinal canal. The main function of the spleno-pancreatic secretion, trypsin, in the blood stream is to protect the organism from the effect of the toxic derivatives of albuminoid bodies.

"That albuminoid poisons, including bacterial toxin, are destroyed by the spleno-pancreatic ferment — trypsin — may also be sustained by experimental data. . . .

"The results of removal of the spleen are suggestive. But here it is necessary to avoid being misled by the action of injected toxins upon the adrenal system, since a sufficient dose will kill an animal irrespective of the presence or absence of its spleen. Again, the protection afforded through adrenal overactivity must not be overlooked, since the removal of the spleen does not reduce the protective power. Indeed, the accumulation of toxic elements in the blood that follows splenectomy tends to increase the latter and thus compensate for the missing organ's beneficial influence. Both these features are well shown in the experiments of Courmont and Duffau, who found that in rabbits splenectomized from two to twenty-five days beforehand the staphylococcus pyogenes and the bacillus pyocyaneus caused death in a few hours, whereas, normal rabbits survived longer or altogether. Yet when attenuated cultures of the very virulent streptococcus were used, animals splenectomized a few hours or days before always resisted better than normal rabbits and sometimes survived when the cultures were further weakened. The splenectomized animals simply had their adrenals stimulated by two active toxic agencies, the normal rabbits only by one, and the bacteria in the former were introduced when the blood was filled with defensive bactericidal agents. . . .

"A predominating feature of all experiments of this kind is the evident compensative influence of adrenal origin, so marked at times as to entirely offset the loss and even to temporarily and perhaps permanently, in some instances, provide unusual

immunity to bacteria, the source of toxins. (Example, the experiment Blumreich and Jacoby.)

"The adrenal overactivity caused by the accumulation in the blood of substances that would be destroyed in the liver if the spleen were present correspondingly activates all the remaining protective powers." *Sajous, vol. i, p. 660.*

Now to test these deductions by applying them to man: In the summer of 1905 I removed the spleen from a man because of rupture. His occupation is one in which his fingers are often bruised and cut. He reports now (three and three-quarter years after the operation) that his cuts heal as readily as before and that he is no more susceptible to colds and illnesses than formerly. The only sickness he has had since the operation was quinsy sore throat, for which an incision was necessary. Were there a decrease in susceptibility as a result of splenectomy, it certainly would have been noticeable in some of the many human cases and would have been commented upon. When the results of experimental work correspond with the findings in the human case, even though it is but one, there can be little doubt of their correctness. It seems proper, therefore, to conclude that the removal of the spleen does not alter practically the individual's susceptibility to infection and that its functions in this respect, if they do actually exist, on its removal are readily taken up by other organs.

THE MEDICAL INSPECTION OF SCHOOLS IN BOSTON, THE PRESENT LIMITATIONS AND FUTURE POSSIBILITIES.*

BY W. P. COUES, M.D., BOSTON.

THE experience of one of your number during a number of years' service, which time comprises periods before and after the employment of trained nurses in the schools, may be of interest to you.

Before speaking of any matters connected with school inspection in Boston, tribute should be paid to Dr. S. H. Durgin, chairman of the Boston Board of Health, for to him belongs the credit of establishing the system in Boston, the first city on this continent, as far as I am aware, to have medical inspection in the public schools. In the BOSTON MEDICAL AND SURGICAL JOURNAL for Dec. 17, 1908, Drs. Sullivan, Murphy and Cronin contributed an able and interesting article on school inspection. The history of the work in Boston, its organization by Dr. Durgin and the advent of the public-school nurse, are spoken of and a clear idea of the whole subject given. It is upon some of the points touched upon in this article that I wish to give you my personal experience.

MEDICAL INSPECTION BY THE INSPECTOR.

The present methods only vary in the detail with which they are carried on by the different inspectors. The teachers in the various school-

* Read at a meeting of the Boston School Physicians' Association, Feb. 29, 1909.