

PLATES ILLUSTRATIVE OF DR. WARREN'S ARTICLE ON THE PATHOLOGY OF CARBUNCLE
OR "ANTHRAX."

FIG. 1.

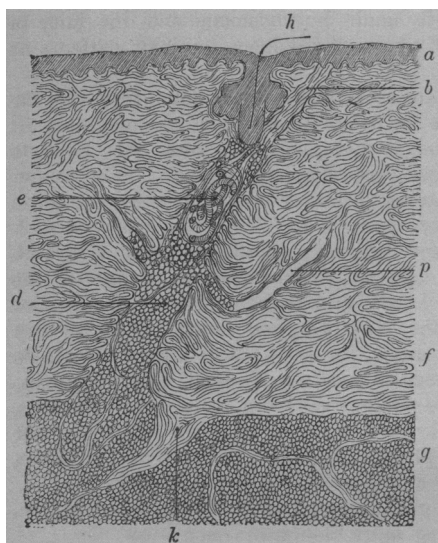


FIG. 2.

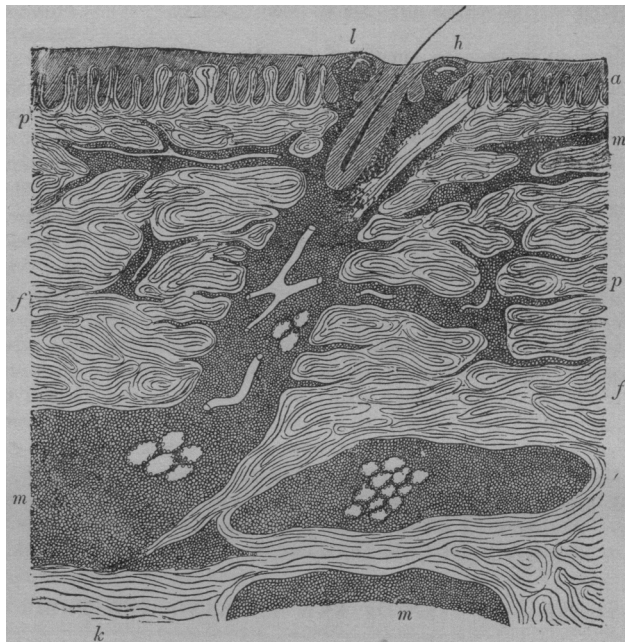


FIG. 3.

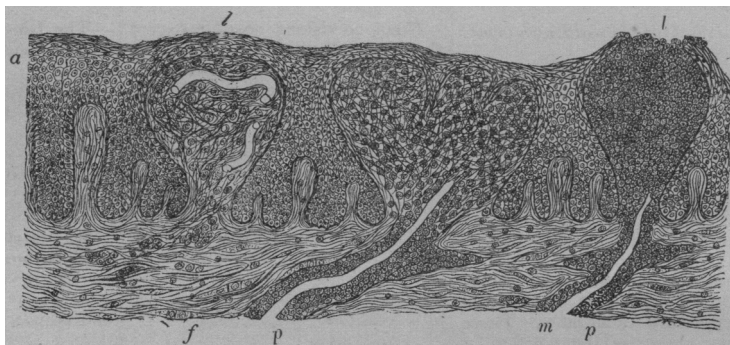
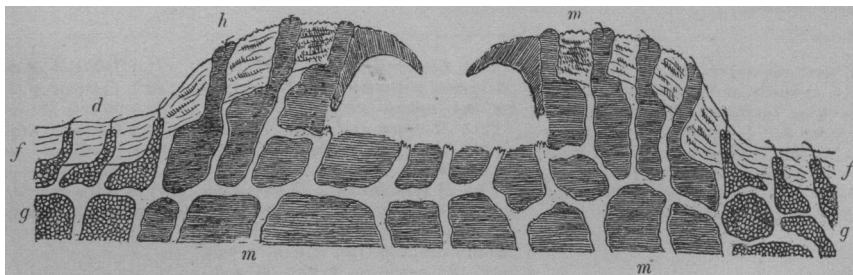


FIG. 4.



a. Epidermis. *b.* Erector pili muscle. *d.* Fat column. *e.* Sudoriparous gland. *f.* Cutis vera. *g.* Subcutaneous adipose tissue. *h.* Hair. *p.* Perivascular lymph spaces. *k.* Cône fibreux. *l.* Distended papillae. *m.* Purulent infiltration.

FIG. 1. Section of skin from the back of an adult, showing columnar adiposa and lanugo hair, magnified about eight diameters.

FIG. 2. Skin from carbuncle, showing the cell infiltration and the mode of formation of the large pustules, magnified about twenty diameters.

FIG. 3. Section from papillary layer, showing the development of the small pustules in the papillae. (Hartnack objective 6.)

FIG. 4. Diagram of carbuncle, actual size. The shaded portion shows the parts infiltrated with pus.

course, I do not include any *totally hopeless* cases of *far advanced* organic disease. Although I have never seen pulmonary difficulties absolutely cured there, they have been relieved and quieted,—a circumstance which I have never met at the sea-coast. Mild (non-tubercular), simple bronchitis I should advise to be sent there, with hope of permanent relief. Early phthisis receives no harm. Sometimes strength is gained. One person with hay asthma (autumnal catarrh), and the only patient with that disease I have met there, had been for many years wholly relieved of her severer symptoms, and only occasionally did she have the slightest dyspnoea, when the west wind had been blowing from over the land, from the coast, for several days in succession. For her the Shoals acted as well as Bethlehem, or any of the places in the White Mountains and elsewhere at which hay asthma is virtually annihilated.¹

Persons recovering from any acute disease would do well to try the Shoals. Some nervous complaints, dependent on debility or overwork, may be almost sure of benefit. Dyspeptics will find fresh air and pleasant exercise in the yachting and rowing afforded there. On one of the islands, occupied solely by fishermen, is one of the prettiest of beach bathing places. There the water is deep and clear. The shore shelves off gradually over a white bottom. One can see to the depth of twelve or twenty feet with perfect distinctness. It is now wholly unused by travelers. Other beaches can be found on other islands. Within fifty years I believe that all the habitable portions of all the islands will be studded with hotels and private villas. These latter will belong to rich men, who, seeking for comfort and for coolness and blandness of climate during the summer, will go there as to almost the only place in this country, where such qualities of climate can uniformly be found.

I adjoin records of the weather kept last summer, at the Shoals and at the Navy Yard at Portsmouth, from which one can judge still more clearly of the characters of the two climates. An examination of the record by days will show how little change takes place at the Shoals.

The temperature there generally ranged between 60° F. and 80° F. Once or twice only did it rise to 80° F., and once in September it fell to 57° F. United with these records are others procured for me, by the courtesy of E. G. Pierce, Esq., postmaster at Portsmouth, from the records kept at the Navy Yard during the same time.

The comparison of these records day by day will give a graphic idea of the difference between the two climates (ocean and coast). Especially I would draw attention to the last two columns, namely, those showing the variations of the daily temperature, and the mean daily temperatures.

THE PATHOLOGY OF CARBUNCLE OR "ANTHRAX."²

BY J. COLLINS WARREN, M. D.

A GREAT deal of confusion has arisen owing to the unfortunate application of one name, anthrax, to two entirely different diseases. The existence of an inflammatory mass in the skin, in each case accompanied by gangrene and constitutional disturbance, which

¹ Autumnal Catarrh, Hay Fever, by Morrill Wyman. Hurd and Houghton, 1872.

² Communicated to the Boston Society of Medical Sciences.

might terminate fatally, led many authors to confound the affections, and although at the present time the fact is well recognized that the fever of a malignant pustule is a specific one, and that of carbuncle merely pyæmic or septicæmic, the names are still largely common to both in most languages. Anthrax, the term originally given to the specific fever of animals, may be translated into murrain or splenic fever (English), *milzbrand* or *carbunkel* (German), and *charbon* (French). Malignant pustule is the name given to the last named disease, when occurring in man, by English and German writers, and occasionally by the French, although *charbon* covers both in the language of the latter. Anthrax is still used by veterinary surgeons as the scientific name for the specific fever, but it is not used in this sense by the prominent surgical writers³ of to-day, who employ it to designate the local inflammation of the skin under consideration. The English "carbuncle" is synonymous with "anthrax." It is a term not employed by the French; by the Germans it is used indiscriminately to denote either disease.

The current authority on surgical pathology⁴ thus describes carbuncle: Anatomically it resembles a group of several furuncles lying close together. Its origin and first stage are the same as in furuncle; that is, the death of a small portion of the skin (perhaps a cutaneous gland) seems to be the starting-point and centre of the inflammation. "Soon a number of white points form near each other, and the swelling, redness, and pain in the periphery increase in some cases so much that the carbuncle may attain the size of a soup-dish; and while the detachment of the white plugs of skin goes on in the centre the process not unfrequently extends in the periphery. . . . After the loss of the plugs of cutis, the skin appears perforated like a sieve. . . . But even when most intense, the process is almost always limited to the skin and subcutaneous cellular tissue. . . . You will have already noticed that the process of formation of furuncles and carbuncles differs from the inflammations with which you are already acquainted by the constant and peculiar death of portions of the skin. Of course, this must be induced by an early, perhaps primary, occlusion of small arteries; possibly of the vascular net-work around the sebaceous glands. . . . This limitation to the skin and subcutaneous cellular tissue is very characteristic of fibrinous (diphtheritic) inflammations; so that on this account, as well as from the hard infiltration and necrosis of the tissue once infiltrated, I do not hesitate to consider carbuncle as a diphtheritic inflammation of the skin. . . . Kochman thinks that carbuncle as well as furuncle originally develops from a sweat gland or from several adjacent glands. J. Neumann distinguishes between carbuncles from sweat glands and from cellular tissue." In Neumann's book I find no such distinction.

In the *Nouveau Dictionnaire de Médecine et de Chirurgie* it is defined as an inflammation of the subcutaneous cellular tissue, with a tendency to mortification of the skin. The author believes that the affection begins ordinarily in the cellular tissue lying between the fascia and the skin. It differs only from a furuncle in the extent and depth of its inflammation. In Holmes's *System of Surgery* it is also described as attacking the subcutaneous tissue and involving the skin.

³ Gross. Ashurst. Thomas Smith (Holmes System). Korányi (von Pitha and Billroth). *Nouveau Dictionnaire*.

⁴ Billroth, Lectures on Surgical Pathology, American edition, page 283.

Mr. Ledwick¹ gives the following summary of views on the pathology of this affection: "There is much discrepancy of opinion in relation to the precise seat of this disease at its commencement. Rokitsansky² believes the affection has its origin in the deep layer of the corium, involving the areolar tissue deep layer of and subsequently extending to the subcutaneous structure. Brodie³ remarks that the disease may commence in the elongations of the cellular membrane. . . . Dupuytren⁴ believes that the dermoid prolongations of the areolar tissue, which become strangulated, are the peculiar localities of the disease, accounting thus for the cribriform suppuration of the skin and subsequent sloughing; whilst Hunter⁵ insists that its source is always tegumentary, and spreads to the cellular tissue. . . . Nélaton⁶ teaches that an anthrax is rather subcutaneous than cutaneous. I have not the least hesitation in affirming that the primary hardening is subcutaneous, spreading, as the disease advances, from the deep to the superficial surface of the skin, which ultimately participates in the gangrenous affection." Mr. Collis,⁷ writing on this point, says it is essentially an inflammation of the dense fascia in which the superficial areolar tissue is implicated, as in furuncle, and also the deep, as in phlegmonoid erysipelas.

Dupuytren appears to have had the most accurate knowledge of the anatomy of the part affected, and hence the clearest views as to the seat of the disease. He defines anthrax as an inflammation of several bundles of cellular tissue contained in the areolar spaces of the skin. These spaces are formed by the interlacing of bundles of fibrous tissue, and the cellular tissue contained in them is frequently filled with "fatty fluid." They have a cone shape, the base being at the lower border of the skin and resting on a layer of cellular tissue, the apex terminating in a number of little holes directed obliquely in the skin, — easily demonstrated in a specimen which has been macerated for some time. Anthrax consists, he thinks, in an inflammation of these bundles of cellular tissue, and is found where they are most perfectly developed.

A glance at the anatomy of that portion of the skin where carbuncle most frequently occurs, namely, that of the upper dorsal region, will serve to explain many of the striking peculiarities of this affection. In the first place, the skin is extremely thick; probably thicker than at any other portion of the body. It forms a solid mass of dense fibrous tissue, well calculated to sustain burdens or to protect a comparatively defenseless portion of the body. The great bulk of the cutis vera necessitates certain important modifications of contained and contiguous structures. The hair follicles, being those supporting downy hair only, and therefore shallow, project but a short distance into the uppermost layers of this mass of fibre; and there would be no communication with the subcutaneous adipose tissue were it not for oblique columns of fat which extend from below to their bases. These fat columns, or *columnæ adiposæ*, which I have described elsewhere,⁸ are found beneath each hair folli-

cle, are of about the same width, — perhaps a little broader, — and contain, besides loose connective tissue fat cells and vessels, the coil of a sweat gland suspended midway in the shaft. (Figure 1, e.) There are generally two horizontal branches to this cleft (*p*) in the skin, and I have already shown how an injection mass forced in from below may ramify through the whole thickness of the cutis, forming quite a delicate net-work, and marking out the anastomosing system of lymphatic channels. At the point where these columns open into the parts immediately below this dense sheet of cutis we find a broad band of fibrous tissue (*k*) given off from one side and extending down obliquely into the subcutaneous structures, to be attached finally (tendon like) to the fascia, beneath which lie the muscles. These fibrous bands interlace one another in various directions; are very different in character from the delicate "cellular tissue" underlying other portions of the skin, and form a dense net-work, which holds firmly in place the tough hide to which it is attached. (Figure 4.) In the interstices there is the usual loose connective tissue, which is largely occupied by fat cells. Dissecting students are familiar with the toughness of this subcutaneous layer, as also any surgeon who has once attacked a lipoma in this region with the vain hope that it was going to "shell out" easily (*g*). It will be observed that the alveoli formed in the mesh-work, although having a comparatively limited communication with the neighboring subcutaneous structures, have a tolerably direct, though narrow, medium of communication with the surface through the fat columns, which chimney like are placed directly above them. These columns are evidently none other than the "holes" alluded to by Dupuytren, who, so far as I am aware, is the only observer who has in any way suspected their existence.

The characteristic features of the carbuncular swelling are its broad, flat, indurated base, the cribriform surface of the skin, and the honey-combed appearance of the subsequent crater. These appearances I have had an opportunity of explaining by the microscopical examination of large sections of skin and subcutaneous tissue removed from the borders of several specimens of carbuncle.

The earliest changes seen at the extreme periphery are scattered collections of wandering cells in the subcutaneous adipose tissue, and as we approach the centre we find clusters of these cells in the *columnæ adiposæ*. These cells appear to follow some of the numerous natural channels of the tissue in their progress, probably the lymphatics. There is nowhere any well-defined boundary to the inflammatory tissue. As we proceed inwards the cells become more numerous, until the entire subcutaneous tissue is occupied by them; at this point the columns of the skin are already filled at their bases with the round cells, while a few rows of cells extend to the apex. When we come to the point where the columns are entirely filled with cells we begin to observe an infiltration of other portions of the skin, which are reached through the lateral horizontal clefts branching on either side from the columns midway from base to apex. (Figure 2.) In these clefts we usually see a blood-vessel, around which lie the cells in abundance; by finer subdivision of the clefts (*p*) the cells penetrate interstices of the fibrous tissue both upward and downward, until the whole of the deeper portions of cutis vera is completely infil-

¹ Dublin Quarterly Journal, vol. xxii. p. 403.

² Rokitsansky, Pathological Anatomy, vol. iii. p. 85.

³ Brodie's Lectures on Pathology, page 392.

⁴ Dupuytren, Clinique chirurgicale, t. iv. p. 111.

⁵ Hunter on Inflammation, page 372.

⁶ Nélaton's Clinical Surgery, page 36.

⁷ Dublin Quarterly Journal, vol. xlvii. p. 76.

⁸ Boston Medical and Surgical Journal, April 19, 1877.

trated (*m*). A thin, superficial layer still remains intact.¹ Meanwhile the inflammatory cells, having reached the apex of the column, are brought to a momentary halt, but soon find their way to the superjacent papillæ around the edges of the hair follicles and along the borders of the erector pili muscle. By this time the column has been much distended and elongated, the whole cutis having become swollen. The adipose tissue has entirely disappeared, (*m*) and later also the hair follicle and muscle, all that is left being the hair shaft, which is now seen projecting and forming a prominent pustule. It is at this point, therefore, that the pus first appears upon the surface. (Figure 2, *h*; Figure 4, *h, m*.)

At this stage of development of the carbuncle the papillæ of the skin covering the tumor present appearances which deserve special attention. (Figure 3.) At those points where cell infiltration is most abundant a change of shape is occasionally noticed, the upper part of the cone becoming greatly distended, so that the narrowest portion of the papilla is its base, the cone being converted into a balloon-shaped figure (*l*). A more minute observation shows that papillæ thus affected contain a number of wandering cells, and that the meshes of their loose tissue are distended with fluid; they have the appearance of being oedematous. The adjacent layers of the rete mucosum are greatly compressed by this swelling, and in some instances the interjacent projections of the deep layers of the rete are nearly obliterated, several neighboring papillæ thus becoming united to form a single large one. Usually, however, we find that the number of cell elements in the papillæ gradually increase, until it becomes packed solid with small round cells, which obscure all other structures. The blood-vessels, if seen, are filled with red blood corpuscles, which are also found at times in considerable numbers in other parts of the papilla. At this stage we find that the fundus of the polypoid structure presents itself above the level of the surface, the epidermis forming but a thin layer above, or being represented by a few adherent crusts and scales. The final stage in the development of this series of changes is an actual giving way of the epidermal covering, and an escape of the contents of the papilla. Should the epidermal covering continue firm the contents of the papilla undergo retrograde changes, and we find, in fact, many containing a shrunken mass of detritus, the anatomical structures of the part having been completely destroyed. In short, we have here an example of the mode of development of the minuter form of pustule which is found scattered in such profusion over the surface of the carbuncle. The cutis beneath these pustules is unusually well supplied with wandering cells, and in specimens treated with picrocarmine we find also most perfect examples of the division of the fixed or the epithelial cells of the connective tissue. (Figure 3, *f*.) Indeed, in no other tissue can the various stages of the inflammatory changes of connective tissue be studied to better advantage. So far as I am aware no such description of the development of certain forms of pustules has ever been given, but the appearances described are too constant and correspond too accurately with the pustules seen on the surface of the specimens examined to admit of other interpretation. In the ordinary acceptance of the term, it

may be objected that these collections of pus in the papillæ should be regarded as genuine pustules, as they are not the result of a purely isolated and local process, but are merely the terminal points at which pus makes its escape from the skin through which it has forced its way from below, as in the case of the channels already described. That many so-called pustules in other localities may, however, be formed in this way will be a point for future investigations to determine.

Finally, as the inflammatory process continues, the spaces between the bundles of fibres of the cutis are much enlarged, and the fibres themselves seem to be partially absorbed; the tissue becomes so brittle that it crumbles readily under the razor. By this time the plug of cells occupying the column has softened to a semi-fluid mass, and is retained in place only by a thin layer of cuticle, which still forms a covering to what has now become a large pustule. (Figure 4, *h, m*.) In the subcutaneous tissue the cell infiltration has spread from one alveolar space to another, while the tendon-like bands of fibrous tissue appear to be but slightly affected (*m*); in fact, the cells do not penetrate them at all, but when the surrounding parts are melted into pus they form the undetached masses of sloughing tissue which hold down at first the integument, and favor spreading in a lateral direction, and at a later stage give to the crater its honey-combed appearance.

In specimens of carbuncle of the lip sections taken from various portions showed the same tendency to a diffused cell infiltration of the structures.

The papillæ in this case also are worthy of notice, although naturally diverse in shape and size, and crowded between large hair follicles, their alteration by the inflammatory process is evident. In some cases the papillæ are distended by a mass of small round cells, and where this cell infiltration is most marked we find extensive ecchymoses at the apices of the papillæ, showing that considerable disorganization of the tissue at that point has taken place.

In the light of these observations it seems unavoidable to abandon the old view that a carbuncular inflammation is one originating or developing itself in a number of adjacent foci, and to conclude that we have a more or less rapidly spreading phlegmonous inflammation of the subcutaneous cellular tissue, we might say a *purulent infiltration*, the characteristic appearances being produced by the anatomical peculiarities of the part affected. In confirmation of this view, attention may be called to the fact that the more distantly removed from the region where the structures described exist in their most highly developed form, the less typical is the appearance of the disease. When seated upon the anterior aspect of the body there is little to remind one of its striking characteristic. On the other hand, when an abscess, that is, a circumscribed collection of pus, forms in the dorsal region, a protective barrier of cells is thrown around the accumulating pus, there is no infiltration of the tissue, and the pus reaches the surface by pressure upon the superjacent integument, which, softened by inflammatory changes, melts slowly away before it. There is in such a case no injection of certain structures with pus, as in carbuncle, and the characteristic appearances of the latter affection fail to show themselves. The cribriform appearance is also not typically developed where the skin is thin and the columns do not exist, as in carbuncle of the lip. The pus then leaks through, so to speak, only at one or

¹ In making injections of Prussian blue by pressure from below against the under surface of a portion of normal skin, I found great difficulty in forcing the mass into the upper fourth of the cutis, although the injection ran well below.

more accidentally less-resisting spots, taking as a route one of the lymph spaces of the cutis, and reaching the surface through a papilla.

HABITUAL DRUNKENNESS.¹

BY THEODORE W. FISHER, M. D. HARV.

THE preceding cases are sufficient to show the chief characteristics of the class of habitual drunkards with which I have to deal. It has been the custom for twenty years, at least, to send selected cases of this class to insane hospitals in this State. The McLean Asylum, being a corporate institution, has usually declined to admit them. The trustees of state hospitals, while recognizing the annoyance their presence causes among more manifestly insane patients, in various ways, have always received and attempted to retain them long enough to effect an improvement, if not a cure. Individual trustees of most of the hospitals, Danvers included, have frequently requested the commitment of habitual inebriates in whom they had some personal or humane interest. The trustees of the Danvers Hospital have, however, recently asked the committing authorities not to recommit certain cases of habitual periodical and dangerous drunkards to that asylum. The claim is not made that these cases were not insane when committed. If the state hospitals should all be closed to this class of patients, a certain risk to the public safety would result, since cases of mania from drink could not be brought into court on a charge of drunkenness. No delirious or temporarily insane person is in condition to plead to an indictment. Delirium tremens being a self-limited disease of a few days' duration, and capable of exact diagnosis, persons having it can be safely sent to Deer Island or Tewksbury for treatment. Mania from drink, on the contrary, is of indefinite duration, and, the diagnosis being more difficult, some judicial process is desirable before commitment.

The State Board of Health, Lunacy, and Charity, last summer, issued blank forms to physicians throughout the State, requesting information on the hereditary influence of the use of alcohol. I am informed that the replies have been few and unsatisfactory; partly from negligence, no doubt, and partly from the lack of complete family histories. The form of the questions requires numerical answers in most instances, and classification of cases as excessive, occasional, periodical, or habitual drinkers. A person may have been each in turn, and doubt would naturally arise as to his proper place in the catalogue. The periodical drunkard is, by the terms of the circular, alone considered insane, while most authorities on the subject regard dipsomania as acute, periodical, or chronic, and insanity may coexist with any form of habitual drunkenness. To avoid the difficulty of tabulating cases, I sent brief statements of the essential facts in as many cases as were sufficiently complete to be of any value, and I would suggest to other physicians to do the same, and hereafter to make such full inquiries in all cases as the circular calls for.

My observation shows that certain defects occur in the descendants of habitual drunkards with greater or less frequency. These are: (1.) All the forms of drunkenness enumerated. (2.) Nearly all the known

forms of insanity. (3.) All degrees of congenital mental weakness from slight moral deficiency to complete idiocy. (4.) Various forms of nervous disorder, such as epilepsy, hysteria, chorea. (5.) Certain bodily defects, as blindness, deaf-mutism, scrofula, and phthisis. The comparative frequency with which these diseases are preceded by ancestral inebriety is important, but not easy to determine, as well as the occurrence of defects in the descendants of drunkards. The questions of the State Board were intended to bring out the negative as well as the positive evidence, and to show how many such descendants escape. The constitutional diseases and defects of body and mind in children which so often succeed drunkenness in parents, in the experience of many physicians, naturally go a long way to convince them of a direct causal relation.

Other questions of the circular related to the origin of drunkenness itself. In how many cases was it hereditary? In how many due to moderate drinking, to wine on the table, to physicians' prescriptions, to the use of beer, or to grief and depression or excitement? The latter question is especially important, going as it does to the root of the matter in many cases. So intimate is the relation between inebriety and mental depression that periodical cases sometimes appear to consist in a genuine *folie circulaire* exhilaration, excitement, and indulgence in drink, with maniacal symptoms as a result; being followed by depression and exhaustion, with an interval of sobriety, and after a brief period of irritability by mania, depression and sobriety again. It is certain that grief and depression are often direct causes of an attack of drinking. Insanity of a melancholic type is sometimes met with in the immediate ancestry or among brothers and sisters of an inebriate, suggesting strongly a common origin of the habit and the disease in an inherited neurotic constitution.

I will give with some detail one more case, interesting from a medico-legal point of view. A suit was brought two years ago in the Massachusetts Supreme Court by Jason L. Blodgett against his divorced wife, Major Jones, now on the Board of Police Commissioners of Boston, and Drs. Fisher and Youngman, for a conspiracy to imprison him in the Taunton Lunatic Hospital on the false charge of insanity; also for assault and battery in causing his arrest; and for taking his property, ruining his business, and causing great damage to his reputation and feelings; for all of which damages to the extent of \$15,000 were claimed. His legal adviser at first was William H. Towne, who afterwards called to his assistance Edward Avery. The defendants were represented by Edward P. Brown. At the first trial the plaintiff's petition was dismissed for informality and illegal contents. Major Jones was excused, as having had nothing to do with the particular commitment complained of, the plaintiff having been sent to Taunton twice; and Mrs. Blodgett, having been his wife at the time of the alleged offense, could not be proceeded against. This left the two physicians standing alone; and, after six months, the case was called again, unexpectedly, at the close of the summer vacation, when police officers, who were important witnesses, were absent. The wife, whose testimony was almost absolutely essential to the defense, had hidden herself from her divorced husband in the far West, and could not be compelled to attend or obtained as a witness without great expense. The plain-

¹ Concluded from vol. ciii., page 636.