ance. Those who reserve for the affection a purely clinical classification, admit in a measure its shortcomings; one of the most representative of these, Crocker,² states:

With all these variations in symptomatology it is difficult to find any one symptom absolutely constant; but on the whole the most characteristic features are: The extremely slow and progressive development of the tumors in number and size, the tendency to group into close and semicoalescing patches, and their asymmetrical distributions; the moderate size attained by the tumors, which were seldom larger than a pea; the dull red color, and firm consistence of the tumors, with a normal epidermis over them, and their mobility over subjacent parts; their painless character at first with the subsequent strong tendency to most severe paroxysmal spontaneous and provoked pains; and finally they do not recur on removal.

These symptoms, singly and collectively, are not absolutely characteristic of the affection. Each occurs in other affections, and may be entirely absent in myoma; all collectively present, without a pathologic confirmation, could not establish beyond reasonable question the diagnosis. Pain is absent in probably one-half the cases, and when present may be attributed to neuromata or other forms of painful new growths. Wolters²⁰ second cases developed acutely and showed a symmetrical distribution. The lesion in Miglionini's¹¹ case was single, as large as a hazel-nut, and situated on the knuckle. Herzog's¹² was single, on the cheek; Förster,⁸ Sokolow,⁷ Santesson¹⁰ and Axel-Key¹⁸ were all solitary cases. Jarisch's¹⁷ case was probably of congenital origin, and Wolter's²⁰ third case situated over a meningocele, can likewise be attributed a similar origin. The remaining clinical features are sufficiently varied to require no special comment.

The histogenesis of myomata cutis presents some features, which are scarcely less interesting, because of their varied character, than the clinical history. Those who have made histologic studies in this direction are about equally divided in their results: a fairly representative number express their conviction that the derivation of the muscular overgrowth can be traced to the muscular coats of the vessels of the skin, arrectors pili, or the muscular appendages of glandular elements: the remainder frankly admit that their painstaking efforts in establishing a true derivation have been negative in character or purely conjectural. Jadassohn,²⁵ in his second case, Roberts,⁴ Nobl,³² Neumann,²⁷ Marschalko,¹⁴ Audry,⁹ Broelemann³³ attribute the derivation to the arrectors pili; Crocker,² Jadassohn²⁵ in his first case, Hardaway³⁴ and Hess¹⁶ to the muscular coats of capillaries; Wolters, Brigidi and Maracacci²⁶ to the involuntary muscular fibers of the glandular elements and hair follicles. Krzyształowicz¹⁹ admits his inability to arrive at any definite opinion, but the peripheral portions bore evidence of arrector pili derivation. Jarisch¹⁷ and Lukasiewicz¹³ derivations are indeterminate as respects arrectors pili, glands, or blood vessels. Huld-schinsky⁵ attributes to the blood vessels a probable derivation. Wolters²⁰ attributes the probable derivation of his third case to the capillaries, although glandular elements were sparingly in evidence, and a portion of the growth could be readily traced to arrectors pili. Interesting, if not amusing, is the latter's conjectural explanation of the growth and development of the myoma which was seated over a meningocele, on the basis of a compensatory hypertrophy, on the part of Nature to arrest the efforts of the pulsating meningocele to effect a

rupture. Personal observation leads me to suspect from the peripheral appearance that the arrectors pili fostered strongly the myomatous hypertrophy in the first case and the muscoli vasorum in the second.

It is impossible to determine, however, beyond purely conjectural speculation, whether the muscular hypertrophy had its origin and development in these two respective areas, or whether these structural areas yielded to the general stimulus, which expended itself on all involuntary muscular tissue of the affected area, in degree proportionate to the amount of each present, and its more favored distribution. The latter explanation seems to be the more plausible one, and is analogous to the hypertrophy of all glandular and epithelial tissue in the immediate neighborhood of an epithelioma, which owes its overgrowth to a similar form of stimulating influence.

On this basis the diversified character of the histogenesis, from glands, arrectors pili, vessels, and all forms of involuntary muscular tissue, is readily explained. All the diversified clinical and physical phenomena find their best explanation on the basis of some such unknown influence, which stimulates the involuntary muscular tissue of the skin to a preponderating development and overgrowth, irrespective of age, area, predisposing causes, and similar inconstant conditions.

The tendency may be inherited, present from birth, and called into activity by the influences of puberty, trauma, etc. Inasmuch as all tissue in general is subject to similar changes, involuntary muscular tissue is probably no exception, and doubtless shares in all the variations of pathologic change, from single hypertrophy to preponderating and irregular conglomerate overgrowth, with all the corresponding gradations of clinical and physical change. In that event the microscope affords the easiest, best and most accurate determination as regards what constitutes, in a generally accepted sense, myomata cutis.³⁵

19 West Seventh Street.

LATE PHLEBITIS FOLLOWING CLEAN ABDOMINAL OPERATIONS.

W. W. GRANT, M.D.
DENVER.

Many surgeons have seen iliac and crural phlebitis develop from the tenth to the twentieth day (usually about two weeks) after abdominal operation which had been aseptic throughout and followed by prompt and perfect healing of the wound.

A disease which appears so unexpectedly and converts a simple operation, with the promise of speedy recovery, into one of suffering, inconvenience and prolonged confinement and disability, merits further study and consideration. Though seldom fatal, it is always a most unwelcome complication and a vexatious disappointment to both patient and surgeon.

The typical cases seem to occur after an interval operation, for example, a clean appendectomy.

In 1903 I expressed the opinion¹ that I had never seen

32. Arch. f. Derm. u. Syph., 1906, lxxix, p. 31.
33. Arch. f. Derm. u. Syph., 1904, p. 163.
34. Am. Jour. Med. Sci., April, 1886, p. 511; also Jour. Cut. Dis., 1904, p. 375.

35. For further literature the reader is referred to Arzovan and Vaillard: Ann. de Derm. et. Syph., 1881, p. 60; Fox: Brit. Jour. Derm., 1902, p. 56; Klob: "Path. Anat. d. Weibl. Sexualorg.," 1864, p. 482; Vidal: Jour. Cut. Dis., 1885.
1. "The Sequels and Complications of Appendicitis," Colorado Medicine, April, 1903.

a case of iliac or femoral phlebitis after an abdominal, rectal or genitourinary operation that was not due to infection. Sepsis, I considered, the commonest cause, even if the operative field did not seem to justify it. Further observation and experience compels me to modify this opinion.

The manifest, acute, septic phlebitis, attending or soon following operations, is not considered in this paper.

I wish to discuss especially that form of phlebitis culminating in the veins of the legs and known to occur most frequently about two weeks after simple aseptic abdominal operations, without being preceded by fast pulse, elevation of temperature, pain or any indication of its advent. In the great majority of cases it culminates in the vessels of the left leg, no matter where incision is made.

Cordier² collected 232 cases; of these, about 200 were intra-abdominal operations and 166 clean cases, hysterectomy, for uterine fibroids leading in order of frequency with appendectomy next. While this form of phlebitis occurs occasionally in many other diseased conditions, it so far seems peculiarly incident to abdominal operations.

The cases of pulmonary embolism occurring soon after severe abdominal operations, usually hysterectomy for large uterine fibroids, are interesting and distressing, but are hardly to be considered in connection with femoral and saphenous phlebitis. In this class of cases pulmonary embolism is very rare.

Mr. Haward³ presents statistics from five London hospitals of 3,334 operations for appendicitis, with 29 cases of phlebitis and 8 of pulmonary embolism, showing about 1 per cent. in this class of operations. In the last few years I have had two cases follow operations for appendicitis. In one acute case, in which the operation was clean because of early intervention, phlebitis of a mild character occurred in both legs three weeks later. The other case was one of chronic appendicitis, with the following history:

History.—Mrs. G., aged 37, married, had one child eight years old. Labor was natural and convalescence uneventful. She has not been pregnant since. She has always been thin and for the last year or two she has been anemic and neurasthenic. Her appetite is uncertain and she is troubled much with indigestion and flatulence. In the spring of 1905 she had occasional attacks of abdominal pain followed by tenderness over the appendix. These continued until she was examined by me in January, 1906, when a diagnosis of chronic appendicitis was made and I operated on her January 27. She also had retrodisplacement of the uterus, with no adhesions or discomfort; she never had inflammation of uterus or appendages.

Operation.—The appendix was removed through a short central incision, and at the same time I did a ventrofixation. Both were done quickly and without the least difficulty. There were no adhesions about the appendix. It was distended throughout with liquid fecal matter and was congested in the proximal half, but the tip was pale and almost bloodless. The appendix was ligated close to the cecum, the stump cleaned with peroxid of hydrogen and salt solution and pouched with one circular stitch. In fixing the anterior surface of the fundus uteri to the lower angle of the wound, care was used not to puncture the sheaths of the recti, the object being not to damage the epigastric veins which lie beneath the muscles; in fact, it was not necessary to ligate a single vein during the operation.

Postoperative History.—The wound healed promptly, per-

fectly and permanently. There was not the slightest interruption to a smooth and satisfactory convalescence. On the second day the temperature was 99.2; after this, from January 28 to February 8, it varied from 98.5 to 98.7 and the pulse was about 75. The kidneys were acting normally at all times, and constipation was prevented by enemas and an occasional simple laxative. There was indigestion during the first two or three days after operation. On February 8, twelve days after operation, the temperature in the evening was 99.2 and pulse 80. At same time she complained of tenderness and pain, which were quite severe in the left calf and under the instep, and lastly in the groin, showing unmistakable phlebitis. Next day the temperature and pulse were normal.

On February 10, temperature was 99.2 and pulse 80. After this date both continued practically normal, but the pain and swelling of the leg continued. The leg was treated by slight elevation, wrapped in cotton and loosely bandaged until the fourth week, when rubbing and gentle massage were commenced and continued daily until convalescence was well advanced. It was two months before the patient could use the leg with comfort. She has since worn an elastic stocking. The swelling of the entire leg was decided, but never extreme. The woman's general health has steadily improved and she walks without discomfort.

ETIOLOGY.

What caused the phlebitis in this and similar cases? The field of operation was clean throughout; the epigastric vessels were not injured; the wound was not stretched, and there was no undue or uncomfortable pressure of the abdomen by bandage. Traumatism, therefore, must be excluded. With our present knowledge, pathogenic bacteria, it seems to me, must be excluded. The phlebitis may have been caused by some albuminoid substance or toxin in the blood, as suggested by Welch and later by Meyer and others, but it would be exceedingly difficult to account for the presence of infective bacteria in such a case. It is admitted that whatever damages the endothelium of the veins, whether trauma or a morbid state of the blood, favors the formation of thrombi. In my experience the patients are usually anemic, with feeble circulation. I believe that a condition of the blood exists previous to operation which predisposes to thrombophlebitis. This blood state is not always apparent.

In the great majority of cases the veins of the left leg only are affected. Why should a clean operation in the right hypogastrium cause phlebitis in the left leg only? The anatomic arrangement of the blood vessels, I believe, offers the best solution.

Keen, in his "Surgery of Typhoid Fever," states that about three-fourths of the cases are in the left leg (other authorities give a larger proportion). He believes that it is due to feeble heart action and to the mechanical arrangement of the vessels—the passing of the left common iliac vein beneath the right common iliac artery. Haward adds the fact that the left common iliac vein also passes beneath the left internal iliac artery. The typhoid state, however, with its long period of recumbency, high temperature and marked debility is different from that under consideration, yet the peculiar arrangement of the vessels is doubtless a factor to be considered in the development of the disease. The thrombus may be the cause or result of the phlebitis.

It is also conceded by many that some cases are exceedingly difficult of explanation, and, I may add, with our present knowledge impossible of satisfactory explanation.

2. THE JOURNAL A. M. A., Dec. 9, 1905.

3. Hunterian Lectures, "Phlebitis and Thrombosis," Lancet, March 10 and 17, 1906.

SUMMARY OF LITERATURE.

Witzel of Bonn⁴ reports three cases that he could not account for following clean appendectomies. He now believes that the condition originates in the epigastric veins and is due to ligation of the epigastric vein and artery during the operation. He therefore would make a more perpendicular incision and would not open the sheath of the rectus muscle, nor ligate the epigastric vessels, nor suture *en masse*.

Stephen Hoffman,⁵ in a paper on blood vessel complications in perityphlitis states that thrombosis and embolism are complications of appendicitis, and that thrombosis may be primary in the veins and is not very rare. He notes as a "singular fact" that it most frequently affects the veins of the left side, and suggests the anatomic arrangement of the vessels and pressure as the explanation.

Lennander of Upsala,⁶ had five cases following appendectomy. He considers the phlebitis of infectious origin, but states that it need not start from field of operation. He states that the compression by dressings, intestinal intoxication and feeble circulation may be factors.

Lockwood⁷ states: "The prognosis of phlebitis is favorable when not complicated with septicemia and pyemia," an admission that some cases are not septic.

Coe⁸ speaks of septic crural thrombosis following aseptic celiotomy.

Vander Veer⁹ says regarding non-septic phlebitis following abdominal operations that the probable causes are: Traumatism, distribution of veins of left leg and bandage pressure.

Secord¹⁰ of Ontario speaks of thrombosis of femoral veins following aseptic laparotomy.

He says that lessened vascular tension, retarded circulation and dressing pressure are causes. It is not due to infection.

Strauch, of Moscow, (quoted by Secord), says that ether and high pelvis position are causes of femoral thrombosis.

John G. Clark¹¹ speaks of this form of phlebitis occurring as a sequel to celiotomy. It originates, he says, from a primary thrombus of the deep epigastric vein which is slowly propagated along the vessel until it reaches the external iliac, where it gives rise to retrogressive thrombus of the femoral vein. It is non-infectious and non-traumatic.

Willy Meyer¹² mentions two cases following appendectomy. Both patients were anemic. Intestinal intoxication and sigmoid pressure, he says, may be contributory causes. The condition is of infectious origin, but not necessarily from the field of operation. A letter from Dr. Meyer in June, 1906, reaffirms his belief in infection as a cause.

Edwards¹³ speaks of phlebitis, thrombosis and embolism following abdominal and pelvic operations. He declares that the condition is not septic. He believes that it is caused chiefly by suddenly formed clots becoming detached and causing pulmonary embolism and sudden death. It usually occurs in cases of hysterectomy from uterine fibroids.

Maurice Richardson,¹⁴ of Boston, says that this thrombosis of the veins of the left calf may be the result of wound infection, but that such an explanation seems against common sense and experience. The common phlebitis, he believes, occurs most frequently in those patients whose wounds have pursued a uniformly favorable and aseptic course.

At the annual meeting of the American Gynecological Society,¹⁵ May 22-24, 1906, Dr. Joseph Taber Johnson, Washington, D. C., read a paper entitled "Thrombosis and Embolism Following Abdominal Operations;" Dr. Eugene Boise, Grand Rapids, Mich., read a paper on "Postoperative Embolism." In the discussion following Noble, Philadelphia, said that he does

not think that sepsis has much to do with the condition; much is yet to be learned about it. There are many factors and trauma plays a part.

Reynolds, Boston, said that he thinks that congestion of pelvic viscera has much to do with thrombophlebitis after operations on these organs.

Currier, New York, declared that we are in the dark as to the exact cause, but believes that patients getting up too soon, say within a week, is dangerous and predisposes to thrombosis.

Watkins, Chicago, said that the evidence is much in favor of infection.

Dührssen, Berlin, thinks it is caused by a blood dyscrasia, not by sepsis.

Edebohl, New York, said that in ten cases none was septic.

Newman, Chicago, said that susceptibility from previous weakness and trauma figure as causes.

J. C. Munro¹⁶ suggests that phlebitis is more common than postmortem statistics indicate. He believes that mild infections do take place from which the patient recovers spontaneously.

C. H. Goodrich,¹⁷ among the causes of femoral phlebitis, mentions infection of the blood clot in or about the superficial or deep epigastric or circumflex iliac veins by attenuated forms of bacteria. In most cases, he says, some trauma to veins is probably a contributing factor. None will dispute that a blood clot, an ideal culture medium, can be infected by a smaller number and less active bacteria than tissues possessing resistive power.

Welch¹⁸ says: "Many of these so-called marantic thrombi are unquestionably of infective origin, and while a more prominent place must be assigned to the action of micro-organisms in the etiology, yet recent attempts to refer all thromboses, formerly called marantic, to the direct invasion of micro-organisms and to phlebitis go beyond demonstrated facts."

Clark and Haward quote with favor von Recklinghausen's whirlpool theory or eddying of the blood as predisposing to blood clot, maintaining that this result is favored by the cross currents under varying pressure and at different angles. When at or near a common receptacle, the influence may be marked, and if the heart action is slow and feeble, it may be influential in the cause of thrombus. This is but another factor in the consideration of the anatomic plan of the vessels in influencing the formation of thrombi.

From the teachings of Virchow that the thrombosis was the primary essential condition and due to slow, feeble circulation, we have witnessed in more recent years the growth and ascendancy of the theory of infectious origin, due largely, as shown by Professor Welch, to the investigations of European pathologists.

Much has been written in the last few years about the blood plates, whether they were degenerated blood corpuscles or inherent constituent elements of the blood. In the Hunterian lectures on phlebitis and thrombosis, previously alluded to,² considerable space is given to this discussion. The investigations of Eberth and Schimmelbusch and others established their prominent influence in coagulation, while Bizzozero and Osler confirm their existence as independent elements in solution with the blood corpuscles.

According to different investigators, from Osler, Brodie and Russell, to Professor Kemp, they number from 250,000 to 778,000 to the cubic millimeter. Their marked influence in the formation of blood clot seems established. Whatever retards or slows the circulation, regardless of local and constitutional conditions, disturbs the normal relation of the elements to each other and

4. Centrbl. f. Chir., July 15, 1906.
5. Deutsch. Ztschr. f. Chir., vol. lxxxi.
6. Centrbl. f. Chir., 1899.
7. "Pathology and Surgery of Appendix," 1901.
8. Medical News, July 1, 1899.
9. American Medicine, July, 1901.
10. Secord: Amer. Gyn., October, 1903. p. 370.
11. "Etiology of Femoral Postoperative Thrombophlebitis," Univ. of Penn. Med. Bull., July, 1902.
12. Annals of Surgery, May, 1901.
13. International Clinics, vol. iv. Series 15, 1906.
14. "Certain Unavoidable Calamities Following Surgical Operations," Boston Med. and Surg. Jour., Dec. 1, 1904.
15. THE JOURNAL A. M. A., June 9, 1906, page 1791.

16. "Lymphatic and Hepatic Infections Secondary to Appendicitis," Annals of Surgery, November, 1905.
17. Brooklyn Med. Jour., June, 1905.
18. Allbutt's System of Medicine, vol. vi, page 173.

to the endothelium. In chlorosis and other conditions of deficient oxygen in the blood, the platelets increase, leave the center of the current and, with the corpuscles, collect in the periphery of the stream, and with their known property of agglutination, attach themselves to each other and to the endothelium and form the nucleus of a clot. Prof. James H. Wright,¹⁹ of Boston, has discovered the origin of the blood plates in the giant cells of the bone marrow and of the spleen. Constitutional conditions affecting the chemistry of the blood and local condition of the vessels will produce the same results, especially with a feeble or retarded heart action. Under such conditions the fibrin ferment it is claimed, is evolved and the tendency to thrombus favored.

The calcium and sodium compounds and thyroid extract are administered to increase the agglutinative conditions of the blood and to shorten the period of coagulation in order to prevent hemorrhage during and after operation. This is perfectly consistent with Professor Wright's (London) observations that citric acid causes decalcification of the blood, and that the blood of the femoral veins, containing more carbonic acid, is more susceptible to coagulation than the sinuses, at the base of the brain.

With the foregoing data and general observations, we ought to be better prepared to form an intelligent opinion in a given case as to the causes and blood conditions which favor thrombophlebitis after operations. Because few patients die, the pathologist has not had a good opportunity to do his best work. The influence of trauma as a factor is emphasized by such men as Lennander, Witzel, Thienhaus, Vander Veer, Baldy, Goodrich, and most of them, at least, recommend the Trendelenburg position as a preventive measure in addition to precautions, which all prudent surgeons recognize, against the infliction of needless force and trauma during the operation.

OPINIONS OF SURGEONS AND PHYSICIANS.

In my examination of the subject I sent the following inquiry, in June and July, to about 30 distinguished surgeons and physicians: "What in your opinion is the chief cause of phlebitis following abnormal operations (occurring usually from the tenth to the twentieth day) with little or no fever, an aseptic field and prompt healing of the wound? Interval appendectomy is a good illustration," I quote from replies received:

Prof. W. H. Welch: "In my article on 'Thrombosis' in *Allbutt's System of Medicine*, (Vol. VI), I discuss the view which has many adherents, particularly in France, that many of the thrombi formerly regarded as marantic or bland are really instances of infective phlebitis, and the discussion applies to the class of thrombi following abdominal operations, to which you refer, although surgical thromboses, as such, are excluded from the scope of my article, which relates to internal medicine. The etiology of the class of thrombi which you are considering is not well understood. The opportunities to make bacteriologic examinations of such thrombi are infrequent, but, as I state in my article, in a number of cases bacteria have been found in such thrombi, and this raises some presumption in favor of their infective origin. Still, I do not consider such an origin as by any means established. The absence of evidences of infection in the seat of operation does not preclude the possibility of the infectious origin of the thrombi, nor does the bland course of the thrombotic process exclude this. The symptoms (fever, rapid pulse, etc.), in some of the cases are suggestive of infection, and on the whole, I incline to this hypothesis, which, in at least some instances, seems established.

J. C. Bloodgood, Baltimore, does not consider the causation definitely settled, but thinks the origin infectious. It is much more frequently observed in anemic and chlorotic individuals.

James M. Finney, Baltimore, believes that there is no one specific cause but several contributory causes, the most important of which is the condition and chemistry, of the blood itself. Add to this slight traumatism to the iliac vein, usually the left, through pressure from fecal impaction in rectum, metal retractors, rough use of the rectal tube, etc., and you have the factors necessary for its production. Infection may play a remote part, but the real change, whatever it may be, is, in his opinion, a chemical one, in the cases under consideration.

Robert Abbe, New York, says: "The cause of postoperative femoral phlebitis is probably not different from that following typhoid or other fevers—retarded current in the left femoral, which shows in three-fourths of the cases, due to pressure of the right common iliac artery on the vein which crosses beneath it at the pelvic brim. This, plus the bacterially infected blood, even in wounds healing by primary union without apparent infection, causes colonization on the vein wall when the current is slowed down."

Clement Cleveland, New York, formed the opinion long ago that even the mildest forms of phlebitis are due to slight sepsis, and later experience has confirmed this view. He is unable to account for it in any other way.

Robert T. Morris, New York, thinks that the phlebitis is due to infection by way of the peritoneal lymphatics, but none of the writers has given a very clear view of the process. The matter needs explanation. He has had two cases of left and two of right iliac and femoral phlebitis following appendectomy without other infection in the cases.

John B. Roberts, Philadelphia, is inclined to attribute the condition to a mild form of infection of the veins, and the same thing, he says, is probably the cause of venous thrombosis that occasionally occurs as a complication of typhoid fever.

John B. Deaver, Philadelphia, says: "Infection is the cause."

Joseph Price, Philadelphia, says: "Stump or pedicle operations and local infection. The appendix operation is the perfect type to demonstrate that it is septic, because nearly all are imperfect operations. A dead ligature in a dead space undermined, with one-sixth or one-eighth of the appendix not removed. Those who cut out the stump and close the hole never have phlebitis."

J. M. Baldy, Philadelphia, thinks that it is impossible to tell the chief cause. Sepsis is the cause in only a few cases. Traumatism is a factor. Pressure on vein by retractors may be a potent cause, and anemia due to loss of blood, and also to disorganized blood from other causes, are also factors.

L. S. McMurtry, Louisville, says that he has had three cases following nonseptic abdominal operations. In each case the left leg only was affected. He regards the etiology as probably a mild local infection causing inflammation of the vein, and formation of a clot, but is not clear as to the cause and pathology.

Maurice Richardson, Boston, says that he has seen a great many cases of the kind, and is strongly inclined to the view that this mild phlebitis is no evidence of sepsis. It occurs in the cleanest cases attended by a slight rise in temperature. Little, if any, disability follows. Sometimes he has thought the trouble came from keeping the patients very still. He has never seen pulmonary embolism in these cases. He has no idea as to the cause of the phlebitis.

Arthur T. Cabot, Boston, says that he has not been able to discover any explanation for the cases of phlebitis under consideration. He has several times seen cases of what seemed to be phlebitis in the deep veins of the calf of the leg after operations, and thought they might be in some way due to pressure of the calf from the Trendelenburg position, but confesses he has no very good reason for holding this opinion.

N. Senn, Chicago, says that his experiments on animals several years ago tended to show that thrombosis is not likely to occur without infection. Developing after an operation, it is

19. Boston Med. and Surg. Jour., June 7, 1906.

suggestive of a mild form of infection, or in consequence of an enfeebled circulation. He has not observed it in appendix operations.

J. B. Murphy, Chicago, does not believe that phlebitis is more common following abdominal than operations on other parts of the body. He thinks it is a stasis caused from placing the patient in the recumbent position.

A. J. Ochsner, Chicago, says that two explanations seem somewhat reasonable, though he is entirely unable to state the reasons for the occurrence of the disease. One is given by Witzel, and the other is that the disease usually occurs in patients whose blood is not quite normal.

W. J. Mayo, Rochester, Minn., believes that there are several factors in the etiology. Phlebitis does not occur as a rule unless the peritoneal cavity is opened, thus arousing a process which results in some blood change, and this is instrumental in causing phlebitis. The recumbent position is a factor. While formerly common in interval appendectomies, when patients were in bed two or three weeks, it is now uncommon since patients are allowed to get up in six days, and are instructed to move their limbs freely. On this account the Mayos aim in abdominal cases to get the patients up in ten or twelve days.

Roswell Park, Buffalo, N. Y., in the cases under consideration, thinks that the early condition is one of endophlebitis, which may be of toxic origin, or an indistinct mild form of sepsis. The handling of viscera or clamping of vessels by forceps may commence the thrombotic process. While micro-organisms are more or less at fault, it does not follow that the condition is necessarily other than thrombus produced by chemical rather than biochemical means. He believes that a mild type of thrombophlebitis is the not infrequent sequel of abdominal operations, and that it is due to chemical agencies in the blood rather than to active germ action, and that it is mildly, if at all, infective. The condition, at times, is most difficult of explanation.

Arpad G. Gerster, New York, states that the question is not so simple as many would imagine. Several factors are to be considered. In some faultless cases the thrombosis is due to a ligated pelvic vein, in which the thrombosis extends to the femoral; but the condition of the blood and the endothelium of the vessels has some direct influence on the thrombotic process. Another factor is inaction due to bed rest, and the low blood pressure due to lack of physiologic stimulus to the heart. The coagulability of the blood and the state of the endothelium he thinks are most important.

Joseph G. Blake, New York, believes that the condition is due to an extension of a phlebitis in the neighborhood of the wound across the abdomen through a transverse vein of the abdominal wall which empties directly into the external iliac vein. The original phlebitis he thinks is probably due to injury to the walls of the vein through traction.

A. W. Vander Veer, Albany, N. Y., says that he is not clear as to the pathology. In the plainest cases traumatism is produced which extends to the venous trunk. The clumsy use of retractors will produce injury which is reflected to the veins. Just why a case of appendicitis, complicated with a lesion of right ovary and tube, should cause a phlebitis of the left leg, he is at loss to explain.

CONCLUSION.

My belief is that the cause of phlebitis of the epigastric, iliac, femoral, saphenous and tibial vessels, occurring late after a perfectly aseptic operation, with prompt healing of the wound, is probably not septic.

We do not know the specific cause or causes. The cases, of which a good illustration is reported, with our present knowledge, are very difficult of satisfactory explanation.

In the absence of convincing or pathologic evidence, and in the face of profound surgical skepticism, it is not rational, in the best and cleanest days known to surgery, to assume an infection that is devoid of satisfactory evidence.

The condition which causes the thrombus, before the

inflammation, or of the phlebitis, preceding the thrombus, is the vital question. It is exceedingly difficult, in fact, quite impossible, to reconcile the facts with the recumbent position, the simple ligature or injury of small veins, in a distant field, often on the opposite side of the body, though admitting that infection need not come from the site of operation.

I believe that there is a general condition affecting the composition of the blood, that may, and often does, exist before operation, which is an essential factor in the cause of thrombophlebitis in these cases. A careful scrutiny of patients should be made before operation, and an examination of the blood should be made before and after operation. This on a fairly liberal scale, in my opinion, would reveal interesting and useful information, and shed some light on a puzzling subject.

If the patient is chlorotic and anemic, or if the conditions are not satisfactory, the health should be improved, if delay is permissible, by the administration of iron and acids, and metabolism improved by a suitable food supply, while specific or constitutional affections should, as usual, receive just consideration.

A SERIES OF MEDICAL AND SURGICAL AFFECTIONS TREATED BY ARTIFICIAL AUTOINOCULATION

ACCORDING TO WRIGHT'S THEORY OF OPSONINS.*

A. P. OHLMACHER, M.D.

DETROIT.

It is somewhat surprising, in view of the remarkable character of the results which have been obtained, that an appreciation of the full value of Sir A. E. Wright's theory and practice is not widely disseminated among the medical profession of the United States. Rarely, indeed, in these days of easy publicity, does a scientist effect an accomplishment of far-reaching humanitarian importance without its immediate and extensive proclamation throughout the civilized world. In fact, such proclamation, especially of discoveries in the healing art, is too often premature and over-colored, with the result that disappointment and pessimism are aroused and progress impeded. With Professor Wright, however, the situation is quite the opposite. He has for four or five years patiently worked along a new line in experimental medicine, has evolved an attractive working hypothesis, the application of which has performed veritable miracles in the cure of certain diseases, and all of this with scarcely a ripple of sensation and almost without the knowledge of the medical profession outside of the originator's immediate circle. For Wright is accomplishing results that are the surprise of those who have been so fortunate as to witness them, and the comparatively uncommon worker who is, by previous training, competent to apply Wright's methods in practice, and who has employed them, is also performing therapeutic feats of a most surprising kind. To a large degree this situation has resulted from the principal investigator's natural modesty, and in part has been due to the conservatism of the medical profession, representing the reaction after a number of sensational but unproductive announcements. But the day when Professor Wright's achievements are to remain hidden has passed in England, and in the United States we are on the verge of a similar

* Read by invitation before the Chicago Medical Society, Jan. 16, 1907.